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DRUGS AND DRIVING
A Selected Bibliography

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Final Report

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16. Abstract

This report presents a selected bibliography on drugs (other than alcohol alone) and driving. Appendices contain a Topical Index, a Title Index, an Author Index, and Abstracts of over 600 articles. Scientific, technical and selected general literature dealing with the effects of drugs on driving behavior are included. Literature that presents drug effects on behavior related to driving is also included. Materials that present legal constraints on drug/driving research and countermeasure programs are listed.

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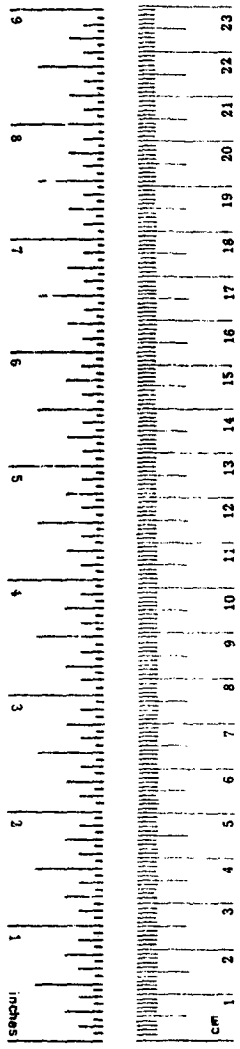
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

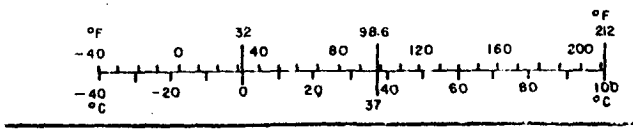
Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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Kent B. Joscelyn, J.D.
Principal Investigator

Roger P. Maickel, Ph.D.
Principal Investigator

DRUGS AND DRIVING
A SELECTED BIBLIOGRAPHY

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1.0 INTRODUCTION

This report presents a selected bibliography of literature dealing with the relationship between drug use (other than alcohol alone) and highway safety.

The report is the product of a literature search conducted under the sponsorship of the U.S. Department of Transportation, National Highway Traffic Safety Administration, as a part of the efforts under contract DOT-HS-4-00994. The period of performance for the contract was from June 1974 to October 1975. Formal literature search activity ceased on April 30, 1975.

This report presents selections from the recent literature that are believed to be of interest to the research and highway safety community. No representation of scientific validity of all the materials included is made by the principal investigators. The decision to include selections was made on the basis of apparent relevance.

1.1 Background

Indiana University received a contract in June of 1974 from the National Highway Traffic Safety Administration to review current problems associated with the use and abuse of drugs (other than alcohol alone) and driving.

The central objectives of the study may be summarized as follows:

1. Ascertain and document on the basis of existing research literature the relationship between drugs (other than alcohol alone) and highway safety.

2. Ascertain the "state of the art" of research in the area of drugs and highway safety.

3. Define areas of the drug/driver problem that require further research and suggest, insofar as present knowledge permits, possible drug/driving countermeasures that can be implemented in the immediate future.

In order to achieve these objectives a basic research plan was developed. The major steps in this research effort were to:

1. Conduct an initial literature search to identify

published studies dealing with the drug/driver problem.

2. Circulate the initial bibliography among known researchers to develop additional published and non-published sources.

3. Conduct an international symposium of leading researchers to identify the state of current knowledge and to develop directions for future action.

4. Collate and synthesize the information obtained from the literature search and the symposium and through an analytical process develop a series of reports including:

   - A Symposium Report
   - A Selected Bibliography
   - A Detailed Technical Report
   - A Summary Report

1.2 Report Organization

This report consists of a series of introductory sections and a set of appendices that organize and present reference materials on drugs and driving.

Section 2.0 describes the technical approach used in the collation of the bibliography. General comments on the limitations inherent in the search methods used are presented. General comments on the limitations of the literature including common methodological problems are also made.

Section 3.0 describes the organization of the bibliographic materials in the appendices and provides instructions for their use.

2.0 TECHNICAL APPROACH

A specific task of the study was to assemble a Research Report File for the National Highway Traffic Safety Administration of current literature dealing with drugs (other than alcohol) and highway safety. In addition to the basic report file, indices were also developed.

A scientific examination of the problem might have limited the literature search to the archival literature, ignoring non-refereed articles or technical reports, as well as summary articles that appear in the non-technical literature. NHTSA must respond to requests for information and be prepared to comment on a wide range of literature sources. Accordingly, the literature search included the examination of source documents that would not be normally considered in a purely scientific review.

This bibliography has been developed from the materials assembled from the Research Report File and in a like manner includes materials from the general literature as well as the archival literature. Thus, caution must be exercised in using the bibliographic references. The user must consult the original article and reach an independent conclusion of validity.

A number of standard search methods were used to develop the reference list. The following sections briefly describe the search methods used.

2.1 Literature Search Methods

2.1.1 Manual Search

A manual search is perhaps the most familiar method of conducting a literature search. In this case it involved the selection of a list of journals, author indices, abstract services, and bibliographies; the indices of these were then searched for material.

There are weaknesses inherent in this approach. First, it is impossible to search every possible publication so that initial decisions on the indices to be used are likely to bias the results.

Second, the indices may be misleading. It is common to find incomplete subject indices, incorrect abstracts, and other omissions. The indices also reflect the compilers' biases.

Third, the individual searcher may inject personal bias through interpretation of a title or subject entry.

Each of these conditions is likely to result in the omission of relevant material. The principal investigators have been sensitive to this problem but believe it probable that the manual search process has resulted in some omissions.

2.1.2 Computer-Assisted Searching

The modern trend of relying on computers has led to the development of a number of computer based information retrieval systems. Several were used in the literature search. Included were the following systems:

- SciSearch (Institute for Scientific Information)
- BIOSIS (Biosciences Information Service of Biological Abstracts)
- CBAC (Chemical Abstracts Service)
- SUNY-MEDLARS (State University of New York-National Library of Medicine)

In addition to these services which were directly available to the research staff, separate searches were completed using other computer-based systems for the project.

NHTSA personnel accessed several computer-based information systems that contain abstracts of the highway safety literature. Included was the TRIS (Transportation Research Information Service) of the Transportation Research Board, National Academy of Sciences. Other search systems accessed the international literature.

Personnel of the Indiana University Aerospace Research Applications Center (ARAC) conducted a search of information systems developed under NASA sponsorship. This search covered some 10,000 technical journals and the unclassified reports of the federal government listed by the Defense Documentation Center and the National Technical Information Service.

The use of computer-based search and retrieval systems produced a large quantity of material (in excess of 10,000 citations). The ability to obtain an information output was dependent upon the accurate selection of key words or topic indicators. Every effort was made to maximize output by using broad search keys. Documents that were found to be relevant were examined to determine the key words used to index such documents. Additional searches were made using any newly identified key words.

Despite such efforts it must be expected that some literature has been overlooked.

2.1.3 Supporting Searches

Significant contributions to the search efforts were made by individuals and organizations that searched private collections to identify relevant materials. Such supportive searches were performed by the following individuals or organizations:

- NHTSA Reference Library, Washington, D.C.
- Addiction Research Foundation, Toronto, Canada
- National Safety Council, Chicago, Illinois
- Highway Safety Research Institute, University of Michigan, Ann Arbor, Michigan
- Gerald Milner, M.D., Melbourne, Australia
- James Nichols, Ph.D., NHTSA, Washington, D.C.

2.2 Limitations on Literature Search

The principal investigators wish to note certain limitations that apply to this bibliography. In prior sections the probable omission of relevant materials because of inherent problems in the search methods has been noted. It is also likely that coverage of material published or issued within the last two years (since 1973) is incomplete.

The publication process is a lengthy one in most cases. It is common to see work reported that has been completed several years previously. The indexing and dissemination of abstracts on published work or the entry of materials into computer systems takes even longer as it must follow the initial publication. Delays of two or more years have been noted.

The problems noted previously are increased when materials published in a language other than English are considered. Translations of titles and abstracts are often inaccurate or uninformative. It is often difficult to obtain articles that have been published in foreign journals of limited circulation. In a number of cases articles could not be obtained at reasonable cost and were omitted from the collection.

A final limitation must be noted and that is the personal biases of the principal investigators. The body of

literature identified was massive. In excess of 10,000 titles were examined. Over 2,500 articles and reports were reviewed for relevance. The over 600 citations included within this bibliography represent a judgmental selection. In many cases the decision to include or exclude a selection was a very close one.

The reader should be careful to recognize that this selection does not represent an inclusive list of the literature. It is believed, however, that the citations present a useful information base and form a valuable research collection.

2.3 Limitations of the Literature

The prior sections dealt with limitations of the methods used to develop the bibliography. This section presents some comments on the quality of the material included.

In preparing any bibliography it is essential to realize that the onus of evaluation must be placed either on the collector or the user - no halfway position is realistic. The objectives of this project and the funding level required that the onus for evaluation of the material be placed on the user.

In the course of collection and use of the literature for other aspects of the study, significant limitations of the literature base have been noted. These are presented to assist the user in evaluating the selections contained within this bibliography.

2.3.1 Source Limitations

As previously noted, the bibliography contains selections from a wide range of sources. In general, the published archival literature is usually viewed as factually accurate and reliable. Confidence in such literature is enhanced because it has been subjected to a significant level of peer review as a part of the editorial process. Data presentation, experimental design and methodological accuracy are presumed to have been reviewed by independent authorities. Statements made or conclusions drawn in the discussion sections are usually those of the authors and are subject to personal bias. In reviewing the archival literature one usually accepts only the data at face value; conclusions may be premature or not fully supported.

Articles on drugs and driving appear in a wide range

of archival publications. Some are highly reputable publications with rigorous review procedures while others are far less rigorous.

Even in those journals which enjoy a reputation for rigor in their review process, some papers of questionable validity have been noted. This occurs most commonly when a technical article is published in a journal that does not usually publish articles dealing with that specific area. Thus, one finds papers that probably would not have been accepted in a scientific or medical journal because of subtle methodological problems, published in the more general highway safety literature. Similar problems are created when technical issues are treated in a summary manner for a lay audience. Simplification tends to create error or lead to misunderstanding. The archival literature presents the best information on drugs and driving but must be viewed with more skepticism than one would view a similar body of archival literature in a single disciplinary area.

Even the archival literature may suffer in the process of translation. This is particularly true when English abstracts are produced for non-English articles. Careful examination of the article in the original language may reveal significant errors in the abstract or summary. The user should make every effort to consult the original source.

The bibliography includes a number of selections that are technical reports published by government agencies, commercial organizations, private research foundations, and universities. These must be examined very carefully since they represent, for the most part, literature that has not been subjected to any peer review process. Many of these reports meet the standards of the research community but a significant number do not. In addition to methodological problems, there are often a number of production errors that are usually eliminated in more formal editorial review processes. Frequently, summaries of the technical reports and abstracts are prepared by non-technical personnel who have not participated in the project. Significant error can be introduced in this manner. Caution should be exercised in using this body of literature and an independent assessment of methodology should always be made.

The bibliography also includes selections from the popular literature. The subject of drugs and driving is of such high interest that a great deal of material has appeared in the general literature and has then been cited or quoted in other more technical literature. To meet the objectives

of the project it has been necessary to include selections from the poupular literature. The user has been cautioned about the archival and technical literature. The popular literature should be approached with even more caution and in general should be used only for background information.

Even "factual" articles in the popular literature are replete with omissions, distortions, emphases of limited aspects of a problem, and oversimplification. The popular literature on drugs and driving has many of the characteristics of the popular literature on the general topic of drugs and society. Many writers approach the topic with an emotional bias and utter polemics designed to sway an audience to a particular viewpoint.

Review articles may be found in the archival, technical and popular literature. The general cautions cited previously must be considered along with several other points. Review articles generally reflect the interests and conclusions of the writer. In some instances the review presents an interpretation of data from other sources. Such interpretations are often inaccurate or misleading. In general, review articles should be treated as a collection of references presented with the conclusions of the reviewer. The secondary or tertiary citations encountered in reviews of reviews present particular problems as errors of interpretation are perpetuated in the literature. This is most frustrating for a researcher because an experimental study may be misinterpreted, and the misinterpretation carried on in subsequent reviews. Whenever possible, original sources should be examined.

2.3.2 Methodological Problems

The examination of the problem of drugs and highway safety is a very complex and expensive endeavor. In the past, funds have not been allocated at any significant level to support comprehensive research efforts. Thus, the literature consists primarily of limited studies that often present methodological problems. In the same way that some of the more common problems associated with the literature sources were discussed in the previous section, this section highlights methodological issues as a caution for the user of the bibliography. It is not our intention to present an exhaustive treatment of such issues.

The limited nature of existing research immediately raises experimental design questions. Frequently, studies

involve very few subjects. Such subjects often represent a sample of convenience. Thus, one finds experimental studies using healthy young college students or epidemiological studies using only fatal accidents. In either case, serious questions can be raised about the sufficiency or representativeness of the sample.

Even if adequate sampling has occurred, other problems associated with analytical measurement of agent presence raise methodological issues. Some epidemiological studies that have reported negative findings have used analytical methods that would not have detected the most probable levels of those drugs believed to present a problem. Equal difficulty exists with studies that report drug presence in biological materials, as adequate information correlating drug presence with driver impairment does not exist for many drugs. Thus, the significance of some results is not known.

Other studies have examined the effects of various drugs using various behavioral tests. There is little evidence providing correlations between test performance and driver performance. Gross impairment, as in the case where the subject loses consciousness, may be relevant but is unlikely to be encountered in the real world.

Frequently, experimental studies utilizing behavioral tests have failed to document drug levels through concurrent analytical testing. Thus, dose response information is incomplete and may lead to misleading or incorrect conclusions.

As might be expected, other more common research problems, such as the case of double blind studies that turn out to not be double blind because of inadequate procedures, are also encountered. Some unexpected problems such as placebos that turn out not to be placebos because they contain psychoactive agents are more unique to the drug/driving research area.

In general, the research literature must be approached with great caution. Methodologically adequate research is extremely expensive. The lack of adequate funding has forced even the most conscientious researchers to accept less than desirable experimental designs. The results can best be viewed as indicators rather than proof.

3.0 USE OF THE SELECTED BIBLIOGRAPHY

The bibliography is presented in the four appendices that follow. These appendices are:

- Appendix A - Topical Index
- Appendix B - Title Index
- Appendix C - Author Index
- Appendix D - Abstract Index

The primary content material appears in Appendix D, the abstract index. Abstracts of the selections are presented by accession number. The accession number was developed for use in conjunction with the Research Report File discussed earlier. The accession number consists of letter-number combinations. A sample number appears below.

IU-64-D0023

The first two letters (IU) signify that the selection was placed in the file by Indiana University researchers. Other designators will be used in the future by other contributors. All selections in this bibliography are from the Indiana University effort and are prefaced by IU.

The second two numbers (64) indicate the year of publication of the selection (1964).

The letter preceding the last number set classifies the selection by category. Categories used for this bibliography are as follows:

- A Bibliographies
- B Books dealing with the topic of drugs/driving
- D Articles, papers and other selections dealing with drugs/driving
- L Materials dealing with legal issues associated with drug/driving research and countermeasures

The last four digits simply represent the sequential assignment of documents to a category. Appendix D lists the document abstracts by category and sequentially by number within category. Other appendices list the category letter and number to allow cross reference to Appendix D. For example, the abstract of document IU-64-D0023 would be listed for cross reference in an appendix simply as D0023.

The following sections describe each index in more detail and provide suggestions for their use.

3.1 Topical Index

A topical index has been developed to assist the reader in using the selected bibliography. Several decisions were made in the construction of the index that should be understood by the user to avoid confusion and error.

First, the index is not inclusive. Not every document included within the bibliography has been listed in the topical index. As previously noted, a number of selections are from the popular literature. Others do not present original data nor can they be classified as a review in any comprehensive sense. It is believed that the major works in each category have been identified. It is suggested that a user who wishes to completely pursue a particular issue scan the title, author and abstract indices for additional material.

Second, the index headings are not mutually exclusive. Documents are listed under several headings when appropriate.

The organization of the topical index is presented in outline form in the first pages of Appendix A. Documents are identified within each portion of the topical index by accession number. The abstract of the document referenced may be found by consulting Appendix D, the abstract index.

3.2 Title Index

Appendix B presents a list of the titles of all selections in alphabetical order (by title). Titles as originally published have been used. Foreign language titles are followed by an English translation in most cases.

Associated with each title is the accession number. The center two numbers indicate the year of publication. The abstract of the document may be found by referring to Appendix D.

3.3 Author Index

Appendix C presents a list of all authors in alphabetical order. Publications of each author are listed following the name by accession number. Abstracts of the referenced publications may be found by consulting Appendix D.

All authors are listed regardless of their order of appearance on the original publication.

3.4 Abstract Index

Appendix D presents a list of abstracts by accession number. Whenever possible, author-prepared abstracts were used. Abstracts prepared by indexing or bibliographic services were used when author abstracts were not available. Every effort was made to avoid alteration of abstracts that presently appear in the literature to avoid future confusion. Abstracts were prepared for articles for which abstracts were not available. NHTSA format guidelines were followed for the preparation of these abstracts.

In some cases the author's abstract was either too long or insufficiently detailed. New abstracts were prepared which included the author's material to the maximum extent possible.

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APPENDIX A

TOPICAL INDEX

TOPICAL INDEX USAGE GUIDE

1.0 REVIEWS

Documents that review relevant literature are presented in this section. Studies have been included that represent major critical examinations of the research literature as well as selections by well known authors or organizations that are frequently cited by other writers.

1.1 Drug/Driving Reviews

This section includes reviews that are directly concerned with drugs and driving.

1.2 Selected Reviews

Documents that review topics closely allied to the issues associated with drugs and driving are listed. The subject of each review is indicated.

2.0 EPIDEMIOLOGICAL STUDIES

Documents that report epidemiological studies are included within this section.

2.1 Drug/Driving Studies

Studies concerned with the incidence of drug presence in accident-involved drivers and in the general driver population are listed.

2.2 Selected Studies

Epidemiological studies not directly dealing with drugs and driving but which are closely allied to the study of

drug/driving issues are listed. The subject matter of each selection is indicated.

3.0 DRIVING TASK STUDIES

Reports of original investigations examining the influence of drugs or other chemical agents on behavior, performance and skills that are used in the driving task are presented. The experimental methods used in these studies involve the use of vehicles or simulators for measurement of drug effects.

3.1 Open Road Tests

3.2 Closed Course Tests

3.3 Simulator Tests

4.0 EXPERIMENTAL STUDIES

4.1 Animal

Investigations that report drug effects on animal behavior or psychomotor impairment and in which the author suggests similar human responses that are driving task-related are listed. In vitro studies included within this section are designated by an asterisk.

4.2 Human

Investigations that report drug effects on human behavior that appear related to driver behavior are listed.

4.2.1 Single Drug Studies

Studies which examine the influences of a single drug are included within this section. Usually the experimental designs use only a single drug. Some studies that use more than a single drug are listed herein if the design allows examination of individual drug effects.

4.2.1.1 Analogue Studies

Studies that examine drugs in the same therapeutic class with similar chemical studies are listed. A study examining sedative/hypnotic drugs with barbiturate chemical structures would be included. An investigation of sedative/hypnotic drugs with disparate structures would not be included in this section but would be listed in other sections.

4.2.1.2 Acute Dosage Studies

Investigations which utilize an experimental design providing for the administration of an acute dosage of a drug or chemical are listed. This is a common experimental approach.

4.2.1.3 Chronic Dosage Studies

Investigations in which the subjects are administered a chronic dose(s) of a drug or chemical agent are listed.

4.2.1.4 Dose-Response Studies

Investigations which examine subject responses to systematically varied dose levels to develop a composite

picture of the relationships between dose level and subject response are included in this section.

4.2.1.5 General

Investigations of single drug effects not appropriately included in prior sections are listed.

4.2.2 Multiple Drug Studies

Investigations that report the examination of two or more drugs in a comparative fashion are listed under the subsections of this category.

4.2.2.1 Synergism, Potentiation and Additive Effects

Studies investigating the possible synergistic, potentiating or additive interaction of one drug on effects of another drug are listed. The studies which tested for, but did not detect, these phenomena are indicated by an asterisk.

4.2.2.2 Drug Antagonism Studies

Studies reporting the investigation of possible antagonistic interactions of one drug to another are included. Studies that report no findings of antagonism are indicated by an asterisk.

4.2.2.3 Cross Tolerance Studies

Studies which examine an alteration in an individual's reaction to one drug due to the presence of another drug are listed.

4.2.2.4 General

Multiple drug studies that do not fall specifically within the categories above are listed in this section.

4.3 Psychomotor Testing

Studies that have used and described (at least minimally) specific tests to evaluate drug effects on psychomotor behavior are included in this section. Studies that utilize simulators are listed separately in 3.3 and are not included in this section.

4.4 Drug Detection and Measurement Procedures

Reports of studies describing analytical methods for the detection and measurement of drug and chemical levels in biological materials are listed.

4.5 Aviation Studies

A significant body of scientific literature relevant to examination of drug/driving issues includes studies of drug effects on human behavior in an aviation setting. Such studies are listed in this section.

4.6 Patient Studies

Investigations that utilize subjects who are receiving drugs as therapeutically indicated are listed.

5.0 SOCIOLEGAL STUDIES

Research and countermeasure programs dealing with drugs

and driving are subject to critical legal and ethical constraints. Documents dealing with such issues have been grouped under the following topical headings.

5.1 Experimentation with Human Subjects

5.2 Informed Consent

5.3 Researcher Privilege

5.4 Right of Privacy and Confidentiality

6.0 DRUG AND CHEMICAL LIST

This section lists experimental studies by the drug or chemical agents involved in the particular study. Studies have not been listed which merely refer to a drug or its effects in an indirect or anecdotal manner. The objective is to provide a list of primary sources on particular drugs and their effects related to driving behavior. For convenience the listing has been divided into two major categories.

6.1 Generic and Chemical Nomenclature List

Drugs and chemicals identified in experimental studies have been placed in alphabetical order by generic name. Other standardized equivalent names or information follows the generic name in brackets. This information is followed by the trade name in parenthesis when it could be identified. The studies involving the agent are listed by accession

number after each identified drug or chemical. Chemical agents not commonly used as drugs are identified by standardized chemical nomenclature as outlined in the Merck Index (8th edition, 1968).

6.2 Trade® Name or other Identifying Name

This section lists drugs by trade names and then identifies the accession number of studies examining the drugs' effects. Included are drugs that have multiple active components, drugs that could not be identified by generic name (usually drugs reported in foreign publications) and experimental drugs.

In each case the trade or identifying name is listed first followed by explanatory information in brackets. The individual chemical components, when known, follow this listing in parenthesis. Studies examining the drugs are listed by accession number.

7.0 CLASSIFICATION OF DRUGS BY USE

An additional classification scheme has been developed to aid the user in extracting information from the bibliography. The drugs and chemicals identified in the experimental studies have been classified by main therapeutic actions. The classification system is patterned on that used by Physicians Desk Reference (PDR). This standard

reference is widely available within the research and medical community. Drugs are primarily listed by generic name within each therapeutic class. Trade names are used if the generic name is unknown or if the agent has multiple components.

Some drugs and chemicals do not have common therapeutic usages as in the case of LSD and carbon monoxide. Appropriate categories have been developed to list such drugs or chemicals.

This listing is designed to assist a user who wishes to obtain an indication of what the therapeutic use of a particular drug identified within the bibliography would be. Further, a user interested in a particular class of drugs (e.g. antihistamines) can quickly determine the drugs within that class reported on in the documents referenced in the bibliography.

After identifying the drugs of interest the user can refer to section 6.1 or 6.2 of the Topical Index to determine the accession numbers of the studies and then refer to Appendix D to obtain the abstracts of the studies.

TOPICAL INDEX

1.0 REVIEWS

1.1 Drug/Driving Reviews

B0001, D0001, D0002, D0004, D0007, D0008, D0035, D0040, D0041, D0046, D0055, D0097, D0129, D0167, D0185, D0191, D0202, D0231, D0238, D0239, D0244, D0260, D0268, D0280, D0288, D0315, D0342, D0346, D0374, D0391, D0420, D0424, D0491

1.2 Selected Reviews

D0128	(Carbon Monoxide Effects)
D0136	(Dangerous Drug Use in the U.S.A.)
D0163	(A.M.A. Physicians Guide for Determining Driver Limitation)
D0179	(Psychotherapeutic Drugs in Clinical Use)
D0229, D0230	(Diabetes Mellitus and Drivers License)
D0299	(Performance Under the Influence of Different Antihistamines)
D0303	(Anesthetic Narcosis in Out-Patients)
D0305	(Side-Effects of Modern Antihypertensives in Clinical Use)
D0335	(W.H.O. Detection of Drugs in Body Fluids)
D0343	(Chronic Marijuana Use Effects on Sleep and Perceptual-Motor Performance)
D0357	(Medical Review of Marijuana)
D0362	(Misuse of Therapeutic Agents)
D0366	(Night Road Illumination Vision Levels)
D0449	(History of British Drinking-Driving Legislation)
D0455	(Psychotherapeutic Drug Complications)

2.0 EPIDEMIOLOGICAL STUDIES

2.1 Drug/Driving Studies

D0029, D0034, D0038, D0042, D0043, D0044, D0045, D0056, D0065, D0068, D0112, D0113, D0117, D0134, D0143, D0261, D0278, D0290, D0293, D0300, D0328, D0332, D0339, D0355, D0356, D0376, D0379, D0380, D0384, D0385, D0407, D0408, D0410, D0412, D0426, D0429, D0430, D0436, D0444, D0450, D0463, D0486, D0499, D0501, D0508, D0518, D0519, D0526

2.2 Selected Studies

D0319, D0322 (Aviation Accident Survey)
D0333 (Incidence of Chronic Medical Conditions in California Traffic Accidents)
D0336 (Analysis of Alcohol, Drugs, and Medical Impairment Involvement in Non-highway Injury Fatalities)
D0354 (Human Factors Analysis of Most Responsible Drivers in Fatal Accidents)
D0368 (Survey of the Physical Condition of Accident Involved Commercial Drivers in 1971)

3.0 DRIVING TASK STUDIES

3.1 Open Road Tests

D0119, D0127, D0142, D0396, D0483

3.2 Closed Course Tests

D0079, D0105, D0127, D0142, D0376, D0409, D0435, D0438, D0451, D0459, D0468, D0469, D0472, D0478, D0481

3.3 Simulator Tests

D0014, D0033, D0037, D0039, D0047, D0080, D0093, D0096, D0106, D0109, D0130, D0147, D0150, D0160, D0181, D0184, D0194, D0247, D0251, D0252, D0256, D0291, D0294, D0295, D0296, D0297, D0298, D0313, D0325, D0326 (Flying Simulator), D0329, D0330, D0331, D0341, D0349, D0363, D0364, D0373, D0421, D0434, D0453, D0459, D0465, D0469, D0503

4.0 EXPERIMENTAL STUDIES

4.1 Animal

D0081*, D0085, D0087, D0131, D0208*, D0222

4.2 Human

4.2.1 Single Drug Studies

4.2.1.1 Analogue Studies

D0012, D0061, D0130, D0133, D0146, D0162, D0184, D0186, D0209, D0225, D0226, D0364, D0395, D0505, D0507

4.2.1.2 Acute Dosage Studies

D0009, D0015, D0016, D0022, D0025, D0026, D0032, D0033, D0037, D0039, D0050, D0051, D0053, D0059, D0061, D0062, D0063, D0067, D0069, D0078, D0079, D0080, D0082, D0086, D0088, D0089, D0090, D0091, D0092, D0093, D0095, D0096, D0101, D0102, D0106, D0107, D0108, D0110, D0111, D0114, D0115, D0116, D0119, D0120, D0125, D0130, D0133, D0139 D0142, D0147, D0150, D0156, D0157, D0158, D0160, D0161, D0164, D0168, D0171, D0172, D0173, D0174, D0175, D0176, D0177, D0180, D0181, D0183, D0184, D0186, D0187, D0188, D0190, D0194, D0195, D0199, D0205, D0206, D0207, D0209, D0210, D0212, D0225, D0227, D0228, D0232, D0233, D0235, D0240, D0245, D0246, D0251, D0256, D0281, D0284, D0291, D0294, D0295, D0296, D0297, D0298, D0307, D0309, D0310, D0312, D0313, D0314, D0321, D0323, D0324, D0325, D0326, D0329, D0330, D0331, D0337, D0340, D0341, D0344, D0347, D0348, D0350, D0353, D0363, D0364, D0370, D0371, D0373, D0376, D0377, D0378, D0383, D0386, D0396, D0415, D0421, D0427, D0428, D0432, D0434, D0435, D0451, D0452, D0454, D0456, D0459, D0465, D0468, D0469, D0472, D0473, D0475, D0478, D0481, D0483, D0487, D0502, D0503, D0505, D0507, D0511, D0514, D0516, D0521, D0523, D0524, D0528, D0530, D0531, D0532, D0533, D0539.

4.2.1.3 Chronic Dosage Studies

D0018, D0066, D0072, D0073, D0074, D0084, D0115, D0121, D0146, D0161, D0162, D0166, D0174, D0178, D0181, D0217, D0218, D0220, D0224, D0226, D0243, D0331, D0372, D0438, D0453, D0474

4.2.1.4 Dose-Response Studies

D0025, D0026, D0033, D0037, D0039, D0047, D0052, D0063, D0067, D0069, D0079, D0086, D0090, D0091, D0093, D0095, D0109, D0111, D0116, D0120, D0125, D0139, D0142, D0157, D0158, D0160, D0175, D0183, D0187, D0188, D0194, D0205, D0206, D0210, D0212, D0326, D0340, D0341, D0348, D0350, D0353, D0364, D0396, D0421, D0465, D0481, D0483, D0513

4.2.1.5 General

D0010, D0019

4.2.2 Multiple Drug Studies

4.2.2.1 Synergism, Potentiation and Additive Effects

D0012*, D0025, D0064, D0085, D0095*, D0096, D0105*, D0112, D0130*, D0131, D0133, D0146, D0150*, D0175, D0184, D0186, D0187, D0188, D0190, D0209, D0220*, D0232, D0233, D0240, D0295*, D0296, D0297*, D0308, D0309, D0310, D0313, D0314, D0321*, D0323, D0347, D0348, D0386, D0390, D0394, D0395, D0409, D0427*, D0428, D0432, D0434, D0435, D0438, D0454, D0468, D0469, D0472*, D0479, D0481, D0505, D0506, D0521, D0528

4.2.2.2 Drug Antagonism Studies

D0064, D0106, D0131, D0147, D0150*, D0184, D0251, D0252, D0291, D0294, D0383*, D0409, D0428*, D0521, D0522, D0523, D0528

4.2.2.3 Cross Tolerance Studies

D0257

4.2.2.4 General

D0003, D0011, D0016, D0017, D0024, D0033, D0037, D0039, D0049, D0061, D0063, D0092, D0093, D0098, D0101, D0105, D0106, D0109, D0133, D0155, D0156, D0157, D0158, D0160, D0182, D0189, D0194, D0200, D0206, D0207, D0218, D0247, D0298, D0324, D0329, D0330, D0331, D0340, D0341, D0344, D0353, D0372, D0411, D0421, D0435, D0438, D0451, D0452, D0453, D0454, D0456, D0465, D0472, D0475, D0487, D0502, D0503, D0514, D0524

4.3 Psychomotor Testing

D0003, D0009, D0012, D0014, D0016, D0018, D0022, D0024, D0025, D0026, D0032, D0037, D0050, D0051, D0052, D0053, D0061, D0064, D0072, D0073, D0074, D0079, D0080, D0081, D0082, D0084, D0086, D0087, D0088, D0089, D0090, D0091, D0092, D0095, D0101, D0102, D0106, D0107, D0108, D0114, D0115, D0120, D0121, D0125, D0130, D0133, D0139, D0146,

4.3 Psychomotor Testing (Continued)

4.4 Drug Detection and Measurement Procedures

4.5 Aviation Studies

4.6 Patient Studies

5.0 SOCIOLEGAL STUDIES

5.1 Experimentation with Human Subjects

6.2 Trade® Name or Other Identifying Name

7.0 CLASSIFICATION OF DRUGS BY USE

7.1 Analgesics and Antipyretics

Alva-Tranquil®
aminopyrine (Pyramidon®)
Bromo Seltzer®
codeine phosphate
dimethyl sulfoxide [Topical Agent] (Demasorb®)
Dristan®
Empirin®
Excedrin®
Neokratin®
Optalidon®
pentazocine (Fortral®)
Saridon®

7.2 Anesthetics

7.2.1 Gaseous, Inhalable Anesthetics

dichloromethane [methylene chloride]
nitrous oxide [N_2O]

7.2.2 Injectable Anesthetics

methohexital Na (Brevital®)
propanidid (Epontol®)
thiobarbital Na (Kemithal®)
thiopental Na (Pentothal®)

7.2.3 Volatile Anesthetics

diethyl ether
halothane (Fluothane®)
methoxyflurane (Penthrane®)
trichloroethylene (Trilene®)

7.3 Anorexics

amphetamine (Benzedrine®)
dextroamphetamine sulfate [d-amphetamine] (Dexedrine®)
methamphetamine HCl [d-desoxyephedrine HCl]
(Methedrine®)
phenmetrazine (Preludin®)

7.4 Antacids

Bromo Seltzer®
Dristan®

7.5 Antibiotic(s) (Antifungal(s))

Bay-b-5097 [Experimental Antimycotic Agent]

7.6 Anticonvulsants

acetazolamide (Diamox®)
phenobarbital (Luminal®)

7.7 Antidepressants

amitriptyline (Elavil®)
chlorimipramine HCl (Anafranal®)
desipramine HCl (Norpramin®)
doxepin (Sinequan®)
imipramine HCl (Tofranil®)
nortriptyline (Aventyl®)
opipramol (Insidon®)
trimipramine (Stangyl®)

7.8 Antidiarrheal(s)

Donnagel®

7.9 Antihistamines

buclizine (Softran®)
chlorcyclizine (Perazil®)
chlorpheniramine (Clor-Trimeton®)
clemastine [tavegil] (Tavegyl®)
clemizole (Allecur®)
cyclizine (Marzine®)
cyproheptadine HCl (Periactin®)
dimenhydrinate (Dramamine®)
dimethindene (Fenestil®)
diphenhydramine (Benadryl®)
hydroxyzine (Vistaril®)
meclastine [the free base of tavegil] (Tavegyl®)
meclizine (Bonamine®)
methapyrilene HCl (Histadyl®)
phenindamine (Thephorin®)
pheniramine p-aminosalicylate (Avil®)
promethazine HCl (Phenergan®)
thonzylamine HCl (Anahist®)
tripellenamine HCl (Pyribenzamine®)

7.10 Anti-Inflammatory Agent(s)

dimethyl sulfoxide (Demasorb®)

7.11 Antinauseants

buclizine (Softran®)
dimenhydrinate (Dramamine®)
diphenidol (Vontrol®)
hydroxyzine (Vistaril®)
meclizine (Bonamine®)
prochlorperazine (Compazine®)
promethazine HCl (Phenergan®)
scopalamine [l-hyoscine]
scopalamine HBr [l-hyoscine HBr] (Scopos®)

7.12 Anti-Parkinsonism Agents

amantadine HCl (Symmetrel®)
levodopa [L-dopa] (Laradopa®)

7.13 Antituberculosis (Synthetic) Agents

ethambutol (Myambutol®)
isoniazid (Nydrazid®)

7.14 Antivertigo Agent(s)

diphenidol (Vontrol®)

7.15 Antiviral Agent(s)

amantadine HCl (Symmetrel®)

7.16 Ataractics (Major and Minor Tranquilizers)

acetophenazine (Tindal®)
benactyzine HCl (Suavitil®)
benzoctamine (Tacitin®)
chlordiazepoxide HCl (Librium®)
chlormezanone (Trancopal®)
chlorpromazine (Thorazine®)
diazepam (Valium®)
droperidol (Thalamonal®)
emylcamate (Striatran®)
flupenthixol (Fluanxol®)
fluphenazine (Permitil®)
haloperidol (Haldol®)
hydroxyphenamate (Listica®)
hydroxyzine (Vistaril®)
lorazepam
medazepam (Nobrium®)
meprobamate (Miltown®)
mesoridazine (Serentil®)
methoserpidine (Decaserpil®)
octoclothepine
opipramol (Insidon®)
oxanimide (Quiactin®)
oxazepam (Serax®)
perphenazine (Trilafon®)
phenaglycodol (Ultran®)
phenelzine (Nardil®)
prazepam
prochlorperazine (Compazine®)
thioridazine (Mellaril®)
trifluoperazine (Stelazine®)

7.17 Bronchial Dialators

Asthmador Cigarettes®
Medihaler Epi®

7.18 Cardiovascular Preparations

7.18.1 Beta Adrenergic Blocking Agents

alprenolol
pronetholol (Alderlin®)
propanolol (Inderal®)

7.18.2 Hypotensives

methoserpidine (Decaserpil®)

7.19 Contraceptive(s) (Oral)

Ovosiston®

7.20 Cough (Antitussives) and Cold Preparations

codeine phosphate
Cosanyl®

7.21 Decongestants (Oral, Nasal)

Dristan®
oxymetazoline HCl (Afrin®)
Wyamine Inhaler®

7.22 Diuretic(s)

acetazolamide (Diamox®)

7.23 Environmental Gases and Toxicants (Pollutants)

air ions
carbon dioxide [CO_2]
carbon monoxide [CO]
dichloromethane [methylene chloride], [industrial solvent vapor]
dimethyl sulfoxide [industrial solvent vapor]
trichloroethylene (Trilene®) [industrial solvent vapor]

7.24 Hormone(s) (Anabolic)

1-methyl-Δ^1-androstenolone acetate (Nibal®)

7.25 Parasympathetic Agents and Parasympathomimetics

bethanecol chloride (Myotonachol®)
pilocarpine (Almocarpine®)

7.26 Parasympatholytic Agents

atropine [d,l,-hyoscyamine]
Bellergal®
glycopyrrhonium [glycopyrollate] (Robinul®)
scopalamine [l-hyoscine]
scopalamine HBr [l-hyoscine HBr] (Scopos®)
Sominex®

7.27 Psychostimulants

caffeine
desipramine HCl (Norpramin®)
imipramine HCl (Tofranil®)
magnesium pemoline (Cylert®)
methylphenidate (Ritalin®)
nicotine [alone, and derived from the use of tobacco, cigarettes)
pemoline (Tradon®)

7.28 Psychotropic Agents

2,5 dimethoxy-4-methyl-amphetamine [DOM]
ethanol [ethyl alcohol]
lysergic acid diethylamide [LSD]
marijuana [cannabis]
mescaline
psilocybin

7.29 Sedative/Hypnotic Agents

allobarbital (Dial®)
Alva-Tranquil®
amyobarbital (Amytal®)
apronalide (Sedormid®)
butabarbital Na (Butisol®)
chloral hydrate (Felsules®)
ectylurea (Levanil®)

7.29 Sedative/Hypnotic Agents (Continued)

ethchlorvynol (Placidyl®)
flurazepam HCl (Dalmane®)
glutethimide (Doriden®)
meparfynol (Somnesium®)
methaqualone (Quaalude®)
methyprylon (Noludar®)
nitrazepam (Mogadon®)
pentobarbital Na (Nembutal®)
phenobarbital (Luminal®)
secobarbital (Seconal®)
Sominex®
Tranxilen® [4306 CB]
GP 41 299 [Geigy experimental hypnotic dibenzthiepin derivative]

7.30 Skeletal Muscle Antispasmodic(s)

dantrolene Na

7.31 Sympatholytic Agent(s)

Bellergal®

7.32 Sympathomimetic Agents

amphetamine (Benzedrine®)
dextroamphetamine sulfate [d-amphetamine] (Dexedrine®)
ephedrine HCl
ephedrine sulfate
epinephrine [l-epinephrine] (Suprarenin®)
Medihaler Epi®
methamphetamine HCl [d-desoxyephedrine HCl] (Methedrine®)
phenmetrazine (Preludin®)
Wyamine Inhaler®

DRUGS AND DRIVING:

A SELECTED BIBLIOGRAPHY

APPENDIX B

TITLE INDEX

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ACT PROVIDING FOR THE CONFIDENTIALITY OF RECORDS OF ACCIDENTS COMPILED BY SPECIAL ACCIDENT-INVESTIGATION TEAMS APPROVED BY THE NEW MEXICO TRAFFIC SAFETY COMMISSION N.M. Stat. Ann. § 64-33-8 (Supp. 1975).

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IU-63-D0284

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IU-68-D0223

ZUR FORENSISCHEN BEURTEILUNG VON HYPOGLYKÄMIEN UNTER BEHANDLUNG MIT ORALEN ANTIDIABETICA (ON THE FORENSIC EVALUATION OF HYPOGLYCEMIA DURING TREATMENT WITH ORAL ANTI-DIABETICS), E. Böhm, Deutsche Zeitschrift f. die gesamte gerichtliche Medizin v64 p217-227 (12 July 1968)

IU-62-D0302

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IU-71-D0118

ZUR KENNTNIS DES RAUSCHMITTELNACHWEISES (PROVING THE EXISTENCE OF DRUGS), [illegible], Zeitschrift für Rechtsmedizin v68 p171-179 (1971)

IU-59-D0248

ZUR PHARMAKOPSYCHOLOGIE VON VERKEHRSUNFÄLLEN (PSYCHOPHARMACOLOGY OF TRAFFIC ACCIDENTS), W. Laves, Munchener Medizinische Wochenschrift v101 n35 p1427-1430 (1959)

IU-63-D0245

ZUR STRABENFÄHIGKEIT NACH INTRAVENÖSEN KURZNARKOSEN (DRIVING EFFICIENCY AFTER SHORT INTRAVENOUS ANESTHESIA), D. Klebelsberg; K. Steinbereithner, Weiner Klinische Wochenschrift v75 n47 p840-842 (1963)

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APPENDIX D

ABSTRACT INDEX

IU-73-A0001

LITERATURE SEARCH NO. 73-4. HUMAN EXPERIMENTATION, National Library of Medicine, Public Health Service, National Institutes of Health (1973)

This bibliography, provided by the National Library of Medicine's Medical Literature Analysis and Retrieval System (MEDLARS), covers legal and ethical concepts for human research.

IU-74-A0002

BIBLIOGRAPHY OF SOCIETY, ETHICS AND THE LIFE SCIENCES, 1974 ED., Hastings Center, Institute of Society, Ethics and the Life Sciences, Hastings-on-Hudson, N.Y. (1974)

This bibliography includes references to three kinds of material: survey and introductory works on the various issues in ethics and the life sciences, background material on those technical developments which have raised acute ethical dilemmas, and rigorous evaluations of the issues by philosophers, theologians, ethicists, legal scholars, and scientists. Topics covered include ethical theory; codes of professional ethics; history of medical ethics; medical ethics education; values, ethics, and technology; genetics, fertilization and birth; population and birth control; behavior control; health care delivery; death and dying; truth-telling in medicine; and scarce medical resources, transplantation and hemodialysis. Of particular interest are the sections on confidentiality, and experimentation and consent.

IU-72-A0003

INTERACTION OF ALCOHOL AND OTHER DRUGS. AN ANNOTATED BIBLIOGRAPHY. 2ND ED., REV., E. Polacsek; T. Barnes; N. Turner; R. Hall; C. Weise, Addiction Research Foundation (1972)

This is an annotated bibliography of the scientific literature on the interaction of alcohol and other chemical compounds normally absent in vivo, the influence of congeners in alcoholic beverages, conjunctive addiction to alcohol plus other drugs, and cross-tolerance between alcohol and other compounds. Items are cross-listed under a key word index, an author index, and a drug index.

IU-73-A0004

INTERACTION OF ALCOHOL AND OTHER DRUGS. SUPP. 1, T. H. Barnes, Addiction Research Foundation (1973)

This is the supplement to INTERACTION OF ALCOHOL AND OTHER DRUGS, and includes more information from the scientific literature on the interaction of alcohol and other chemical compounds normally absent in vivo, the influence of congeners in alcoholic beverages, conjunctive use of alcohol plus other drugs, and cross-tolerance between alcohol and other compounds. It is also cross-listed by author, key word, and drug.

IU-74-A0005

DRUG USE AND DRIVING, T. H. Barnes, Addiction Research Foundation (1974)

This bibliography contains studies on the effects of drugs, other than alcohol, on driving or simulated driving of automobiles, piloting or simulated piloting of aircraft, and laboratory tests concerning various intellectual, sensory, and psychomotor functions, personality, and subjective states. Entries are arranged by author, key word, and drug.

IU-74-B0001

DRUGS AND DRIVING. A SURVEY OF THE RELATIONSHIP OF ADVERSE DRUG REACTIONS, AND DRUG-ALCOHOL INTERACTION, TO DRIVING SAFETY, G. Milner, Volume 1 of Monographs on Drugs, G. S. Avery, ed. (1972)

This book contains a survey of the relationship of adverse drug reactions, and drug-alcohol interaction, to driving safety. Emphasis is placed on the medical, biological and social consequences stemming from the misuse and therapeutic use of drugs. Section 1 contains a survey of drugs and driving in relation to general problems of drug potentiation and adverse reactions, including the following topics: psychotropic drugs, drugs and alcohol, therapeutics and experimental medicine, pharmacological aspects of drugs and adverse drug reactions. Section 2, on drugs and driving research, discusses the effect of drugs on driving skills, research investigations in animals and man, statistical studies and the road toll. There is a general discussion of drugs and driving and some related problems including: history, further research, responsibility of the doctor, advice to patients given specific drugs, prescription and drug hazards, control of drugs and driving problems and the prevention of traffic accidents. This book was intended for physicians and researchers as well as laymen interested in general reading concerning drugs.

IU-74-B0002

STREET DRUG ANALYSIS AND ITS SOCIAL AND CLINICAL IMPLICATIONS, 1ST ED., J. A. Marshman, ed., Addiction Research Foundation (1974)

This symposium was designed to bring together individuals who have been involved in street drug analysis efforts, in order that they might share their experiences, determine what has been achieved by such programs, and consider appropriate directions for future endeavors. Efforts to establish street drug analysis programs in Europe and North America have been variously directed to patient care, research into patterns of drug availability and use, education of users, health care personnel and the general public, and facilitation of law enforcement. It is mainly those topics which are discussed in this collection of papers.

IU-74-B0003

SOCIAL ASPECTS OF THE MEDICAL USE OF PSYCHOTROPIC DRUGS. 1ST ED., R. Cooperstock, ed., Addiction Research Foundation (1974)

This collection of papers presented at the International Symposia on Alcohol and Drug Research covers such topics as international drug control and the pharmaceutical industry, factors involved in the increased prescribing of psychotropic drugs, the social responsibility of the physician in prescribing mind-affecting drugs, and family patterns in prescriptions of psychotherapeutic drugs. Other subjects discussed include increased alcohol intake as a coping mechanism for psychic stress, the role of the consumer, perspectives on the new psychoactive drug technology, and directions in psychotropic drug research.

IU-70-D0001

DRUGS AND DRIVING - WHAT'S THE PROBLEM?, J.A. Waller, Concepts for Traffic Safety v3 n1 p1-4 (Spring 1970)

This article mentions the state of knowledge, or lack of it, concerning drug involvement in highway crashes. Drugs, both prescription and over-the-counter, taken licitly and illicitly, discussed include: stimulants such as amphetamines (Dexedrine®, Benzedrine®), Blavil®, Preludin®, No-Doz® (Caffeine); sedatives such as barbituates (Seconal®, Phenobarbital), Doriden®, Sleep-Eze® (scopalamine); tranquilizers such as Miltown®, Equanil®, Librium®, Compoz®; and combination stimulant-sedative (amphetamine-barbiturate) types, Dexamyl® and Desbutal®.

Marijuana and alcohol use and effects were also mentioned in the context of the paper, but data on the former drug as compared to the sizable body of information gathered on the latter.

IU-68-D0002

EFFECT OF DRUGS IN DRIVING, R. W. Sneed, Medico-Legal Bulletin v17 n11 bull-187 (Nov 1968)

This paper consists of a compilation of drugs and drug classes that have the potential to adversely affect driving skills and ability. The drug classes and drugs discussed, include: antibiotics - streptomycin, sulfa drugs; anticonvulsants - diphenylhydantoin (Dilantin), primidone (mysoline), trimethadione (Tridione), paramethadione (Paradione), and phenobarbital; antispasmotics - atropine; hypotensive agents; analgesics - aspirin, phenacetin, codeine, morphine, meperidine (Demerol); antihistamines - diphenhydramine (Benadryl, Dramamine), tripelannamine (Pyribenzamine), chlorpheniramine (Chlortrimeton, Coricidin), Anahist; barbiturates - phenobarbital; antidepressants - imipramine (Tofranil), amitriptyline (Elavil); tranquilizers - meprobamate (Equanil, Miltown), chlordrazepoxide (Librium), diazepam (Valium), chlorpromazine (Thorazine), prochlorperazine (compazine); the parasympathetic blocking agent - scopolamine (Hyoscine); amphetamines - Benzedrine, Dexedrine; hallucinogens - marijuana, LSD; and insulin. Two antihistamines used as antimotion sickness agents - meclizine (Bonine) and cyclizine (Marezine), were mentioned as producing less drowsiness and blurred vision than other drugs in this class. Carbon monoxide poisoning was spoken of, as was alcohol-barbiturate, alcohol-antidepressant, and alcohol-amphetamine synergism. The physician's role in prescribing drugs with regard to their effect on the patient's driving ability was mentioned.

IU-66-D0003

COMMON HYPNOTICS AND A PSYCHOMOTOR PERFORMANCE TASK, P. E. Siegler; D. Winstin; J. H. Nodine, Current Therapeutic Research v8 n5 p215-219 (May 1966)

This study was designed to compare the effects of several commonly used hypnotic drugs on psychomotor performance, with the pursuit rotor test used to these ends. Six medical student volunteers received each of the following at bedtime: 500 mg. ethchlorvynol (Placidyl), 300 mg. ethychlorvynol, 100 mg. secobarbital (seconal), 500 mg. glutethimide (Doriden), 1000 mg. chloral hydrate, and placebo. They took the drugs in a varied but systematic sequence for a total of six test nights per student. Ten trials of the pursuit rotor at both 30 and 60 RPM were given to the students at bedtime (immediately before taking the medicine), two to three hours later (awakened from sleep), and the following morning after natural awakening. A two- or three-day "washout" period was used between test nights.

The midnight test results indicate that 500 mg. glutethimide, 500 mg. ethchlorvynol and 100 mg secobarbital cause significant impairment of psychomotor function; with 300 mg. ethchlorvynol and 1000 mg of chloral hydrate being tolerated without impairment in this function. The morning test results indicate that 100 mg. secobarbital, 300 mg. ethchlorvynol and 1000 mg. chloral hydrate significantly enhance performance, while 500 mg. glutethimide significantly impairs it. If fine movement coordination is required during nocturnal awakening and in the morning, chloral hydrate and ethchlorvynol 300 mg. proved to be superior by this testing technique to the other hypnotic dosages used.

IU-72-D0004

TRUTHS, TRAPS, AND TACTICS CONCERNING ALCOHOL, OTHER DRUGS AND HIGHWAY SAFETY, J. [illegible] Waller, California Medicine v116 n2 p10-15 (Feb 1972)

This paper is concerned with the effects of alcohol and drugs, alone and in

combination on highway safety. The author reviews the viability of much of the data collected on this subject to date and reaches the following conclusions: Ingestion of alcohol by pedestrians is an important factor in severe highway crashes, just as alcohol is important in the injury of drivers and their passengers. Blood alcohol concentrations below 50 mg per 100 ml (0.05 percent by weight) do not increase crash risk, but above that concentration the risk rises rapidly. Three distinct groups -- problem drinkers (many of whom do not have blatant alcoholism), teenagers, and heavy social drinkers -- make up the overwhelming majority of persons in alcohol related crashes, and countermeasures specific to each group must be applied and evaluated. Past and present countermeasures usually have not been adequately evaluated, or in some cases have been proven ineffective. Countermeasures aimed specifically at reducing losses in addition to those aimed at changing behavior are an integral part of any control program.

Epidemiological data do not identify drug-related crashes as frequent events and, with the possible exception of amphetamine abuse, do not suggest that, from the viewpoint of highway safety, a countermeasure effort is warranted at this time.

Laboratory studies consistently show that small amounts of alcohol in combination with other mind-altering drugs may create a special hazard to driving because of synergism. The epidemiologic data, however, indicate that most persons fatally injured with alcohol in combination with other measurable drugs in fact have such high alcohol concentrations that for all practical purposes the effect of the other drugs probably is of minor importance.

IU-69-D0005

MEDIKAMENTÖSE BEEINFLUSSUNG DES SEHORGANES AND VERKEHR (DRUG INFLUENCES ON THE VISUAL ORGANS AND TRAFFIC), B. Gramberg-Danielsen, Opthalmologica (Basel) v158 supp p410-416 (1969)

A wide variety of drugs may have adverse influences on motor vehicle operation by virtue of their ability to alter various visual functions.

IU-72-D0006

CANNABIS AND DRIVING SKILLS, Canadian Medical Association Journal v107 n4 p269-270 (19 Aug 1972)

This journal's Editorial Statement dealt with the effects of cannabis on driving skills and ability. After reviewing selected investigations in this area it concluded that there is now a strong suggestion that cannabis does impair driving skills and also that the impairment may persist for a surprisingly long time. The Statement additionally propounded that it is only through the accumulation of studies like those reviewed that a rational solution to the cannabis problem will eventually be found.

IU-71-D0007

DRUGS AND HIGHWAY CRASHES, J. A. Waller, Journal of the American Medical Association v215 n9 p1477-1482 (1 Mar 1971)

This paper examines the extent to which impairment by mind-altering drugs other than alcohol is a factor in highway crashes, and seeks to identify the types of persons likely to get into trouble on the highway as a result. The extent to which the drug and alcohol problems overlap is also investigated. Data available indicate some crashes are attributable to impairment from drug effects. Except for amphetamine abuse, drug effects are not very marked, and usually occur when users are not exposed to the hazards of walking or driving. Two categories of users who represent a problem, but not because of drugs, are sociopaths who repeatedly flaunt authority in a variety of ways, and problem drinkers. A third group who use prescription or non-prescription drugs to

cope with every day stresses and young adults who use only marijuana probably do not have an increased risk of crashes or citations.

IU-66-D0008

DRUGS AND DRIVING. C. J. C. Perry; A. L. Morgenstern, Journal of the American Medical Association v195 n5 p376-379 (31 Jan 1966)

This article discusses the need for physicians to be aware of potential hazards a medication may have if a patient drives. Specific drugs and drug classes mentioned in this context are: chlorpromazine, gluthethimide, ethchlorvynol, griseofulvin, meprobamate, amphetamine, codeine, alcohol, scopolamine derivatives, antihistamines, bromides, antidepressants, and antispasmodics.

IU-69-D0009

BETHANECHOL CHLORIDE IN THE TREATMENT OF MOTION SICKNESS. NEGATIVE RESULTS, A. L. Godbey, Jr., Aerospace Medicine v40 n4 p432-433 (Apr 1969)

In this study, the effectiveness of bethanechol chloride in the treatment of motion sickness was examined in a double-blind fashion in twenty-four aviators with a previous history of in-flight motion sickness. Bethanechol chloride in doses of 20 mg. and placebo were given to the fliers who were instructed to take the medication sublingually at the first sign of discomfort. Bethanechol chloride was less effective than placebo in successfully treating motion sickness.

IU-71-D0010

MARIHUANA EFFECTS. A SURVEY OF REGULAR USERS, J. A. Halikas; D. W. Goodwin; S. B. Guze, Journal of the American Medical Association v217 n5 p692-694 (2 Aug 1971)

A study of 100 regular marihuana users indicated that marihuana use is usually a pleasant experience with few aversive effects, either during intoxication or afterwards. However, 16% reported that they "usually" experience one or more unpleasant acute or postintoxication effects, and a majority "occasionally" experience some aversive effect, including anxiety symptoms, feelings of derealization, and memory impairment.

IU-68-D0011

EFFECTS OF D-AMPHETAMINE AND CHLORDIAZEPOXIDE UPON STRENGTH AND ESTIMATED STRENGTH, P.M. Hurst; R. Radlow; S. K. Bagley, Ergonomics v11 n1 p47-52 (Jan 1968)

Four drug treatments were administered to each of 58 college students volunteers who served as their own controls in a Latin square design. The treatments were d-amphetamine sulphate (11-17 mg), chlordiazepoxide HCl(25 mg), placebo, and no drug.

Grip strength was measured on a Stoelting hand dynamometer 3-3½ hours after ingestion. Prior to giving their maximum effort, subjects were required to estimate their strengths on the basis of perceived effort required to reach an assigned submaximum valve, determined as a percentage of masked pre-test scores.

Objective strength was significantly higher under d-amphetamine than under any other treatment condition. The treatments did not differ significantly with respect to estimated strength or estimate bias.

IU-71-D0012

JOINT EFFECT OF ALCOHOL AND SOME ANTIHISTAMINES ON SKILLS SIMILAR TO DRIVING, A. A. Landauer; G. Milner, Editest, Brussels (1971)

This address described the authors' study of the joint effect of alcohol and some antihistamines on skills similar to driving. In this double-blind experiment 27 men and 5 women who were non-abstainers were used as subjects. Either 2x50 mg of Avil®, 2x4 mg of Periactin, 2x1 mg of Tavegyl, or two doses of placebo were given. Experimental intoxication was achieved by giving the subject 1 ml per kg body weight of ethanol; this resulted in a mean blood level of 0.088%.

It was found that there was no significant effect due to drug or alcohol on the tapping test, and no significant interaction was found. The results of the dot tracking test were similar; no main effect on interaction approached a significant level. On the pursuit motor test, performance improved significantly at the second test administration. Although they were intoxicated the effect of previous experience significantly improved their total time on target. On all tests none of the drugs affected performance to a significant extent, either alone or in conjunction with alcohol. There was a significant increase in the percentage of steering errors made after alcohol had been consumed.

The experimenters concluded that although many clinicans have warned that antihistamines may adversely affect a person's driving ability either alone or in conjunction with alcohol, it does seem likely that this warning is based on experience with the older types of antihistamines which have a low alertness ratio (sedative dose/therapeutic dose). They suggest that modern antihistamines are not likely to add greatly to the road toll.

IU-69-D0013

THERAPEUTIC POTENTIAL OF DIMETHYL SULFOXIDE (DMSO) IN AEROSPACE MEDICINE, S. W. Jacob; D. C. Wood; J. H. Brown, Aerospace Medicine v40 n1 p75-84 (Jan 1969)

The toxicology, fate, metabolism, primary pharmacology, and potential usefulness of dimethyl sulfoxide (DMSO) were discussed. Potential uses in aviation and aerospace medicine include effective and rapid treatment of soft tissue injuries, frostbite, burns, and changes in barometric pressure.

IU-59-D0014

PSYCHOLOGICAL AND PSYCHOPHYSIOLOGICAL FACTORS IN MOTOR VEHICLE ACCIDENTS, J. J. Conger; H. S. Gaskill; D. D. Glad; L. Hassel; R. V. Rainey; W. L. Sawrey; E. S. Turrell Journal of the American Medical Association v169 n14 p1581-1587 (4 Apr 1959)

A continued investigation of the personal factors that might make some drivers more susceptible than others to automobile accidents was carried out in 20 airmen. Ten had been held officially responsible for two or more accidents in the preceding 4½ years. They were compared with 10 who had no record of accidents in the same period. The tests included a structured psychiatric interview and a routine examination as well as other functional tests. No differences were found in either intelligence or psychophysiological responsivity. In the area of personality functioning, accident repeaters displayed poorer control of hostility, lower tension tolerance, higher separation anxiety and dependency needs, and extremes both of egocentricity or sociocentricity and fantasy-preoccupation or unreflectiveness.

IU-68-D0015

A NASAL DECONGESTANT FOR HIGH-ALTITUDE FLYING, C. V. Caver, Current Therapeutic Research v10 n11 p557-560, (Nov 1968)

Oxymetazoline hydrochloride was studied in pilots for use as a nasal mucous membrane shrinking agent. Seventeen pilots returned questionnaires regarding effectiveness of the compound. Seventy-four percent of the pilots were of the opinion that the preparation was particularly useful in in-flight operations requiring oxygen breathing. An increase in mask comfort was also reported.

IU-73-D0016

EFFECTS OF HYPNOTIC DRUGS ON PERFORMANCE, E. O. Bixler; A. Kales; T. L. Tan; J. D. Kales, Current Therapeutic Research v15 n1 p13-24 (Jan 1973)

The effects of various hypnotic drugs on performance were evaluated with and without intervening sleep. Several different study designs were used, employing tests which evaluated areas of performance such as vigilance, eye-hand coordination, cognitive-association and decision-making. Detectable changes in performance were produced by administration of a single clincial dose of these hypnotics. The hypnotics typically employed were secobarbital, gluthethimide and flurazepam. Secobarbital, in general, produced a more consistent and greater decrement in performance than flurazepam. The results with gluthethimide were quite variable.

IU-72-D0017

AVIATION PERFORMANCE AND THE USE OF HYPNOTIC DRUGS, C. R. Harper; G. J. Kidera, Aerospace Medicine v43 n2 p197-199 (Feb 1972)

A double-blind study was used to evaluate any performance decrement after two nights of hypnotic drug induced sleep. A Sanborn 8-channel recorder was used to measure flight parameters from a flight simulator. After a learning period, a baseline 1½ hour performance was recorded for thirty pilots. This was compared to an identical flight after two nights of drug or placebo induced sleep. The drugs were glutethimide (Doriden®) and flurazepam (Dalmane®).

The flight recorder data indicated no significant decrement in flight performance. Subjectively, flurazepam was judged superior to glutethimide, particularly in the "hangover" effect.

IU-65-D0018

EFFECT OF AN ANABOLIC STEROID ON PHYSICAL PERFORMANCE OF YOUNG MEN, W. M. Fowler, Jr.; G. W. Gardner; G. H. Egstrom, Journal of Applied Physiology v20 n5 p1038-1040 (Sept 1965)

The performance of 47 men was measured during a 16-week study. Eight of the men received placebos; nine received 1-methyl-Δ^1-androstenolone acetate, and anabolic steroid; 15 received placebos and exercise; and 15 received the drug and exercise. There were no significant differences in strength, motor performance, or physical working capacity between the control and the androstenolone-supplemented groups. Differences in other factors such as vital capacity, limb circumference, and skin-fold thickness were also nonsignificant.

IU-66-D0019

DETECTION AND MANAGEMENT OF LATENT DIABETES IN COMMERCIAL PILOTS, G. F. Catlett; G. J. Kidera, Aerospace Medicine v37 n6 p545-551 (June 1966)

Diabetes mellitus is a common cause of medical disqualifications among commercial airline pilots and grounding is considered mandatory whenever the

disease cannot be controlled by diet alone. Since only minor degrees of carbohydrate intolerance respond to dietary measures and neglected cases can be expected to progress, early detection is essential if the yield of pilot salvage after diagnosis is to be increased. In this study, a modified glucose tolerance test was performed on a group of apparently healthy airline pilots. Of the 142 subjects tested, seven responded with elevated blood glucose levels and three cases of early diabetes were eventually diagnosed. None of those studied had demonstrated glycosuria prior to this test, indicating the inadequacy of a random urinalysis in periodic physical examinations. The clinical management of latent diabetes in pilots is discussed and the question of limited use or oral hypoglycemic drugs for pilots in selected cases is raised.

IU-68-D0020

CARDIOVASCULAR STRESS (ELECTROCARDIOGRAPHIC CHANGES) PRODUCED BY DRIVING AN AUTOMOBILE, E. Simonson; C. A. Baker; N. M. Burns; C. G. Keiper; O. H. Schmidtt; S. P. Stockhouse, American Heart Journal v75 n1 p125-135 (Jan 1968)

A review of cardiovascular changes during automobile driving was presented. The heart rate responds instantaneously to critical situations and in stressful situations such as car racing, increases rapidly to frequencies of 200 per minute or more. Blood pressure is less responsive. Significant ST depression and T wave changes were reported in healthy drivers and more so in ambulatory patients with coronary heart disease or in hyperreactors.

In the experimental part, significant changes of the T wave in the ECG are reported which occurred in five men (having normal resting and postexercise ECG's) while driving an automobile over distances of 200 to 2,600 miles. The previously positive T wave of a bipolar manubrium-C5 lead, similar in pattern of V_5, decreased to half its original size in one subject after three hours of driving. Transient flattening or inversion of the T wave developed in two other subjects after one to four hours of driving with some correlation to road events. The changes recovered partially during rest periods. The repeatability of ECG changes in eight drives over the same route (suburban and urban driving during rush hour) was quite good.

IU-70-D0021

AEROSPACE TOXICOLOGY. 1. PROPELLANT TOXICOLOGY, K. C. Back, Federation Proceedings v29 n6 p2000-2005 (Nov-Dec 1970)

In this study several unrelated experiments are discussed which deal with various toxicological aspects of new missle propellants. The convulsant action of uns-dimethylhydrazine was shown to be reversible in several species by pyridoxine and pyridoxamine. The effectiveness of pyridoxine and pyridoxamine in revising this toxicity was highly species specific. Monomethylhydrazine was shown to be several times as toxic in producing convulsions and was shown to have species specific effects on glucose metabolism. Glucose, in addition to pyridoxine, was required to reverse the toxicity of monomethylhydrazine. Another propellant, decaborane, was shown to cause depression, catatonia, convulsions, EEG changes, lactation in females, and changes in primate performance. Decaborane decreased brain serotanin and norepirephnine in the rat. Pargyline was shown to reverse decaborane toxicity. Several other flourine containing propellants were discussed and their acute toxicologic effects of tachycardia, hyperpnea, and methemoglobin formation were attributed to metabolic conversion to cyanide. Concentration of these compounds in bone, teeth, and thymus were discussed as well as excretion patterns.

IU-71-D0022

EFFECTS OF DANTROLENE SODIUM ON SPASTICITY AND MOTOR PERFORMANCE IN HEMIPLEGIA, S. B. Chyatte, J. H. Birdsong; B. A. Bergman, Southern Medical Journal v64 n2 p180-185 (1971)

In this study, nine hemiplegic patients were evaluated for 4 weeks in a double-blind fashion for improvement in spasticity resulting from a regimen of either 11 days of a placebo followed by 12 days of dantrolene Na or of drug followed by placebo. Dosages in the drug portion of the test ranged from 50 to 300 mg. daily. Pre-test baseline evaluations were made using deep tendon reflex activity, resistance to passive movement, and clonus in the involved extremities as measures of spasticity. A battery of clinical laboratory tests was also employed to screen for possible side effects. Gross muscle strength and motor performance were also monitored. Results showed dantrolene Na as being effective in reducing spasticity and increasing range of movement in affected limbs while having a detrimental effect on strength and timed gross motor performance.

IU-73-D0023

EFFECTIVITY OF ANTIMOTION SICKNESS DRUGS DURING ARTIFICIAL GRAVITY SIMULATIONS, J. A. Green, Aerospace Medicine v44 n11 p1255-1261 (Nov 1973)

Selected antimotion sickness drugs were evaluated in a simulated artificial gravity environment. Coded capsules, containing Scopolamine/Dexedrine®, Promethazine/Ephedrine, Dramamine®, or a placebo were administered in a double-blind technique. Test subjects were rotated at 6 rpm at a radius to 80 ft. Measurements were obtained of cognitive functions, psychomotor performance and degrees of motion sickness. The drugs were effective in modifying the response to the rotational stimuli with Promethazine/Ephedrine being most beneficial. This preparation and Scopolamine/Dexedrine® adversely affcted short-term memory and problem-solving functions. There were no measurable effects on the majority of the psychomotor test evaluations.

IU-69-D0024

EFFECT OF DIPHENIDOL AND PROCHLORPERAZINE ON SEMICIRCULAR CANAL FUNCTION IN MAN, A. J. Benson, Aerospace Medicine v40 n6 p589-595 (June 1969)

In a double-blind cross-over trial, 12 subjects were given by mouth, diphenidol (30 mg), prochlorperazine (10 mg) or an inert substance, 90 min. before rotational tests were performed. Neither drug produced a significant change in the senation cupulogram, in the decay of subjective angular velocity and of nystagmus following 60°/sec impulses, or in subjective estimates of angular displacement (20-100° in less than 4 sec). However, subjects' overall assessment of the intensity of their sensations of turning obtained at the end of each test session was significantly (P= 0.01) reduced by diphenidol. The failure of the drugs to alter evoked vestibular responses at dose levels which gave significant side effects (dry mouth with diphenidol and drowsiness with prochlorperazine) suggested that their site of action was other than on the primary vestibular projections.

IU-67-D0025

INFLUENCE OF ALCOHOL AND DRAMAMINE, ALONE AND IN COMBINATION, ON PSYCHOMOTOR PERFORMANCE, P. C. Tang; R. Rosenstein, U.S. Army Aeromedical Research Unit (1967)

The effect of alcohol and Dramamine®, alone and in combination, on the performance of four young adult subjects on the Scow Complex Coordinator was studied in a series of eight experiments. Alcohol alone produced a 12.5% decrease in performance when the blood alcohol level was between 44 mgs and 50 mgs. When

the blood alcohol decreased to the 35 mg% level, the performance decrement became insignificant.

Dramamine alone in dosage of 100 mg per person produced relatively insignificant performance decreases (Max. 6%). The combination of alcohol with Dramamine produced much larger performance decrements. During the first three hours following ingestion of Dramamine and alcohol, the performance decrements were 8%, 25%, and 9%, respectively, when the blood alcohol levels were 50 mg%, 44 mg%, and 34 mg%. Reasons for not recommending a maximum permissible alcohol level for airmen are discussed.

IU-73-D0026

IMPAIRMENT OF PERFORMANCE WITH LOW DOSES OF MARIHUANA, M. A. Evans; R. Martz; D. J. Brown; B. E. Rodda; G. F. Kiplinger; L. Lemberger; R. B. Forney, Clinical Pharmacology and Therapeutics v14 n6 p936-940 (Nov-Dec 1973)

Eight volunteers smoked marihuana cigarettes under controlled laboratory conditions on four separate occasions. The cigarettes were calibrated to deliver doses of 0, 3, 6, and 9 ug per kilogram of delta-9-tetrahydrocannabinol (THC). The experiment design was a double-blind random block with a one-week interval between sessions. Analysis of variance revealed a significant linear decrease in stability with increase in dose of THC. The tracking scores with pursuit meter demonstrated a significant increase about control for all three doses of THC. Mental performance, as evaluated by delayed auditory feedback, and a subjective evaluation revealed no consistant change with dose.

IU-64-D0027

CRIMINAL ON THE ROAD. A STUDY OF SERIOUS MOTORING OFFENCES AND THOSE WHO COMMIT THEM, T. C. Willett, Tavistock Publications, London (1964)

This section is concerned with driving under the influence of alcohol or drugs in regard to British statutory law on the subject. The elements needed to constitute the offense of driving under the influence of drugs are the same as when the agent is alcohol. The fact that a driver, who has taken a medication to alleviate a condition like hay fever, not realizing that his physical condition might predispose him to drowsiness from the drug, is liable to prosecution illustrates the particular characteristic of this and some other driving offenses: they are absolute prohibitions against certain behavior that is held to be dangerous in itself, regardless of the actor's motives or intention. It is noted that in cases where the action of the accused seemed to be entirely innocent and justifiable it would be open to the police either not to prosecute at all or to do so under some other offense, but otherwise it is unlikely that the driver's sickness or need for medication would prevent conviction.

IU-70-D0028

DRUGS AND DRIVING, The Attack v4 n1 p6-7 (Winter 1970)

This article makes a general comment on the effects of drugs on driving. Drugs mentioned in this context included: hallucinogens (marijuana, LSD), barbiturates, amphetamines, tranquilizers, narcotics, and antihistamines.

IU-69-D0029

DRIVING RECORDS OF HEROIN ADDICTS, D. V. Babst; J. A. Inciardi; P. K. Raeder, Jr.; D. B. Negri, New York State Narcotic Addiction Control Commission; New York State Dept. of Motor Vehicles (1969)

This paper examines the relationship between drug abuse and driving safety

of 6,076 opiate addicts admitted to the Narcotic Addiction Control Commission. It was found that 1,245, or 20% of these addicts, had a driver's license and/or a driving record. Analysis of these records indicates that 77% of the males and 73% of the females had one or more accidents, or convictions for violation of the vehicle and traffic laws. In contrast, only about 20% of all New York State motor vehicle operators have any accidents or traffic convictions on their records. None of the addicts were licensed to operate a motorcycle, nor were any ever convicted of driving while under the influence of drugs. The records of the 1,226 male addicts showed a total of 4,465 accidents and traffic convictions, with 402 accidents involving injury or death. The results of this study indicate that drug addicts who drive are dangerous drivers. Findings suggest, however, that poor driving may be a result of problems other than the physical effects of drugs.

IU-68-D0030

DRUG AND TOXIC HAZARDS IN GENERAL AVIATION, J. R. Dille; S. R. Mohler, Federal Aviation Administration, Office of Aviation Medicine (1968)

This paper discusses both the potential and the documented roles of drugs, alcohol, pesticides and CO in general aviation accidents, and the need for education to reduce the incidence of involvement of these factors. Pesticide poisoning was found in about 1/3 of aerial application accidents in two small studies considered. Carbon monoxide was concluded to be another real, but relatively rare, cause of general aviation accidents. Pilot factors were attributed to 80% of general aviation aircraft accidents.

IU-65-D0031

DRUGS AND DRIVING. SOME PRECAUTIONS FOR HIGHWAY SAFETY, Food and Drug Administration, Dept. of Health, Education, and Welfare, Government Printing Office, Washington, D.C. (1965)

This pamphlet mentions a number of licit and illicit uses of prescription and non-prescription drugs that may affect driving behavior and ability. The drug classes considered ranged from narcotics to stimulants (amphetamines), tranquilizers, sleeping pills (barbiturates), and antihistamine-containing cold remedies. The general topic of drug-alcohol synergistic effects was broached, as was the necessity of doctors informing their patients of possible untoward drug effects on driving where these may occur.

IU-69-D0032

EFFECTS OF SELECTED NONPRESCRIPTIVE DRUGS ON SPECIFIC PSYCHOPHYSICAL DRIVING SKILLS, M. K. Carter, Xerox University Microfilms, Ann Arbor, Mich. (1969)

The purpose of this study was to determine the effect of certain drugs on driving skills. The drugs used included Alva-tranquil, Empirin, Dristan, Wyamine Inhaler, Excedrin, Bromo Seltzer, Asthmador Cigarettes, Medihaler Epi, Sominex, Cosanyl, and Donnagel. An equal number of placebos were used, and tests were made with 18 subjects. The drugs were found to have no significant effect on driving skills and some were followed by a trend toward the improvement of scores. Subjects were tested for reaction time, depth perception, visual acuity, peripheral vision, glare recovery and steadiness.

IU-69-D0033

EFFECTS OF MARIHUANA AND ALCOHOL ON SIMULATED DRIVING PERFORMANCE, A. Crancer, Jr.; J. M. Dille; J. C. Delay; J. E. Wallace; M. D. Haykin, Division of Research, State of Washington Dept. of Motor Vehicles (1969)

The effects of marihuana, alcohol, and no treatment on simulated driving performance were determined for experienced marihuana smokers. Subjects

experiencing a "social marihuana high" accumulated significantly more speedometer errors than when under control conditions, whereas there were no significant differences in accelerator, brake, signal, steering, and total errors. The same subjects intoxicated from alcohol accumulated significantly more accelerator, brake, signal, speedometer and total errors than under normal conditions, whereas there was no significant difference in steering errors. Impairment in simulated driving performance does not seem to be a function of increased marihuana dosage or inexperience with the drug.

IU-68-D0034

DRIVING RECORDS OF PERSONS ARRESTED FOR ILLEGAL DRUG USE, A. Crancer, Jr.; D. L. Quiring, Division of Research, State of Washington, Dept. of Motor Vehicles (1968)

Driving records of 302 persons arrested for illegal drug use were compared with 687,228 driving records of persons living in the same driving environment. Three groups of illegal drug users were studied: (1) narcotic users; (2) dangerous drug users; and (3) marihuana users.

Accident and violation rates for each group were higher, some statistically higher, than those for comparable population groups. Considerably fewer of the illegal drug users had driving records clear of violations and accidents. When compared to the population, each of the groups had a larger proportion of violations for reckless, hit and run, and negligent driving. In addition, they had fewer violations for speeding, failure to stop, and failure to yield. The proportion of injury and property damage accidents were comparable to the population. None of the illegal drug group had been involved in a fatal accident.

IU-73-D0035

MARIHUANA AND HEALTH. THIRD ANNUAL REPORT TO CONGRESS FROM THE SECRETARY OF HEALTH, EDUCATION, AND WELFARE, Secretary of Health, Education, and Welfare, National Institute on Drug Abuse, Rockville, Md. (1973)

This report describes the present knowledge of marihuana, summarizes the progress of the past year in this area and translates the disparate and necessarily technical data into reasonable answers concerning the health implications of marihuana use on the American people. In addition to reports from the scientific literature, formal and informal reports from grantees of the National Institute of Mental Health and researchers supplied with materials from the Institute are presented. The content contains an introductory section, a summarized report, and sections on the extent patterns and social context of use in the USA. Marihuana use in other countries and materials and analytical methodology are discussed as are preclinical research in animals, tolerance, effects in man and therapeutic uses of cannabis. Future research directions in this area are indicated.

IU-72-D0036

NONHIGHWAY INJURY FATALITIES. 2. INTERACTION OF PRODUCT AND HUMAN FACTORS, J. A. Waller, Journal of Chronic Disease v25 p47-52 (Jan 1972)

The contributions of toys, tools, appliances, chemicals, fabrics and other products both to the initiation of fatal nonhighway injury events and to the severity of such events once initiated, were compared for persons of different ages, blood alcohol concentrations and states of health. Among persons who did not have medical impairment or alcohol in their blood, products were involved in half of the fatalities, whereas they were a factor in a quarter of the fatalities of persons with such impairment.

For persons without impairment or alcohol, products involved usually contributed to the initiation of events. Where impairment or alcohol was present,

however, the products usually did not play a part in initiation but contributed to the severity of injury, in most instances because of excessive flammability of fabrics. The contribution of flammable fabrics to injury and death far exceeded that of toys despite greater public concern with potential hazards of the latter.

IU-73-D0037

ALCOHOL, MARIJUANA, AND RISK TAKING. FINAL REPORT, V. S. Ellingstad; L. H. McFarling; D. L. Struckman, Human Factors Laboratory, Dept. of Psychology, Univ. of South Dakota, Vermillion, S. D. (1973)

The performance of six groups of 16 subjects each (marijuana user control, non-user control, .05 BAC alcohol, .10 BAC alcohol, low dose marijuana, and high dose marijuana) were compared on two laboratory analogs of the automobile passing task. Analysis of the data utilized a multiple discriminant analysis, producing statistically significant discrimination between the six groups. The first dimension of discriminant was related to "judgmental accuracy" and was capable of distinguishing the two marijuana treatment groups from the remaining four groups. The marijuana subjects tended to overestimate time required to complete passes, and showed considerable variability in their estimates. The second discriminant function dimension was labelled "riskiness/decisiveness" and appeared capable of distinguishing the alcohol groups from the remaining subjects. The alcohol group subjects tended to exhibit patterns of psychomotor performance suggesting a tendency to make "snap decisions" which were subsequently overridden.

No dose responses were found for either alcohol or marijuana.

IU-74-D0038

CORRELATES OF BARBITURATE USE. INTERIM REPORT, J. R. Saunders; B. M. Vitola; C. J. Mullins, Personnel Research Division, Air Force Human Resources Lab., Lackland Air Force Base, Texas (1974)

A sample of 448 self-admitted pre-service barbiturate users was compared with a control sample of airmen with no known record of drug abuse. Within the sample of barbiturate users, several variables were examined to see if they were associated with degree of barbiturate use. The barbiturate sample differs significantly from the control sample in that barbiturate users are disproportionately represented in the North-Northeast and Far West-Pacific Coast enlistment areas, they more often indicate no religious preference, and they enlist at a younger age. Degree of barbiturate use is negatively associated with aptitude, educational level, and with measures of success in the Air Force. However, degree of barbiturate use is positively associated with the use of other drugs.

IU-72-D0039

EFFECT OF MARIHUANA ON RISK ACCEPTANCE IN A SIMULATED PASSING TASK, A. B. Dott, Injury Control Research Laboratory, (1972)

Twelve male marihuana users operated an optical driving simulator under a nonsmoking condition and under three conditions after smoking crude marihuana leaf. The estimated dosages of delta-9 tetrahydrocannabinol (THC) in the smoking conditions were 0 mg., 11.25 mg., and 22.5 mg. During each session, each subject was given the opportunity to pass a lead car with the assistance of a passing aid device under conditions of varying risk. During several of these passing trials, there arose an emergency condition that required immediate response in order to avoid an accident. No differences in performance were noted between the nonsmoking and placebo (0 mg. THC) conditions. No differences in performance were noted during any of the emergency conditions. Subjects under the influence of marihuana completed fewer passes

and took more time to make the elective decision as to whether to pass. Subjects under the influence of marihuana did not have more accidents. It is concluded that chronic users under the influence of marihuana are less likely to accept risks than users not under the influence of marihuana. It is not clear whether this represents a compensatory mechanism for perceived disability or a lack of motivation as an effect of the drug. Comparisons of the performance of these subjects with another group performing the same task under the influence of alcohol are also made.

HS-801 095 IU-74-D0040

USE OF PSYCHOACTIVE AND HALLUCINOGENIC DRUGS IN RELATION TO DRIVING RISK, R. G. Smart, In ALCOHOL, DRUGS, AND DRIVING. FINAL REPORT, M. W. Perrine, ed., Psychological Research Foundation of Vt., Inc., (1974)

Reviewed were investigations of prevalence of drug use in different populations (including the driving population), drug use among persons involved in accidents, and accident rates among drug using/abusing populations. A review of the available literature on drug involvement in vehicular accidents suggests that few definite conclusions can be made. It appears that 35 to 50% of the general population take the risk of driving after drug use at least once per year. Much of the known drug use problem occurs among drinking drivers. It is uncertain whether narcotics and hallucinogenic drug users had elevated accident rates and whether their accidents are due to their drug use. Such drugs cannot easily be analyzed in body fluids at present. It appears that the known contribution of drugs to accidents is small, compared to say, alcohol. However, better studies on more frequent drug use in the population may necessitate a revision of this conclusion. At present, there appears to be no need for greater legal countermeasures against drug use and driving.

HS-801 096 IU-74-D0041

ALCOHOL, DRUGS, AND DRIVING. FINAL REPORT, M. W. Perrine, ed., Psychological Research Foundation of Vermont, Inc., (1974)

The basic purpose of the Vermont Symposium was publication of the proceedings to incorporate the following specific aims: (1) Systematic, evaluative reviews of the eight major aspects of alcohol and drug problems related to highway safety, with each review written by a leading specialist in that aspect; (2) a synthesis of the edited transcriptions of the discussion periods that followed presentation of the summaries of each of the eight review papers; and (3) ratings of 176 keyword topics on three dimensions of alcohol, drug, and driving problems, i.e., the extent of present knowledge, the relative priorities for basic research in terms of informational yield, and the relative priorities for applied research in highway safety. The critical reviews consist of combinations of the following topics: Alcohol and/or drug influences upon driving-related behavior as studied in laboratory, simulator, and closed-course driving experiments; epidemiologic studies of the role of alcohol and/or drugs in highway crashes and citations; and research on countermeasures for alcohol and/or drug involved problems on the highway.

HS-800 648 IU-72-D0042

COLLECTION ANALYSIS AND INTERPRETATION OF DATA ON RELATIONSHIP BETWEEN DRUGS AND DRIVING. FINAL REPORT, B. A. Moser; L. D. Bressler; R. B. Williams, Research Triangle Institute (1972)

The purpose of this study was to determine if drug usage is related to driving history. Laboratory analyses of urine samples, in-depth interviews, and public driving records were obtained to investigate the relationship of traffic accidents and violations between male users and nonusers of alcohol and drugs. Data were being collected in six geographical areas. The frequency and amount of use drugs were analyzed in terms of driving performance for

1,889 arrestees for serious crimes. In general the results show that for this select population, drug using drivers have no worse driving records, in terms of accidents and convictions, than the nondrug user drivers.

HS-801 016 IU-74-D0043

INCIDENCE OF DRUGS IN FATALLY INJURED DRIVERS. FINAL REPORT, E. J. Woodhouse, Midwest Research Institute, (1974)

Methods for the collection of blood, urine, bile and alcohol washes of face and fingers from fatally injured drivers have been developed. Specimens were supplied by coroners and medical examiners from fatally injured drivers. Seven hundred and ten were returned. Methods for analysis of blood, urine, and bile for 44 commonly abused drugs were developed. These methods consist of extraction of the fluids, followed by qualitative thin-layer chromatographic screen. If the screen indicated positives, quantitative gas chromatographic confirmation was conducted. Mass spectrometry was used if additional qualitative information was necessary. Alcohol washes of face and fingers were examined for evidence of marijuana using thin-layer chromatographic and colorimetric methods. Blood samples were assayed for alcohol content using a gas chromatographic method.

The analytical results indicated that 58% of the drivers had ingested alcohol, and 47% of the drivers were legally drunk (BAC$\geq$0.100%). Thirteen percent of the drivers evidenced the presence of a prescription drug. Over 5% of the drivers evidenced the presence of a prescription drug in the absence of alcohol. The predominant type of prescription drug found was of the sedative/hypnotic drug -- over 8% of the fatally injured drivers evidenced this type of drug.

The test for contact with marijuana yeilded 38% positive responses.

HS-800 754 IU-72-D0044

DRUG ABUSE AND DRIVING PERFORMANCE. FINAL REPORT, R. D. Blomberg; D. F. Preusser, Dunlap and Associates, Inc., (1972)

Data on 1562 methadone maintenance patients in New York State were gathered through face-to-face interviews. A control group of 1059 people was constructed by asking the experimentals to volunteer names of non-addicted friends. State driver records for 718 experimentals and 579 controls were obtained and analyzed.

In general, experimental subjects were no worse drivers than the controls for the entire period covered by the driver records. This was so despite the fact that experimentals estimated their mileage to be at or above the national average throughout their abuse of non-narcotic and narcotic drugs and during their methadone treatment. It was also found that drug abusers who drive are likely to drive immediately after using drugs.

HS-800 613 IU-71-D0045

STUDY OF POSSIBLE INFLUENCES OF LICIT AND ILLICIT DRUGS ON DRIVER BEHAVIOR. FINAL REPORT, Institute for Research in Public Safety, Indiana University, (1971)

The study investigated the relationship between usage of licit and illicit psychotropic drugs and traffic accidents. Tests were conducted to estimate the incidence of drug presence in the blood among college student drivers just involved in a traffic accident (experimental group) and among college student drivers on the road at the same time as those just involved in a traffic accident (control group). In addition, both groups were interviewed to identify drug usage patterns and relationships between traffic accidents, drug usage,

and other factors. The major conclusions of the study were (1) there was no evidence that subjects involved in traffic accidents had a greater proportion of positive blood sample readings than did the controls, (2) drug usage was statistically unrelated to the number of traffic accidents subjects had incurred in their driving lifetimes, and (3) driving history and other factors were more strongly related to traffic accidents than drug usage. The major study recommendation was that a large scale survey be conducted to develop statistically reliable data to describe the nature of the drug-impaired driver problem.

HS-800 580 IU-71-D0046

DRUG USE AND HIGHWAY SAFETY. A REVIEW OF THE LITERATURE. FINAL REPORT, J. L. Nichols, University of Wisconsin (1971)

This report reviews the research literature concerning several aspects of drug use as it relates to traffic safety. Some of the topics covered include the effects of drugs, types of drug users; research problems in assessing risk; laboratory findings concerning the effects of drugs; survey findings, toxicological investigations; and a discussion of the legal aspects of drug-driving laws.

HS-800 951 IU-73-D0047

EFFECT OF MARIHUANA DOSAGE ON DRIVER PERFORMANCE. FINAL REPORT, H. Moskowitz; W. McGlothlin; S. Hulbert, Institute of Transportation and Traffic Engineering, Univ. of California, Los Angeles, Calif. (1973)

Performance in a complex driving simulator under 4 marihuana dose levels was examined. Car control and tracking appeared to be uninfluenced, but significant dose-related impairment was found on a visual recognition task simulating the search-and-recognition aspects of driving. An additional study of sensory signal detection supported the view that the perceptual deficit induced by marihuana involves a decrease in discrimination sensitivity.

IU-71-D0048

DRINK, DRUGS, AND DRIVING, T. C. Mayer, British Medical Journal v3 n5766 p112 (10 July 1971)

The author in this Letter to the Editor makes mention that generally it is only the patient and his family doctor who are aware of those driving under the influence of drugs. He suggests that steps should be taken not only to dissuade people from driving under the influence of drugs, but to bring existing legislation into effect by requiring family doctors to provide details of current therapy of their patients involved in road traffic accidents.

IU-70-D0049

VISUAL DISTURBANCES EXPERIENCED BY HALLUCINOGENIC DRUG ABUSERS WHILE DRIVING, G. E. Woody, American Journal of Psychiatry v127 n5 p 683-686 (Nov 1970)

Three case reports were presented of young men with histories of hallucinogen usage who experienced visual disturbances while driving. None was "high" at the time of the experience to their knowledge. Each person acted on his perceptions and only after he had changed the course of his automobile did he realize that what he had seen was unreal. It was noted that the disturbances were probably due to recurrences of the acute effect of 1 or more hallucinogens and that the use of LSD and other hallucinogens may be introducing a new driving hazard through their ability to cause visual disturbances and spontaneous recurrences of acute effects. Mentioned in this context as being three of the many possible acute effects of hallucinogens were: prolonged afterimages, visual hallucinations and alterations of cognition and judgement.

IU-70-D0050

COMPARATIVE EFFECTS OF SMOKING MARIHUANA OR PLACEBO ON HUMAN MOTOR AND MENTAL PERFORMANCE, J. E. Manno; G. F. Kiplinger; S. E. Haine; I. F. Bennett; R. B. Forney, Clinical Pharmacology and Therapeutics v11 n6 p808-815 (Nov-Dec 1970)

Normal subjects smoked placebo and marihuana cigarettes which delivered 5 mg delta-9-tetrahydrocannabinol. A significant decrease in all motor performance tests and in 5 of 9 mental performance tests was observed after the marihuana cigarette. Subjects smoking marihuana had more symptoms and greater symptom intensity than those smoking the placebo. Pulse rates markedly and significantly increased after smoking marihuana; the increase was slight and not significant with the placebo. Blood glucose concentrations were not affected by either cigarette. Both cigarettes slightly but significantly decreased plasma K levels. Cannabinols were not found in blood or urine of any subject.

IU-68-D0051

EFFECTS OF NICOTINE ON THE CONSOLIDATION OF PURSUIT ROTOR LEARNING, C. D. Frith, Life Sciences v7 n2 p77-84 (15 Jan 1968)

In this study the effect of nicotine on consolidation of learning was examined using performance on a pursuit rotor as an indicator. Nicotine, which was assumed to be active between five and fifteen minutes after oral administration, was given to twenty subjects who were alternated between test and rest periods so that each subject performed the pursuit rotor before and after the action of the drug. The dose was 0.1 mg. The subjects were divided into two groups so that placebo control could be used in a Latin Square design. Total time on target per minute and mean hit length were used as indices of performance. Analysis of variance showed a significant improvement in terms of mean hit length but non-significance in % time on target, although measurable improvement with this index could be seen from the raw data.

IU-71-D0052

LOW LEVEL CARBON MONOXIDE EXPOSURE AND HUMAN PSYCHOMOTOR PERFORMANCE, R. D. O'Donnell; P. Mikulka; P. Heinig; J. Theodore, Toxicology and Applied Pharmacology v18 n2 p593-602 (Mar 1971)

The effects of 5 concentrations of carbon monoxide exposure on time estimation, tracking, and ataxia were studied in 10 humans. The tracking task required the subjects to keep a needle display dial from going off scale by manipulating a control stick. Levels of CO used were 0, 50, 125, 200, and 250 ppm, yielding mean carboxyhmeoglobin levels from 0.96 to 12.37% in a 3-hour exposure. No significant symptoms were reported by the subjects, and no ability to detect the presence of CO was noted. No overall trend toward poorer estimates of a 10-second interval occurred as a function of CO uptake, and tracking performance did not deteriorate over the course of the exposures to CO. The subjects inhaling CO seemed to show a different overall pattern of tracking performance over time than control subjects. It was concluded that the present data did not support the hypothesis that low level carbon monoxide exposure of humans results in performance decrement.

IU-65-D0053

PSYCHOTROPIC EFFECTS OF CAFFEINE IN MAN. 2. ALERTNESS, PSYCHOMOTOR COORDINATION, AND MOOD, A. Goldstein; S. Kaizer; R. Warren, Journal of Pharmacology and Experimental Therapeutics v150 n1 p146-151 (Oct 1965)

Experiments were conducted with 20 subjects on 9 evenings to study the effects of caffeine (150 mg and 300 mg) as compared with placebo upon objective tests

of alertness and psychomotor coordination. Simultaneously, mood was assessed by means of a self-rating inventory.

Caffeine had no demonstrable effect upon either objectively measured performance although at the same time it made the subjects feel more alert and physically active. In some subjects caffeine caused a feeling of nervousness rather than alertness.

IU-74-D0054

COMMITTEE ON PROBLEMS OF DRUG DEPENDENCE, National Academy of Sciences, National Research Council, Committee on Drug Dependence (1974)

This work is composed of papers of a meeting of the Committee on Problems of Drug Dependence, and includes subjects such as clincial studies, treatment and rehabilitation, opiate receptor and pharmacology, sociology, and epidemiology. Individual papers can be found on methadone analysis, synthetic substitutes for morphine, narcotic antagonists, heroin addiction, Vietnam drug addiction, effect of maternal narcotic addiction, analgestic studies in cancer patients, and alcoholism. These papers concern ongoing research and projects only, and are not meant to be the definitive word on the subjects considered.

HS-801 246 IU-74-D0055

ALCOHOL/DRUG LITERATURE RELATED TO LAW ENFORCEMENT. ALCOHOL COUNTERMEASURES LITERATURE REVIEW. FINAL REPORT, L. P. Watts, National Safety Council, (1974)

The author has reviewed and reported on those U.S. publications in which a significant portion touches upon legal matters or upon materials of direct bearing upon legislative policy, administration of justice, or law enforcement. The review deals with general policy recommendations developed by major writers such as H. Lawrence Ross, Robert F. Borkenstein, and Arthur J. McBay; administration of justice, including sanctions designed to deter the drinking driver; implications for law and law enforcement from Alcohol Safety Projects and related activities; roadside screening tests; implied consent laws; and legislation and legislative proposals at state and national levels.

IU-67-D0056

ROLES OF ALCOHOL, DRUGS AND ORGANIC FACTORS IN FATAL SINGLE VEHICLE ACCIDENTS. FINAL REPORT, (State of) California, Department of Highway Patrol (1967)

This study selected California single car accidents where the driver died within 15 minutes of the accident occurrence, and its object was to attempt to estimate the degree of the problem of alcohol, drugs, and organic factors. In the area of alcohol, it was found that 71% of the men studied and 39% of the women were drunk; the alcohol problem was most pronounced in the 30 to 50 age group. Between midnight and 3:00 a.m., 26% of the accidents occurred, and of these drivers, 83% were drunk. Although the percentage of these drunk drivers tended to be higher during the weekend, the alcohol problem was significant on all seven days of the week.

The same drivers were studied for drugs. Among men, 13% were found to have taken drugs while 16% of women had, and beginning at about 16 years of age, the drug usage increased proportionately with age. The alcohol problem was also present among drug users.

Of the 1,474 drivers studied, 155 died from natural causes rather than the traffic accident, and these drivers were older and tended to be men. Considered by the time of day, the drivers dying from natural causes were a daytime problem, while the drivers dying from the traffic accidents tended to be a night-

time problem. There was a very low occurrence of alcohol among drivers dying from natural causes, but the drug usage was higher.

IU-72-D0057

TESTING FOR DRUGS - ADVANTAGES AND DISADVANTAGES, G. G. De Angelis, International Journal of the Addictions v7 n2 p365-385 (Summer 1972)

This paper is concerned with detecting illicit drug use (drug abuse) principally among individuals participating in treatment--methadone type--rehabilitation programs. The author notes that tests done for the sole purpose of detecting drug abuse, whether performed by the physician during examination or by an outside laboratory, are really no different in design, execution or value from any other diagnostic (analytical method) test. The analytical methodology considered included: urinalysis and blood analysis by means of Thin Layer Chromatography (TLC), Gas Liquid Chromatography (GLC), and the FRAT™ (free radical assay technique) system which utilizes antibody-antigen in combination with stable free radical and election spin resonance (ESR) techniques. False positivies and false negatives are discussed as are their significance in and to rehabilitation programs. Along this line, the shortcomings and limitations of some of the analytical techniques are mentioned, and the advantages and disadvantages of drug testing in these types of programs are outlined.

IU-67-D0058

AEROMEDICAL EVALUATION OF TOPICAL 2 PER CENT LEVO-EPINEPHRINE ON NORMAL SUBJECTS, C. R. O'Briant; T. J. Tredici; J. F. Culver, Aerospace Medicine v38 n11 p1171-1174 (Nov 1967)

This study was undertaken to evaluate the effect of 2 per cent levo-epinephrine applied topically to the cornea of normal rated subjects. Specific attention was given to any possible aeromedical ocular or systemic effect which might create a hazard to a flyer or flying safety. The only criteria for the subject volunteer were that he be on no medication, have normal intraocular tension and have no known hypersensitivity to epinephrine. The subjects had thorough visual baseline studies including tonometry and tonography, as well as baseline blood pressures and pulse studies. Levo-epinephrine was then placed in one eye and the subject carefully monitored for visual acuity, pupillary diameter, accomodation, night vision, blood pressure and pulse. Intraocular tension by tonometry and tonography for aqueous facility of outflow was again determined.

The results indicated that there was no adverse cardiovascular effect of the medication, such as tachycardia or systemic hypertension. It was also noted that none of the subjects had any objectionable side effects from the drug, and that importantly, there was no impairment of visual acuity or night vision. There was a slight loss of accommodation in the subjects with dilated pupils. There was no noticeable change in intraocular pressure or facility of aqueous outflow in normal subjects in contrast to the reported effects on individuals with intraocular pressure. It was concluded that the application of 2% levo-epinephrine to normal eyes produced no adverse aeromedical impairment.

IU-67-D0059

SOME PSYCHOMOTOR AND PHYSIOLOGICAL TESTS ON HUMANS EXPOSED TO AIR IONS, R. D. McDonald; C. H. Bachman; P. J. Lorenz, Aerospace Medicine v38 n2 p145-148 (Feb 1967)

In this study humans were exposed to air ions by inhalation only. The ion current to each subject was measured. Both the psychomotor and physiological tests performed under ionization were ambiguous. In a vigilance task both negative ions and positive ions reduced the number of omissions, the positives being the most effective. Neither polarity affected heart rate. Reduction in

respiratory rates measured for both polarities of ions as well as the control during the ion exposure. The reduction for positive ions was greater than for the control. The reduction for negative ions was less. Measurements of DC potential between forehead and ear showed no correlation with ion treatment.

IU-70-D0060

PRÜFUNG EINES MEDIKAMENTS AUF [illegible] DER KRAFTFAHRTAUGLICHKEIT (INVESTIGATION OF THE IMPAIRMENT OF DRIVING FITNESS BY A DRUG), L. Moser, Zeitschrift für Verkehrssicherheit [illegible] 1979)

By the use of a variety of tests of [illegible] performance, and psychomotor skills, the author concludes that decisions can be made regarding the possible adverse effects of drugs (alone or in combination with alcohol or caffeine) on motor vehicle operation.

IU-68-D0061

EFFECTS OF TWO ANTIHISTAMINE CONTAINING [illegible] ALTITUDES, F. [illegible] W. Davis; [illegible] Vaughan; G. [illegible] Aerospace Medicine [illegible] Nov 1968)

In a study of 45 human [illegible] determined that a [illegible] containing the antihistamine [illegible] did not significantly impair performance on a modified Mashburn coordinator. Another compound containing the antihistamine chlorpheniramine did impair performance. Performance also was impaired by increasing altitudes. The combination of the chlorpheniramine compound and increasing altitude was [illegible] to performance than the sum of the decrements that each influence caused when encountered separately. Undesirable side-effects were noted on administration of the phenindamine compound.

IU-68-D0062

EFFECTS OF TOPICAL OPHTHALMIC 2 PERCENT PILOCARPINE ON VISUAL PERFORMANCE OF NORMAL SUBJECTS, E. E. Lindstrom; T. J. Tredici; B. G. Martin, Aerospace Medicine v39 n11 p1236-1240 (Nov 1968)

Twenty subjects in different age groups were studied for the effects of 2 percent pilocarpine on normal ocular dynamics. Considerable individual variability in response was noted. Maximum effects on visual acuity, accommodation, and refraction were produced in the younger subjects, with the older subjects exhibiting less marked changes. The most significant change was the initial decrease in visual acuity for distance. All subjects demonstrated characteristic miosis but without significant reduction in peripheral fields. The mean reduction in intraocular pressure was 1.7 mm Hg. All subjects experienced some reduction in their dark-adaptive ability.

IU-68-D0063

SIDE-EFFECTS OF l-HYOSCINE AND CYCLIZINE STUDIED BY OBJECTIVE TESTS, J. J. Brand; W. E. Colquhoun; W. L. M. Perry, Aerospace Medicine v49 n9 p999-1002 (Sep 1968)

Doses of l-hyoscine base of 0.1, 0.42 and 0.7 mg., and of cyclizine hydrochloride of 15 and 100 mg., were given by mouth to groups of volunteer subjects and measurements of saliva flow, resting pulse rate, accommodative power and mental performance were then carried out at various time intervals after the dose.

l-hyoscine at doses of 0.42 and 0.7 mg., gave rise to depression of saliva flow and a fall in pulse rate, but had no measurable effect on power of accommodation. These effects were well-established at 2-3 hours after dose and

appeared to have worn off after 6 hours. Cyclizine hydrochloride at doses of 15 and 100 mg. produced no effects of this nature, and therefore no accurate response time data could be obtained using these parameters. Neither of the two drugs produced any significant effect on tests of vigilance or speed of arithmetical computation.

IU-68-D0064

ALKOHOL UND MEDIKAMENTE. STATISTISCHE UNTERSUCHUNGEN ÜBER HÄUFIGKEIT UND WIRKUNG ANHAND GERICHTSMEDIZINISCHER BLUTALKOHOL-UNTERSUCHUNGEN (ALCOHOL AND DRUGS. STATISTICAL INVESTIGATIONS ON INCIDENCE AND EFFECT WITH REFERENCE TO FORENSIC MEDICAL BLOOD ALCOHOL TESTS), C. Romeyke (1968)

This is a doctoral thesis examining the interaction of alcohol with a variety of therapeutic agents, especially with regard to blood alcohol concentrations. No results specifically for driving are presented. Basically, the author concludes that drugs may influence (either potentiating, additive, or inhibiting) the effects of alcohol on various behavioral tests without altering the levels of blood alcohol.

IU-69-D0065

DER INFORMATIONSGRAD ÜBER DIE GEFÄHRDUNG DES STRABENVERKEHRS DURCH ALKOHOL--UND ARZNEIMITTELGEBRAUCH EINER RHEINISCHEN BEVÖLKERUNGSGRUPPE (LEVEL OF INFORMATION ABOUT THE THREAT TO ROAD TRAFFIC BY ALCOHOL AND DRUG USE IN A RHENISH POPULATION GROUP), H. van Straelen (1969)

This doctoral thesis examines the state of knowledge of the hazards of alcohol and drugs, in relation to motor vehicle operation, of a random population of Rhenish adults. The results lead the author to conclude that such knowledge is very poor, and in some cases, quite erroneous.

IU-69-D0066

ESSENTIAL HYPERTENSION IN AIRLINE PILOTS, F. Jönsson; N. Sundgren, Aerospace Medicine v40 n1 p70-75 (Jan 1969)

A review of hypertension problems in selection and evaluation of airline pilots is given. Efforts to define normal blood pressure have not been successful, and the use of arbitrary cut-off values is discussed. Essential hypertension in a skilled and experienced pilot should not terminate his flying career if there is no evidence of complications. Blood pressure values *per se* should not necessarily be a reason for definite grounding until the possibilities of treatment -- including drug treatment -- have been tried. As drug treatment of essential hypertension is a long-term treatment, one must consider if the side effects of the drug are compatible with flight duty. Although this is not the case with the majority of the more potent hypotensive drugs, the thiazides might be safely used under competent medical supervision. 8 cases with thiazide treatment on flight duty are subsequently described.

IU-71-D0067

EFFECTS OF CARBON DIOXIDE ON THE ALPHA FREQUENCY AND REACTION TIME IN HUMANS. M. R. Harter, Electroencephalography and Clinical Neurophysiology v23 n6 p561-563 (Dec 1971)

The effects of acute exposure (5 min.) to carbon dioxide (0-7.9%) on the EEG's reaction times of five humans were investigated. Alpha frequency and alpha amplitude were recorded from the central and the occipital-parietal areas of the scalp while subjects reacted with their right index finger to flashes of light. Variance analysis indicated that the percentage CO_2 inhaled significantly affected alpha frequency and reaction time. Alpha frequency and reaction time were significantly faster under the 0-5.5% CO_2 condi-

tions than under the 7.9% CO_2 condition. A slight increase in alpha frequency and decrease in reaction time were evident under the 3.5 and 5.5% CO_2 conditions as compared to the 0 and 1.5% CO_2 conditions.

IU-68-D0068

DRUGS AND CARBON MONOXIDE IN FATAL ACCIDENTS, I. Sunshine; N. Hodnett; C. R. Hall; R. Rieders, Postgraduate Medicine v43 n3 p152-155 (Mar 1968)

This investigation analyzed blood and urine of adults who died in car accidents during a one-year period in Philadelphia and an 18-month period in Aryahoga County (Cleveland). Alcohol was found frequently, carbon monoxide less often, and drugs rarely.

IU-70-D0069

TEMPORAL DISINTEGRATION AND DEPERSONALIZATION DURING MARIHUANA INTOXICATION, F. T. Melges; J. R. Tinklenberg; L. E. Hollister; H. K. Gillespie, Archives of General Psychiatry v23 n3 p204-210 (Sept 1970)

On a cognitive task and a subjective inventory, oral doses of 20-60 mg marijuana extract, calibrated for content of (-)deta-9-tetrahydrocannabinol (THC), induced confusion of past, present, and future and loss of goal-directedness in normal men. This temporal disintegration was related to increases in depersonalization for all of the subjects. The fragmentation of temporal experience and the accompanying depersonalization were euphorigenic. The euphoria often took place when subjects felt less concerned about future outcomes relevant to maintaining their usual sense self.

IU-71-D0070

MARIHUANA IN MAN: THREE YEARS LATER, L. E. Hollister, Science v172 n3978 p21-28 (2 Apr 1971)

The past 3 years of renewed research on the effects of marihuana in man has added little not previously known about the clinical syndromes produced by the drug. The major advance was a quantification of dose in relation to clinical phenomena, and a beginning of an understanding of the drug's metabolism. The crucial clinical experiments in regard to the social questions about marihuana, such as the possible deleterious effects from chronic use, cannot be answered by laboratory experiments. These must be settled by close observations made on those who experiment on themselves. It should be possible, within a relatively short time, to determine whether marihuana has any medical utility, but the future would appear to be no more promising than the past in this regard. The mechanisms by which marihuana alters mental functions are not likely to be answered in man, nor even answered soon by animal studies. As marihuana may be unique among drugs in that more experimentation was accomplished in man than in animals, it may be necessary to look to additional animal studies to provide leads for pertinent future studies in man.

IU-74-D0071

PSYCHOTHERAPEUTIC DRUGS AND DRIVING, L. E. Hollister, Annals of Internal Medicine v80 n3 p413 (Mar 1974)

The author in this editorial note discusses in a general manner the effects of psychotherapeutic drugs on driving. Specific drugs and drug classes mentioned are: diazepam, chlordiazepoxide, caffeine, marihuana, ethanol, antihistaminics, analgesics, sympathomimetics, gastrointestinal drugs, and antianxiety agents. He concludes that: the physician who prescribes psychotherapeutic drugs has a responsibility to warn his patients of their possible deleterious effects on driving. Denying the right to drive is neither practical nor desirable. It is practical and desirable to use dose

schedules for those drugs that will minimize possible impairment of the patients' driving ability. Giving the major or the sole dose of drugs in the evening or before bedtime is feasible for all types of commonly used psychotherapeutic drugs. The patient must be warned that self-administered drugs can also impair his ability to drive. It should be assumed that, when alcoholic beverages interact with psychotherapeutic drugs, they impair performance -- despite the difficulties in proving such interactions experimentally.

IU-71-D0072

L-DOPA AND ERROR CORRECTION TIME IN PARKINSON'S DISEASE, R. W. Angel; W. Alston; H. Garland, Neurology (Minneapolis) v21 n12 p1255-1260 (Dec 1971)

Ten patients with Parkinson's disease were tested on a pursuit tracking task before and during the administration of L-Dopa. Incorrect responses were elicited by reversal of the visual feedback during portions of the test. At the time of the second test, the therapeutic regimen had not produced a significant effect on the latency of movement in response to a visual stimulus or on the time needed to execute correct responses. There was, however, a significant decrease of the time needed to stop incorrect responses. The results were discussed in terms of a control mechanism that monitors and controls voluntary movement.

IU-74-D0073

LONG-RANGE MOTOR PERFORMANCE CHANGES IN LEVODOPA-TREATED PATIENTS WITH PARKINSON'S DISEASE, J. H. Birdsong; A. S. McKinney, Neurology (Minneapolis) v24 n2 p107-115 (Feb 1974)

In this study, the ability of L-Dopa to improve the long range motor performance of Parkinson's patients was examined. The Methods-Time Measurement (MTM) System was used to evaluate the motor function of patients receiving L-Dopa in doses ranging from 3 to 7.5 gm. per 24 hours for a period of two years. This test system divided a task into five motor elements: grasp, move, position, release, and reach. Performance in each of these elements was compared at periods of 3 weeks, 3 months, and two years after beginning of the experiment. Analysis of variance showed a continued decrease in performance over the period of the study indicative of continued deterioration in the disease despite L-Dopa therapy.

IU-73-D0074

SENSORIMOTOR COORDINATION IN PARKINSON'S DISEASE BEFORE AND AFTER LEVODOPA THERAPY, F. P. Bowen; E. Brady; M. D. Yahr, Neurology (Minneapolis) v23 n10 p1101-1106 (Oct 1973)

Parkinson patients who benefited neurologically from levodopa therapy were tested on two types of tasks of motor ability, (1) repetitive tapping of a button for a 10 second period under unimanual and bimanual conditions and (2) tracking a randomly moving light.

It was found that concomitant with the neurologic improvement, the parkinson patients on levodopa therapy improved on both tapping and tracking after taking the drug for an average of four weeks. This improvement was still present after being on levodopa therapy for one year, the extent of this study.

Parkinson patients on standard anti-cholinergic drugs did not exhibit a significant change in the tapping and tracking task for the short term (four week period). There was also little change in normal subjects tested again after a four week period, although some practice effect was noted in these subjects.

IU-67-D0075

POSSIBLE MEDICAL FACTORS CONTRIBUTING TO THE FATAL CRASH OF A RACE PILOT. A CASE REPORT, R. G. Snyder; J. R. Dille, Aerospace Medicine v38 n2 p195-197 (Feb 1967)

The fatal crash of an unlimited class aircraft during high-G pylon racing at the 1965 Internation Air Races at Boulder City, Nevada, raised questions of possible gastrointestinal symptoms and drug use which could have lowered the pilot's G tolerance and his ability to react adequately in an emergency situation. Discussion of the possible effects of sedation, fatigue, and reduced G tolerance due to acute gastroenteritis is presented. It is suggested that this be considered as a possible contributing cause of the accident.

IU-72-D0076

OCULAR COMPLICATIONS OF DRUG THERAPY, T. J. Tredici; D. L. Epstein, Aerospace Medicine v43 n8 p898-902 (Aug 1972)

A brief resume of the neuro-pharmacology of the eye was given. With the feeling that treatment of occular or systemic disease may primarily or secondarily affect vision, complications of drugs usually used in glaucoma therapy were stressed; also complications to the eye and vision resulting from the use of steroids, certain topical drugs, oxygen, antimalarial compounds, and several miscellaneous drugs were discussed. It has hoped that by enumerating the variety of drugs and reactions to them the flight surgeon would be alerted to seek a reliable history and be better able to advise the flyer accordingly.

IU-67-D0077

EPILEPSY AND DRIVING, British Medical Journal v1 n5538 p510 (25 Feb 1967)

In a decision by the Divisional Count of the Queen's Bench Division, it was determined that a person taking drugs to prevent the manifestation of a disease does, in fact, suffer from that disease and that he may be denied a driver's license if such a disease is specified as grounds for disqualification. In this case a man was denied a driver's license because of a history of epilepsy even though his medication prevented the occurrence of attacks.

IU-71-D0078

EFFECT OF CARBON MONOXIDE EXPOSURE ON HUMAN SLEEP AND PSYCHOMOTOR PERFORMANCE, R. D. O'Donnell; P. Chikos; J. Theodore, Journal of Applied Physiology v31 n4 p513-518 (Oct 1971)

In this study to test the effect of exposure to small amounts of carbon monoxide (CO), four subjects were exposed to 75 and 150 parts per million of CO during sleep for 9 hrs., producing mean carboxygemoglobin levels of 5.9 and 12.7%. Sleep was monitored continuously through electrophysiological recording. Upon waking, subjects were given mental arithmetic, time estimation, tracking, monitoring and visual tests. No performance decrements or differences from control conditions were found in any of the tests used. With respect to sleep patterns, it was found that subjects under CO had more deep sleep and less light sleep than in the control condition: Rapid eye-movement sleep was not affected. It was concluded that, although certain CO effects occur in sleep, these are not great enough to affect performance and that for healthy well-motivated human subjects these levels of CO do not produce performance decrements in the tasks used.

IU-73-D0079

LOW LEVEL EXPOSURE TO CARBON MONOXIDE AND DRIVING PERFORMANCE, R. A. McFarland, Archives of Environmental Health v27 n6 p355-359 (Dec 1973)

In this study subjects were exposed to low levels (700 ppm) of carbon monoxide until carboxyhemoglobin (COHb) levels of 6%, 11%, and 17% were reached, and they were then tested as to their ability to perform both selected driving related laboratory tests of visual response and control reactions and over-the-road vehicle driving. These results were compared with those on the same subjects under control conditions without exposure to CO.

The overall pattern of results indicates that a 6% COHb level had no effect on driving ability, and that COHb levels of 11% and 17% did not appear to seriously affect the ability to drive motor vehicles, as measured by the tests administered in this study. Statistically significant differences were found in some tests that suggest some decrement in performance as a result of CO exposure.

IU-73-D0080

CARBON MONOXIDE AND DRIVING SKILLS, G. Wright; P. Randell; R. J. Shephard, Archives of Environmental Health v27 n6 p349-354 (Dec 1973)

Eighty milliliters of carbon monoxide (CO) or 80 ml of air was administered double-blind to 50 adults (32 men, 18 women). Blood carboxyhemoglobin (COHb) levels increased by 3.4% in those receiving CO. Brake reaction time, night vision, glare vision, glare recovery, hand-steadiness and depth perception all showed small and individually insignificant deterioration in the group receiving CO. Grouping data in a nonparametric analysis, the performance difference became significant ($P < .005$). During operation of a driving simulator, the CO-exposed group showed a highly significant deficit in "careful driving" skills ($P < .005$), with a statistically insignificant facilitation of emergency-type movements. Since a 3.4% increase of COHb level is sufficient to prejudice safe driving, it was then felt that there is a need to revise the permitted eight-hour industiral CO exposure level of 50 ppm.

IU-73-D0081

EFFECT OF SOME BETA ADRENOCEPTOR BLOCKING AGENTS ON SKELETAL NEUROMUSCULAR TRANSMISSION AND MOTOR CO-ORDINATION, F. S. K. Barar; B. R. Madan, Indian Journal of Medical Research v61 n7 p1054-1061 (July 1973)

Beta-adrenergic blockers such as propranolol and pronethalol caused a deficit in motor coordination in rats as measured by the rotorod test. These results may have implications for driving in patients on chronic dosage of such drugs.

IU-66-D0082

EFFECT OF PROMETHAZINE HYDROCHLORIDE ON HAND-EYE CO-ORDINATION, G. R. Molson; J. A. Mackey; J. V. Smart; P. Turner, Nature (London) v209 n5022 p516 (29 Jan 1966)

Four healthy male students, aged between 21 and 23 years, took part in a double-blind cross-over experiment in which promethazine hydrochloride (50mg) was compared with a placebo at 2-weekly intervals. The test apparatus for measuring hand-eye coordination consisted of a small rotating drum with surface electrical contacts and a hand-controlled contact arm. Each subject was fully familiarized with the technique in order to minimize learning effects. They abstained from stimulants and cigarettes during the experiment. Before and at 1, 2, and 3 hours after administration of the drug or placebo, measurements were recorded over eight rotations of the drum, with an interval of 1 minute between each rotation.

The mean values of the highest score of each determination at any one time in the four subjects were obtained and it was determined that promethazine hydrochloride produced a significant fall in score ($P < 0.05$) compared with the placebo at 3 hr., but no significant difference was seen at 1 and 2 hr. The results demonstrated that promethazine hydrochloride significantly impairs hand-eye coordination. The dose used was sufficient to produce subjective symptoms of central depression in all the subjects. The possible hazards involved in driving and other complex tasks were mentioned.

IU-70-D0083

POSSIBLE EFFECTS OF SPACE CABIN ENVIRONMENTS ON DRUGS, H. L. Bitter, Military Medicine v135 n6 p495-499 (June 1970)

Long-term space flights may call for continued maintenance of the physiologic system by means of analgesics, analeptics or antibiotics, for proper performance or for emergency conditions. To more thoroughly understand the complex physiologic phenomena occurring in space travelers, the modes of drug administration, absorption, distribution, detoxication, metabolism, side effects and excretion patterns must be considered. Any environmental change has the potential to alter some physiological or biochemical function in the body. When this occurs, the body adjusts in an attempt to attain a new equilibrium. This may produce an altered internal environment for enzyme systems, and thus have a marked effect on how the body responds to drug administration. The simultaneous exposure to the various stresses involved in space travel will make such information difficult to obtain, except in space.

IU-70-D0084

MEASUREMENT OF BEHAVIOURAL CHANGES IN PATIENTS ON L-DOPA, M. J. Meier; W. E. Martin, Lancet v1 n7642 p352-343 (14 Feb 1970)

In this letter to the editor, the author describes a controlled study of the effects of L-Dopa on Parkinson patients performing a simple motor task employing the 'Purdue-Groved Pegboard'. L-Dopa was found to significantly ($P<0.01$) improve the group's performance on this task.

IU-67-D0085

AMYTRIPTYLINE-POTENTIATION BY ALCOHOL, G. Milner, Lancet v1 n7483 p222-223 (28 Jan 1967)

In this letter to the editor, the author raised the possibility of amytriptyline and trimipramine - alcohol interactions occuring at a more frequent rate than had been previously recognized and its probable involvement in "late mortality" reactions. These comments were based on a number of studies he had done, with the two drugs involved, on rats. He concludes by suggesting that antidepressant drug-alcohol combinations may have a synergistic effect which greatly increases the risks of traffic-accidents and deaths from overdosage.

IU-73-D0086

LORAZEPAM ON VISUO-MOTOR CO-ORDINATION AND VISUAL FUNCTION IN MAN, R. W. Bell; D. S. Dickie; J. Stewart-Jones; P. Turner, Journal of Pharmacy and Pharmacology v25 n1 p87-88 (Jan 1973)

In this study, the benzodiazepine drug lorazepam was tested for its effects on visual function and visuo-motor co-ordination. Lorazepam in doses of 1 and 2 mg. and a placebo were given in two latin square designs to 6 volunteers familiarized to a plateau of performance to eliminate learning effects. Tests

were performed on refraction, visual acuity, amplitude of accomodation, oculomotor balance, visual fields and hand-eye coordination. Tests before and at 1½ and 3 hrs. after treatment were subject to analysis of variance. A significant ($P < 0.001$) dose related increase in tracking errors was shown in the hand-eye coordination test, the maximal effect being at 1½ hrs. after dosage. No significant changes were found in any of the other tests of visual performance.

IU-68-D0087

QUANTITATIVE MEASUREMENT OF MOTOR INCOORDINATION IN NAIVE MICE USING AN ACCELERATING ROTAROD, B. J. Jones; D. J. Roberts, Journal of Pharmacy and Pharmacology v20 n4 p302-304 (Apr 1968)

A simple modification of the standard rotarod apparatus was described which eliminated the necessity of time-consuming training, and consequently gave a truer measure of motor coordination since any effects on memory were avoided. The sensitivity and reproducibility of the procedure were much greater than those obtained with constant speed rotarods and fewer animals were required to obtain statistically significant results. Phenobarbitone caused a significant dose-response related decrease in performance from controls in doses of 75 mg/kg or more, as did chlorpromazine in doses exceeding 1 mg/kg, meprobamate in doses exceeding 100 mg/kg and ectyurea in doses of 100 mg/kg or more.

IU-71-D0088

PROMETHAZINE ON HAND-EYE CO-ORDINATION AND VISUAL FUNCTION, A. T. W. Large; G. Wayte; P. Turner, Journal of Pharmacy and Pharmacology v23 n2 p134-135 (Feb 1971)

In this study six male students, aged 20-22 years, in good health, with visual accuities of 6/4.5 or better in both eyes, and who were receiving no other medication, were given promethazine 25 mg orally, or a placebo in random order under double-blind conditions. The test apparatus for measuring hand-eye coordination consisted of a small rotating drum with surface electrical contacts and hand-controlled contact arm. Each subject was fully familiarized with the techniques involved to minimize learning effects and abstained from stimulants, alcohol and nicotine during the experiments. At least one week elapsed between each treatment. Measurements were made before and at 1½ and 3 hrs. after administration of the treatment. Promethazine, it was found, produced a significant reduction in the hand-eye coordination test score when compared with placebo, which was most marked at 3 hrs. ($d=16.8$, $S.C.=4.23$, $t=3.906$, $(P<0.02)$. No sedation effects at this dose were seen during the 3 hr. experimental period, although sedation about 6 hr. after having taken promethazine was noted by all the subjects.

IU-69-D0089

EFFECT OF A LARGE DOSE OF ATROPINE UPON THE PERFORMANCE OF ROUTINE TASKS, R. J. Moylan-Jones, British Journal of Pharmacology v37 n1 p301-305 (Sep 1969)

A field trial was conducted in order to assess the effect upon tasks (including hard labor, skilled work, the use of instruments and tools, and shooting) of giving 6 mg. of atropine sulfate by injection to 23 adult male volunteers. Impairment of performance was seen in these tasks under the influence of the drug, but this was statistically significant only in some of them. Drowsiness occurred in twenty-one men and perceptual disorders were common, but two men were almost completely resistant to the effects of the drug. The implications of the therapeutic use of comparable doses of atropine were discussed.

IU-70-D0090

EFFECT OF NITROUS OXIDE ON REACTION TIME AND CEREBRAL EVOKED POTENTIAL, M. J. Jarvis; M. H. Lader, British Journal of Pharmacology v39 n1 p254P-255P (May 1970)

In this study, reaction times and evoked electroencephalographic responses to tone stimuli were measured. The effects on these measures of inhaling 10, 20, or 30% N_2O (nitrous oxide) in oxygen were compared with those of pure oxygen in normal subjects. N_2O prolonged reaction time and diminished all components of the evoked responses in a regular dose-related manner. The form of the evoked response was also related to the speed of reaction-time. These findings were briefly discussed in terms of the processes of attention and arousal.

IU-68-D0091

CLINICAL AND PSYCHOLOGICAL EFFECTS OF MARIHUANA IN MAN, A. T. Weil; N. E. Zinberg; J. M. Nelsen, Science v162 n3859 p1234-1242 (13 Dec 1968)

This study was the first to attempt to discern the clinical and psychological effects of marihuana in man, in a controlled laboratory setting employing a well-balanced experimental design. Nine healthy, male volunteers, 21 to 26 years of age, who had never taken or participated in marihuana use, served as the marihuana naive subject group. Matched volunteers who were chronic users of marihuana also participated, both to "assay" the quality of marihuana received from the Federal Bureau of Narcotics and to enable the experimenters to standardize the protocol. The naive subjects submitted to physiological measurements, and a psychological and psychomotor test battery, both before and twice after smoking either placebo, a low dose of marihuana, or a high dose of marihuana. The marihuana-experienced subjects did the same, but they always received the high marihuana dose.

The experimenters concluded that it is feasible and safe to study the effects of marihuana on human volunteers who smoke it in a laboratory. In a neutral setting persons who are naive to marihuana do not have strong subjective experiences after smoking low or high doses of the drug; the effects they do report are not the same as those described by regular users of marihuana who take the drug in the same neutral setting. Marihuana-naive persons do demonstrate impaired performance on simple intellectual and psychomotor tests after smoking marihuana and the impairment is dose-related in some cases. Regular users of marihuana do get high after smoking marihuana in a neutral setting, but do not show the same degree of impairment of performance on the tests as do naive subjects. In some cases, their performance even appears to improve slightly after smoking marihuana.

IU-71-D0092

HANGOVER EFFECT OF HYPNOTICS IN MAN, A. J. Walters; M. H. Lader, Nature (London) v229 n5287 p637-638 (28 Feb 1971)

In a double blind study involving 10 normal subjects, hypnotic doses of Na butobarbitone (100-200 mg) and nitrazepam (5-10 mg) caused a definite hangover 12 hrs. after the administration of the drug. The hangover effects were accompanied by psychological impairment and electrophysiological changes.

IU-69-D0093

COMPARISON OF THE EFFECTS OF MARIHUANA AND ALCOHOL ON SIMULATED DRIVING PERFORMANCE, A. Crancer, Jr.; J. M. Dille; J. C. Delay; J. E. Wallace; M. D. Haykin, Science v164 n3881 p851-854 (16 May 1969)

The effects of marihuana, alcohol, and no treatment on simulated driving performance were determined for experienced marihuana smokers. Subjects

experiencing a "social marihuana high" accumulated significantly more speedometer errors than when under control conditions, whereas there were no significant differences in accelerator, brake, signal, steering and total errors. The same subjects intoxicated from alcohol accumulated significantly more accelerator, brake, signal, speedometer, and total errors than under normal conditions, whereas there was no significant difference in steering errors. Impairment in simulated driving performance does not seem to be a function of increased marihuana dosage or inexperience with the drug.

IU-68-D0094

CARBON MONOXIDE AND HUMAN HEALTH, J. R. Goldsmith; S. A. Landaw, Science v162 n3860 p1352-1359 (20 Dec 1968)

This paper discusses various aspects of carbon monoxide exposure. The major sources of exposure are cigarette smoking, motor vehicle exhaust, occupational sources and home heating and cooking devices. There is also endogenous production of CO from lime metabolism. CO combines with hemoglobin to occupy a substantial portion of this oxygen-carrying substance and carboxyhemoglobin interferes with the release of oxygen from hemoglobin, further reducing oxygen transport. With exposures of CO as low as 50 parts per million for 45 minutes, researchers found central impairment in test subjects' ability to estimate one-second time intervals.

Other researchers found changes in response with pulse rate, respiratory rate, blood pressure, neurologic reflexes and a battery of psychomotor tests. Electrocardiographic changes, right- sided hypertrophy, heart muscle scarring and fatty degeneration have been found in exposure of laboratory animals to CO. Attempts to correlate atmospheric CO levels with fatality rates in myocardial infarction have been difficult to evaluate due to variability in individual histories but there does seem to be a slight positive correlation. Attempts to correlate accident rates and CO levels have been more difficult to interpret due to hourly, seasonal, individual, and locational variability.

IU-73-D0095

EFFECT OF BENZOCTAMINE AND ALCOHOL ON MOTORSKILLS USED IN CAR DRIVING, A. A. Landauer; W. Laurie; G. Milner, Forensic Science v2 n3 p275-283 (Aug 1973)

Three groups each of 11 healthy male subjects were given either 40, 20 or 0 mg. of benzoctamine (Tacitin). They were tested with a battery of motor-skill tests and questionnaires both before and after alcohol intoxication (induced average blood alcohol level: 0.083%). In 3 out of 5 measures, performance decreased significantly ($P<0.001$) after alcohol consumption. There was no significant difference in performance between the 3 groups of subjects in relation to use effects of benzoctamine. Subjects who had received 40 mg of benzoctamine felt less energetic than the subjects in the other 2 groups, as assessed by self-rating scales. A single dose of 40 mg of benzoctamine or 2 doses of 10 mg did not affect motor-skill performance and no potentiation of alcohol effects occurred in these subjects. The possibility of adverse idiosyncratic reactions was noted in the context that no drug should be prescribed for trivial or casual indications. Attention was drawn to the importance of testing all drugs given to outpatients for any possible adverse effects if alcohol is also taken.

IU-73-D0096

INTERACTION OF ALCOHOL AND DRUGS ON PSYCHO-MOTOR SKILLS AS DEMONSTRATED BY A DRIVING SIMULATOR, M. Linnoila; M. J. Mattila, British Journal of Pharmacology v47 n3 p671-672 (Mar 1973)

In this study ninety male driver volunteers, aged 19-21 years, doing their compulsory military service in motorized troops, were distributed in nine

test groups of ten subjects each. The drugs, given double blind in identical capsules, were: 10mg of diazepam, 15mg of codeine phosphate, or 10mg of isoniazid. Drugs were administered in combination with placebo or alcoholic drinks, the amount of ethanol being 0.3 g/kg. The subjects were then tested on the driving simulator for a period of 40 min. starting 30 min. after the drug intake.

The results indicated that alcohol alone increased the collision frequency and made the subjects prone to ignore instructions and traffic rules. Diazepam alone increased collision frequency and so did codeine. Diazepam given in combination with alcohol resulted in a further increase in the number of collisions and negligence of the rules and a new phenomena of serious steering errors. Codeine potentiated alcohol in the same way as diazepam and both codeine and diazepam reduced the tachycardia induced by an emergency situation. Isoniazid alone exerted minimal effects and only slightly enhanced alcohol effects. Generally, the most sensitive variables to the drugs effects were changes in the steering direction, flashing lights, brakes, and clutching.

IU-59-D0097

ÜBER DIE MEDIKAMENTÖS BEDINGTEN ABNORMEN ALKOHOLWIRKUNGEN BEIM KRAFTFAHRER (ABNORMAL EFFECTS OF ALCOHOL IN THE DRIVER CAUSED BY DRUGS), E. Michel (1959)

The literature of alcohol-drug interactions is reviewed. From the files of the Institute of Forensic Medicine in Frankfurt, 10 court cases in which interaction between alcohol and drugs was established are discussed. The various theories of interaction of alcohol with hypnotics, analgesics, antihistamines, antipyretics, sedatives, and tranquilizers are presented. It is suggested that, in every accident in which the driver is found to be intoxicated, blood and urine tests should also be analyzed for the presence of drugs.

IU-59-D0098

VERKEHRSTÜCHTIGKEIT UND KURZNARKOTICA (DRIVING ABILITY AND SHORT-TERM ANESTHESIA), R. Klein, Deutsche Zeitschrift für die Gesamte Gerichtliche Medizin v49 p187-193 (1959)

In the post-narcotic phase of anesthesia with short-acting agents, the author finds a significant degree of nystagimus that may have an adverse effect on motor vehicle operation.

IU-72-D0099

METHODS-TIME MEASUREMENT IN ASSESSMENT OF MOTOR PERFORMANCE, S. B. Chyatte; J. H. Birdsong, Archives of Physical Medicine and Rehabilitation v53 n1 p38-44 (Jan 1972)

A derivative of motion-time study was employed over several years to monitor the motor performance of patients with brain damage from different causes. This report deals with a survey of previous projects and with the implications of the use of this engineering-based system in rehabilitation. Projects have dealt with qualification and quantification of motor peformance and with evaluation of the effectiveness of drug therapy in CNS disorders. This approach is valuable for the analysis of motor performance and it permits evaluation of proposed or existent tests of motor performance.

IU-65-D0100

FORENSISCHE ASPEKTE ZUM THERPA "ARZNEIMITTEL UND VERKEHRSSICHERHEIT" (FORENSIC ASPECTS ON THE THEME, "DRUGS AND TRAFFIC SAFETY"), H. J. Wagner, Aktuelle Probleme der Verkehrsmedizin v2 p125-133 (1965)

The author comments on the forensic aspects of drugs and highway safety, es-

pecially with regard to the widespread use of a variety of pharmacologic agents by outpatients who may operate motor vehicles while "under the influence." He discusses the legal and medical questions involved, as well as the need for an organized approach to the development of appropriate analytical methodology and countermeasures.

IU-67-D0101

EFFECTS OF D-AMPHETAMINE SULFATE, CAFFEINE, AND HIGH TEMPERATURE ON HUMAN PERFORMANCE, B. W. Lovingood; C. S. Blyth; W. H. Peacock; R. B. Lindsay, Research Quarterly of the American Association for Health, Physical Education, and Recreation v38 n1 p64-71 (Mar 1967)

Amphetamine, caffeine, and high ambient temperature (125.6°F) were compared with placebo to determine their effects on a variety of strength, psychomotor, and mental performance tasks and certain physiological measures of 24 young men. Performance was measured objectively only after each subject had been given standard extensive practice and acclimatization.

The study concluded that (a) 15 mg. of d-amphetamine sulfate significantly improved performance but caused a significant increase in heart rate, (b) 500 mg of citrated caffeine did not produce a significant change in either the performance tasks or the physiological parameters tested and (c) high ambient temperature (125.6°F) produced a significant improvement in performance.

IU-72-D0102

EFFECTS OF CAFFEINE ON VISUAL MONITORING, W. J. Baker; G. C. Theologus, Journal of Applied Psychology v56 n5 p422-427 (Oct 1972)

This study examined the effects of caffeine on a protracted visual monitoring task analogous to an aspect of automobile night driving. The task involved monitoring two red lights that moved apart at random intervals. This display simulated the rate-of-closure cue of change in visual angle for a vehicle following 60 yards behind another vehicle. Twenty measures of response latency were provided for each subject in each of 4 hrs. of continuous testing. Five groups (n=20 in each) were given the following treatments: placebo, 200 mg. of caffeine at the beginning of the second hr., 200 mg. at the third hr., 400 mg. at the second, and 400 mg. at the third. The results indicated that caffeine significantly inhibited response blocking (attention lapses). The effects were apparent within 1 hr. following administration and persisted over the remaining hrs. No difference was found between dosage levels or in magnitude of effect at the different administration times.

IU-72-D0103

DRUGS AND DRIVING, Medical Journal of Australia v2 n23 p1274-1276 (2 Dec 1972)

This article mentions the state of knowledge, - or lack of it, concerning drug involvement, both prescription and over-the-counter, taken licitly or illicitly, in highway crashes. Drug and alcohol use and effects were noted in the context of the paucity of data on the former agents as compared to the sizable body of information gathered on the latter. The article also notes that while there is no doubt that in the laboratory situation some drugs depreciate driving and skills important in driving, very much more epidemiological field work needs to be done before laboratory findings can be regarded as having significance in practical everyday driving, at least with therapeutic doses of drugs. Practitioners, it is stated, when prescribing any psychoactive drugs, whether sedative or tranquillizing, or even drugs like the antihistamines, should be most meticulous in warning the patients of the possible deleterious effects of such drugs on driving. Further, such patients should be warned against drinking alcohol when taking such drugs; and that in prescribing drugs with known side effects as drowsiness, dizziness and so on, physicians should again warn the

patient to be wary of driving during the first few days of such therapy. The article finally concludes that it is clear that research is needed both in field studies and in laboratory testing of older drugs and of new drugs, preferably as they are evolved, in regard to their effects on driving.

IU-73-D0104

DRUGS, DRIVING AND MEDICAL RESPONSIBILITY, I. McDonald, Medical Journal of Australia v1 n15 p774 (14 Apr 1973)

In this letter to the editor the author proposes the concept of the "registered drug user", whereby a patient applying for an Australian driver's license might declare himself a user of tobacco, caffeine, alcohol, antihistamines, etc. On examination for his license he would be questioned on his knowledge of the effects these drugs might have on his performance singly and in combination. Drugs affecting driving performance would be so labelled routinely, so that holders of drivers' licenses could thus be advised that if taking medication bearing such a warning they must either register themselves as a user or not drive. This, it was felt, would ensure that the responsible citizen suffers no disability.

IU-72-D0105

EFFECTS OF FOUR COMMONLY-USED TRANQUILLIZERS ON LOWSPEED DRIVING PERFORMANCE TESTS, T. A. Betts; A. B. Clayton; G. M. Mackay, British Medical Journal v4 n5840 p580-584 (9 Dec 1972)

A double-blind controlled comparison of four commonly-used tranquilizing drugs (haloperidol, amylobarbitone sodium, chlordiazepoxide, and trifluoperazine) against placebo was made in their effects on the performance of volunteers during three low speed vehicle-handling tests. The drugs (with the exception of haloperidol) significantly altered driving behaviour though they did not seem to interact significantly with alcohol. There is, therefore, a strong possibility that such drugs will similarly alter driving performance in patients taking them for therapeutic purposes. Since, as these experiments also show, those affected may be subjectively unaware of it, and routine clinical screening is not sensitive enough to detect them, physicians should warn patients of the probability that their driving performance will be affected by such drugs, particularly during the first few days that they are taken.

IU-73-D0106

EFFECTS OF ISONAZID ON PSYCHOMOTOR SKILLS RELATED TO DRIVING, M. Linnoila; M. J. Mattila, Journal of Clinical Pharmacology (and New Drugs) v13 n8-9 p343-350 (Aug-Sep 1973)

The effects of a single oral dose of 750 mg isoniazid (INH) alone or in combination with 0.5 gm/kg of alcohol, on psychomotor skills related to driving were investigated. Volunteer cadets (100) were tested with a battery of a choice reaction test, two coordination tests, and an attention test. Further, 50 drivers from motorized troops drove a simulator for 40 minutes. The experiments were double blind.

Both INH and alcohol slightly elevated the subjective feeling of performance. At 30 minutes after the ingestion of the drugs, both INH and alcohol shortened reaction time, and INH also improved coordination at 90 and 150 minutes after drug intake. Both alcohol and INH impaired attention. No major interaction was observed between INH and alcohol in psychomotor tests.

In simulated driving, INH antagonized the deleterious effect of alcohol on attention. The numbers of collisions at simulated emergency conditions were slightly increased after either drug. The numbers of drivers driving off the road were increased after alcohol and INH given together. After this combina-

tion, the small movements of the steering wheel characteristic of drunken drivers were significantly increased. Administration of INH, 10 mg/kg, might cause some extra risks for driving in the very beginning of the treatment and in combination with alcohol.

IU-72-D0107

CLEMASTINE ON HAND-EYE COORDINATION AND VISUAL FUNCTION, E. S. Day; S. Jones; J. Stewart-Jones; P. Turner, Journal of Clinical Pharmacology (and New Drugs) v12 n5-6 p240 (May-June 1972)

In this study clemastine was studied in a double-blind crossover experiment with eight normal volunteers. Treatments separated by one week were made and measurements of hand-eye coordination, retinal sensitivity, color vision, oculomotor balance, pupil diameter, and amplitude of accommodation were made. Student's t-test showed no significant differences between clemastine, 1 mg, and placebo.

IU-71-D0108

VISUAL-MOTOR PERFORMANCE DURING LITHIUM TREATMENT. A PRELIMINARY REPORT, R. G. Demers; G. R. Heninger, Journal of Clinical Pharmacology (and New Drugs) v11 n4 p274-279 (Jul-Aug 1971)

In this study performance was assessed on the Bender Gestalt test and the randomized and nonrandomized digit symbol test in six patients before, during, and after a period of lithium carbonate treatment. Therapeutic serum lithium ion concentrations were associated with impaired digit symbol test performance when the patients were compared with themselves or with matched control subjects. Performance on the Bender Gestalt test was not affected by lithium carbonate treatment. The impaired digit symbol test performance was associated with the present neuromuscular symptoms and both the test performance and the symptoms improved when lithium carbonate treatment was discontinued.

IU-73-D0109

CANNABIS AND ALCOHOL. EFFECTS ON SIMULATED CAR DRIVING, O. J. Rafaelsen; P. Bech; J. Christiansen; H. Christrup; J. Nyboe; L. Rafaelsen, Science v179 n4076 p920-923 (2 Mar 1973)

The effects of cannabis and alcohol on simulated car driving were studied. Cannabis resin containing 4 percent Δ^1-tetrahydrocannabinol was administered orally in three doses equivalent to 8, 12, and 16 milligrams of that component. Alcohol was given orally in one standard dose of 70 grams. Both cannabis and alcohol increased the time required to brake and start, whereas alcohol increased while cannabis decreased the number of gear changes. An effect of dosage on response was observed with cannabis.

IU-68-D0110

RECOGNITION OF COLOURED LIGHTS BY COLOUR DEFECTIVE INDIVIDUALS, S. Y. Shirley; R. J. Gauthier, Canadian Journal of Ophthalmology v3 n3 p244-253 (July 1968)

In this study 52 color defective males were tested with the flashing directive signals. 11% made errors at high intensity and 13% at low intensity. More mistakes were made under daylight conditions than at night. The amber signals were mistaken for red (22% of total mistakes under high intensity and 24% at low intensity). The white signal was mainly mistaken for green (12.8% of total mistakes at high intensity and 21.4% at low intensity). With traffic signals the protan (red defective) group made 10% mistakes at low intensity and none at high intensity; the deutan (green defective) group made 5.2% mistakes at low intensity and 3.7% at high intensity. With "Symbolite" signals 1% made mistakes at low intensity and none at high intensity. Ten normal subjects with a blood

alcohol level of 0.1% showed no difficulty with color recognition. It was concluded that the results would indicate that the amber flashing signal is not a safe color for the color defective driver. Street traffic signals would be made safer by the use of a symbol system and also by increasing the brightness.

IU-72-D0111

EFFECT OF MARIHUANA UPON PERIPHERAL VISION AS A FUNCTION OF THE INFORMATION PROCESSING DEMANDS IN CENTRAL VISION, H. Moskowitz; S. Sharma; W. McGlothlin, Perceptual and Motor Skills v35 n3 p875-882 (Dec 1972)

Detection of peripheral light stimuli was examined with 12 subjects under 4 treatment levels of smoked marihuana. Marihuana severely impaired detection performance and the decrement was linearly related to dose. Information-processing demands from the central fixation light did not affect the degree of impairment.

IU-63-D0112

DER GEMEINSAME EINFLUSS VON ARZNEIMITTELN UND ALKOHOLGRENZKONZENTRATIONEN AUF DIE VERKEHRRSICHERHEIT AN HAND DER ÜBERPRÜFUNG VON 2500 FÄLLEN (COMBINED INFLUENCE OF DRUGS AND ALCOHOL THRESHOLD CONCENTRATIONS ON TRAFFIC SAFETY, BASED ON THE SURVEY OF 2500 CASES), A. Kessler (1963)

A survey was conducted on 2500 traffic accident cases in which use of alcohol was established. The blood alcohol level in these cases was .15% or more. 99% were male, 1% female. 10.3% admitted that they had taken drugs within the last 24 hr. More than half of the drugs were analgesics and antipyretics, followed by sedatives and hypnotics. 8 cases are discussed in detail. In most of the latter cases, alcohol-drug synergism was clearly established. It is concluded that drivers should be warned more effectively about the dangers of simultaneous alcohol and drug ingestion.

IU-62-D0113

ÜBER DIE EINWIRKUNG VON MEDIKAMENTEN BEI 500 KRAFTFAHRZEUGUNFÄLLEN IN FRANKFURT A.M. (INFLUENCE OF DRUGS ON 500 CAR ACCIDENTS IN FRANKFURT A.M.), E. F. K. Reinartz (1962)

The author considers the use and abuse of alcohol and drugs in relation to automotive medicine. Statistical data on traffic accidents in Frankfurt, and percentages of drug and alcohol users are given. The effect of interactions between alcohol and drugs are discussed and illustrated.

In one of the cases cited, 2 glasses of brandy, one luminal® tablet (0.15 g), and an analgesic (dolviran)® resulted in synergism which induced sleep while driving a motor vehicle. In another case, brandy, beer, and 3 sobering-up tablets ("cafaspin")® caused appreciable intoxication, resulting in a traffic accident. Public education of interaction dangers between alcohol and drugs, especially analgesics, is needed.

IU-68-D0114

PERFORMANCE DECREMENT AFTER INTAKE OF MEPROBAMATE AS A FUNCTION OF TASK DIFFICULTY AND LEARNING LEVEL, M. Frankenhaeuser; A. L. Myrsten, Perceptual and Motor Skills v27 n3 p839-843 (Dec 1968)

The effect of 800 mg of meprobamate on performance in choice-reaction tasks of varying difficulty was examined. Comparisons between scores obtained in drug and placebo conditions showed that performance was progressively more impaired by the drug as task difficulty increased and progressively less impaired as learning level increased.

IU-71-D0115

PSYCHOMOTOR PERFORMANCES OF PATIENTS UNDERGOING L-DOPA THERAPY, L. J. Davis, Jr.; M. D. Muenter, Perceptual and Motor Skills v33 n3 p1303-1308 (Dec 1971)

Eleven patients undergoing L-dopa therapy for Parkinson's disease were evaluated using 3 psychomotor measures designed to assess functioning of the upper extremity. The patients were tested prior to L-dopa therapy, when they had reached optimum dosages of L-dopa, and finally, during a period when they had been placed on a placebo. Significant differences were found on two of the three measures between pretreatment and L-dopa periods, and between pretreatment and placebo periods. No significant differences were found between L-dopa and placebo periods, however.

IU-72-D0116

EFFECT OF MARIHUANA ON THE VISUAL AUTOKINETIC PHENOMENON, S. Sharma; H. Moskowitz, Perceptual and Motor Skills v35 n3 p891-894 (Dec 1972)

The effects of 4 dose levels of marihuana upon the visual autokinetic phenomenon were examined in 12 subjects. The amount of apparent movement was greatly increased under the two highest doses. Possible hazards associated with vehicle operation at night under marihuana are noted.

IU-73-D0117

DRUG USAGE, PERSONALITY, ATTITUDINAL, AND BEHAVIORAL CORRELATES OF DRIVING BEHAVIOR, K. Jamison; W. H. McGlothlin, Journal of Psychology v83 n1 p123-130 (Jan 1973)

Subjects (N=164) were divided into four groups on the basis of their driving records: no accidents or moving violations, two or more violations, one or more accidents, and no accidents. They were compared on various personality, attitudinal, drug usage, and biographical variables. The less safe drivers scored significantly higher on a sensation-seeking scale; were more likely to have experimented with such drugs as marijuana, hashish, amphetamines, LSD, etc.; attended religious services less often; and were less likely to own their residences. There were also differences in political attitudes and life-style preferences among the groups.

IU-71-D0118

ZUR KENNTNIS DES RAUSCHMITTELNACHWEISES (PROVING THE EXISTENCE OF DRUGS), E. Klug, Zeitschrift für Rechtsmedizin v68 p171-179 (1971)

Several well-proved analytical methods for tracing opium, hashish, and various hallucinogens, which can be applied in any laboratory, are compiled in this work. In addition, the possibility of tracing marihuana and LSD after passing through the body are discussed.

IU-70-D0119

EXPLORATORY STUDY OF AUTOMOBILE DRIVING PERFORMANCE UNDER THE INFLUENCE OF LOW LEVELS OF CARBOXYHEMOGLOBIN, A. M. Ray; T. H. Rockwell, Annals of the New York Academy of Sciences v174 art-1 p396-408 (5 Oct 1970)

Estimated automobile concentrations of CO result in 8% of the nonsmokers having blood carboxyhemoglobin concentration levels greater than 7%, and 4% having greater than 14% carboxyhemoglobin, assuming that they were exposed for two hr. or more. Smokers would have carboxyhemoglobin levels up to 15% higher than these depending on their smoking habits. Several of the effects of carboxyhemoglobin studied, such as increases in response times to sensory detection

tasks of relative velocity and taillight brightness discrimination, and increases in the variance of several performance measures including velocity, headway, gas pedal reversals and gas pedal deflection, were detrimental to driving performance.

IU-70-D0120

EFFECT OF CARBON MONOXIDE ON HUMAN PERFORMANCE, P. Mikulka; R. O'Donnell; P. Heinig; J. Theodore, Annals of the New York Academy of Sciences v174 art-1 p409-420 (5 Oct 1970)

A study was undertaken to detect the effects of CO (Carbon Monoxide) on relatively simple applied performance tasks. Carboxyhemoglobin (COHb) levels reflected a direct relation with the ambient CO exposure levels. The individual performance curves, however, revealed no consistent differences as a function of low levels of CO exposure.

IU-70-D0121

DRIVING AND EPILEPSY, K. T. Farn, British Medical Journal v3 n5723 p646 (12 Sep 1970)

In this letter to the editor, the policy of allowing epileptics, who have been free from attacks for 3 years, to hold driver's license is criticized. The author cites five examples of patients who suffered attacks after periods of up to fourteen years without fits.

IU-73-D0122

EFFECTS OF TRANQUILLIZERS AND HYPNOTICS ON DRIVING, N. J. Legg; A. Malpas; D. F. Scott, British Medical Journal v1 n5850 p417 (17 Feb 1973)

In this letter to the editor, the authors expressed the opinion that the effects of drugs on psychomotor skills and driving ability should be determined in patients for whom the drugs are therapeutically indicated and not just on normal subjects in investigations regarding this concern. Their group at the London Hospital studied normal subjects' cognitive and motor performance, using digit symbol substitutiCn and card sorting, and found that this may be impaired by a single dose of amylobarbitone or nitrazepam given the previous night.

Doubting whether this observation was relevant to the usual therapeutic situation, they undertook a similar investigation on anxious patients, who received drug or placebo over seven days. These patients were tested 18 hours after the last dose and showed no impairment on the tasks. Electroencephalograms taken on the same occasion showed higher scores for drowsiness after drug than placebo, but the scores were much lower than those previously obtained in normal subjects. The authors concluded that the results could not be extrapolated directly to normal driving performance, but they (results) indicated that tranquilizers and hypnotics may effect the performance of normal subjects and anxious patients in different ways.

IU-69-D0123

MARIJUANA AND SIMULATED DRIVING, H. Kalant, Science v166 n3905 p640 (31 Oct 1969)

This article was written to serve as a critical critique on the report by Crancer et. al. Science 164:851 (1969) on the relative effects of alcohol and marijuana on a simulated driving task. It mentions the possibility of a subjective bias, on the part of the test subjects, for marijuana and against alcohol. It also criticizes the arbitrary choice of a single dose of each substance for the comparison, and warns readers from drawing the unjustified conclusion that lack of effect of a drug on the simulated task will correlate with lack of effect on the actual task (i.e. driving in traffic).

IU-68-D0124

AERIAL APPLICATION ACCIDENTS 1963 TO 1966. AN ANALYSIS OF THE PRINCIPAL FACTORS, G. A. Reich; W. H. Berner, Archives of Environmental Health (Chicago) v17 n5 p776-784 (Nov 1968)

An analysis of 1,328 aerial application accidents revealed the large majority of these occurred during the summer, with the accident rate for aerial applications being second only to pleasure flying. Most of these crashes occurred in southern and western states. Texas, California, and the Mississippi Delta accounted for 46% of all fatal crashes. Five plane manufactures accounted for 83% of all crashes. Fire after impact was associated with fatal crashes. It was concluded that safety-oriented engineering might well reduce the number of fatalities, pilot factors being very important in the causation of these crashes. Lack of pilot experience at flying appeared to be associated with fatal crashes. There was some evidence that the pilot's exposure to toxic chemicals may have played a contributory or causal role in these crashes.

IU-70-D0125

EXPERIMENTAL HUMAN EXPOSURE TO CARBON MONOXIDE, R. D. Stewart; J. E. Peterson; E. D. Baretta; R. T. Bachand; M. J. Hosko; A. A. Herrmann, Archives of Environmental Health (Chicago) v21 n2 p154-164 (Aug 1970)

Human volunteers were exposed to carbon monoxide at concentrations of < 1, 25, 50, 100, 200, 500, and 1,000 ppm for periods of one-half to 24 hours. No untoward effects were observed in sedentary males exposed to 100 ppm for eight hours. Exposures producing carboxyhemoglobin saturations greater than 15% to 20% resulted in delayed headaches, changes in the visual evoked response, and impairment of manual coordination.

IU-73-D0126

A COMPUTERISED TRACKING TECHNIQUE FOR THE ASSESSMENT OF PARKINSONIAN MOTOR DISABILITIES, K. Cassell; K. Shaw; G. Stern, Brain v96 p815-826 (Dec 1973)

A description was given of the more commonly used methods of assessing the motor disabilities of parkinsonism. The role of computerized tracking as an adjunct to these methods was also described. A pursuit tracking apparatus together with a mathematical analysis was used on 10 normals and 23 parkinsonians and was shown to be a valuable test in the measurement of motor disabilities. The correlation between this tracking test and clinical evaluation was better than that of other tests and clinical evaluation.

IU-67-D0127

MOTOR-CAR DRIVING AND THE HEART RATE, P. Taggart; D. Gibbons, British Medical Journal v1 n5537 p411-412 (18 Feb 1967)

Motor-car driving in London traffic may be associated with an increased heart rate, which is very rapid in certain persons with normal cardiovascular systems. ST-T changes in the electrocardiograms occurring at the same time seem to be related to anxiety rather than tachycardia. Even more rapid heart rates (>180) may develop in certain drivers before and during competitive motor-racing.

IU-69-D0128

EFFECTS OF CHRONIC EXPOSURE TO LOW LEVELS OF CARBON MONOXIDE ON HUMAN HEALTH, BEHAVIOR, AND PERFORMANCE, National Academy of Sciences (1969)

This report presents the findings and recommendations of the Committee on Effects of Atmospheric Contaminants on Human Health and Welfare, a group organized in the Division of the Medical Sciences of the National Research Council to assess

the state of knowledge concerning the effects of carbon monoxide on human health. It sets forth what is reasonably well-established about these effects and recommends research needed to provide answers to some key questions.

For obvious reasons, attention has focused on the effects of low levels of carbon monoxide, such as those most commonly encountered on city streets and in traffic tunnels. Assessment of these effects has required the development of new psychological and physiological tests, and the results are in many instances not yet definitive. Nevertheless, enough has been done to suggest the urgency of further studies to confirm and extend the present tentative findings. Topics discussed include: the basic reactions of carbon monoxide in the body; blood carboxyhemoglobin concentrations; probable effects of breathing carbon monoxide on mental performance; possible effects of carbon monoxide on the normal circulation; hypothetical effects of carbon monoxide on susceptible persons; a possible effect of increased ambient levels of carbon monoxide in coronary vascular disease; and the possible adverse effects of carbon monoxide in cigarette smoke.

IU-70-D0129

PSYCHOTROPIC DRUG USE AND DRIVING RISK. A REVIEW AND ANALYSIS, E. Kibrick; R. G. Smart, Journal of Safety Research v2 n2 p73-85 (June 1970)

This review dealt with studies of the incidence of psychotropic drugs in general populations, in samples of drivers, and samples of accident-involved drivers. The psychotropic drugs considered were the barbiturates and other sedative-hypnotics, tranquilizers, and the stimulants and anti-depressants. Studies showed that as high as 35 to 50% of the general population risk driving after drug use at least once yearly and that 11-15% of accident-involved drivers' have taken psychotropic drugs prior to the accident. Psychotropic drug use was most likely to be found among certain drinking driver groups, especially the fatally injured. The veracity of drivers statements about drug use was very low; and, estimates derived from questioning were probably very low. Further research on the use of these drugs in connection with driving error and accident responsibility was recommended.

IU-71-D0130

ANTIHISTAMINES, ALONE AND TOGETHER WITH ALCOHOL, IN RELATION TO DRIVING SAFETY, A. A. Landauer, G. Milner, Journal of Forensic Medicine v18 n4 p127-139 (Oct-Dec 1971)

This paper discusses the concept of grouping various types of antihistamines according to their alertness ratio (sedative dose/therapeutic dose), the chemistry and pharmacology of the antihistamine, and some previous human studies with antihistamines. Evidence is now accumulating which indicates that the degree to which an antihistamine adds to the effects of alcohol is proportional to the alertness ratio of the drug.

The authors outlined their double-blind experiment which investigated the joint effect of ethanol and three relatively new antihistamines (with high alertness ratio) on measures of skilled performance related to driving ability. Subjects received either 50 mg of pheniramine P-aminosalicylate, 4 mg of cyproheptadine hydrochloride, 1 mg of meclastine, or a placebo. After allowing time for drug absorption the subjects completed a motor skill battery, which included simulated driving, pursuit motor performance, a dot-tracking task, and a key-tapping test. Afterwards they were given 0.95 ml per kg body weight of ethanol. A Breathalyzer test was then given, and the subjects repeated the test battery.

Results showed that none of the drugs, either alone or in combination with alcohol, significantly affected test performance. However, the effect of alcohol (mean blood level of 88 mg%) showed a highly significant increase in the number of steering errors made. Under these experimental conditions only alcohol adversely influenced performance; no drug potentiation due to alcohol was observed.

IU-68-D0131

EFFECT OF ANTIDEPRESSANTS AND "TRANQUILLIZERS" ON THE RESPONSE OF MICE TO ETHANOL, G. Milner, British Journal of Pharmacology v34 n2 p370-376 (Oct 1968)

The techniques and apparatus used for investigation of the interaction of various psychotropic drugs with ethyl alchol (EtOH) in mice are described. The parameters measured were (a) length of loss of righting reflexes; (b) continuous coma; (c) subjects remaining in coma 12 hrs. after dosing; (d) changes in toxicity. The following drugs were tested: amitriptyline, trimipramine, imipramine, nortriptyline, desipramine, thioridazine, phenelzine, methylphenidate, chlorpromazine, trifluoperazine, phenobarbitone, diazepam. The total no. of mice used was 3140. Imipramine caused no significant changes in the effects of EtOH. Methylphenidate and desipramine protected the mice against EtOH-induced coma. All other drugs induced statistically significant potentiation of the depressant and toxic effects of EtOH in mice. Late (delayed) deaths after a tricyclic antidepressant have been noted in animals and man. It was suggested that the potentiation of alcohol by some psychotropic drugs may add to the hazards of drug overdosage and contribute to traffic accidents. Hence, it was felt necessary to test all psychotropic drugs for interaction with alcohol.

IU-67-D0132

ALCOHOL, DRUGS AND DRIVING, N. J. Chetta, Journal of Louisiana State Medical Society v119 n9 p344-347 (Sep 1967)

According to the author, drugs other than alcohol have a very minimal effect in deaths resulting from automobile accidents; only two such cases were discovered, and these were not considered important enough to discuss. However, alcohol is a different matter, and the author concludes that in one way or another alcohol is definitely a factor in 50% of the fatal accidents in the United States. If something is to be done about highway safety, then efforts should be channeled into studying the role which alcohol plays in motor vehicle accidents.

IU-71-D0133

ALCOHOL, THIORIDAZINE AND CHLORPROMAZINE EFFECTS ON SKILLS RELATED TO DRIVING BEHAVIOUR, G. Milner; A. A. Landauer, British Journal of Psychiatry v118 n554 p351-352 (Mar 1971)

In this study it was determined that chlorpromazine and to a lesser extent, thioridazine inhibited motor skills and potentiated the adverse effects of ethanol on driving behavior when administered to volunteers at 1 mg./kg. orally in the evening and again the next morning.

IU-69-D0134

DRINKING AND DRIVING IN 753 GENERAL PRACTICE AND PSYCHIATRIC PATIENTS ON PSYCHOTROPIC DRUGS, G. Milner, British Journal of Psychiatry v115 n518 p99-100 (Jan 1969)

A description was given of a survey of all adult patients attending a number of general practitioners and psychiatrists in Perth, Western Australia, during June and July 1967.

Psychotropic drugs were given to 753 of the 4,584 patients seen. Of those given psychotropic drugs, 85% of the men took alcohol, 66% were licensed to drive, and 57% were at risk of drinking and driving while taking the drug prescribed. The corresponding figures for women were 71%, 42%, and 35%. Since psychotropic drugs may potentiate the effects of alcohol, it was noted, special hazards may be present for patients who drive.

IU-71-D0135

TRANQUILIZERS AND THE AUTOMOBILE, R. L. Wells, Journal of American Medical Association v215 n5 p705 (1 Feb 1971)

Alcohol is the major offender in traffic fatalities, but the physician must always be alert in advising his patient about possible contraindications and side effects of the medications he prescribes. An account of a patient who was injured in a traffic accident while on tranquilizers is presented, and the author concludes that it is the prescribing physician's grave responsibility to do everything possible to protect his patient against such events.

IU-70-D0136

NON-MEDICAL USE OF DANGEROUS DRUGS IN THE UNITED STATES. A COMPREHENSIVE VIEW, D. F. Berg, International Journal of the Addictions v5 n4 p777-834 (Dec 1970)

This paper is a review and discussion of some of the methodological and epidemiological aspects of a compilation of studies, surveys, and rolls on the non-medical use of dangerous drugs and other "exotic" substances in the United States. Included in the compilation are drug usage statistics for students in colleges, universities, secondary schools, and junior high schools. Additional statistics are shown for high school dropouts, hippies, working youth, adults, and enlisted men who served in Vietnam. Altogether, 69 surveys are included in the compilation. Categories of dangerous drugs and special substances listed in this report are the hallucinogens, stimulants, depressants, opiates, and other "exotic" or special substances, such as glue, gasoline, nitrous oxide, and cough syrup.

The author concluded that it is difficult to generalize the results of most surveys and studies since many are not representative of their populations, and vary in reliability and validity. Statistics on the extent and prevalence of the non-medical use of dangerous drugs serve as indicators of misuse and abuse of drugs, but by themselves do not define the problem. These statistics have to be interpreted in terms of the numerous factors which are related to drug use. Data which more nearly reflect the prevalence and incidence of illicit drug use need to be obtained through rigorous methods, both on a national level and among specific populations.

IU-67-D0137

DRUGS AND DRIVING, L. Rees, Medicine, Science and the Law v7 n1 p26-27 (Jan 1967)

This paper discusses in a general manner the possible effects of a number of drugs on driving, and the need for physicians to be aware of potential hazards a medication will have it a patient drives. Drug classes mentioned in this regard include: hypnotic-sedatives (chloral, paraldehyde, barbiturates), tranquilizers, phenothiazines, alcohol, CNS stimulants, MAO Inhibitors, tricyclic antidepressants, insulin and antibiotics.

IU-68-D0138

DRUGS, DRIVING, DANGER!, H. E. Dark, Analogy p20-21 (Winter 1968)

The dangers of taking drugs while driving are described, and many anecdotal reports of accidents occurring to persons under the influence of drugs, either alone or in combination with alcohol, are presented. Drugs which may prove dangerous to drivers include: analgesics, barbiturates, tranquilizers, antihistamines, wonder drugs, insulin, and antidepressants.

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IU-67-D0139

MAGNESIUM PEMOLINE. LACK OF FACILITATION IN HUMAN LEARNING, MEMORY, AND PERFORMANCE TESTS, R. G. Smith, Science v155 n3762 p603-605 (3 Feb 1967)

Eitner a placebo or 25 or 37.5 mg of magnesium pemoline was administered on a double-blind basis to three groups of adult males. Learning and 24-hour retention tests included verbal learning, motor learning, and classical conditioning. Short-term memory tests were administered through both the visual and auditory modalities. Arm-hand steadiness and visual reaction time performance tests were included. The only significant difference was that the performance of subjects given pemoline was inferior to that of subjects given a placebo.

IU-73-D0140

LOGICAL PROBLEMS IN CONTEMPORARY CANNABIS RESEARCH, D. Triesman, International Journal of the Addictions v8 n4 p667-682 (Winter 1973)

This paper deals with problems in logic on the part of investigations involved in contemporary cannabis research. The author divides the typology of errors into four basic clusters - the nosological, the nomological, and psychological, and the socio-pathological. He points out that in order to establish the incidence of antisocial or biochemically or psychologically unacceptable outcomes of cannabis use, almost all studies have been made on populations that already show the predicted sociopathic or medical disturbance. They retrospectively determine, and therefore by fiat alone, that the disturbance is the "outcome." He suggests that cannabis use is causally associated, on the part of many investigators, with precipitating a number of undesirable phenomena but it is as likely that these phenomena have causally led to cannabis use among a myriad of other things considered both desirable and undesirable. He concludes that unless fundamental questions of theory involving logic are faced, research is likely to remain anodyne to researchers rather than addressing those questions believed to be socially important to resolve.

IU-64-D0141

EFFECTS OF ALCOHOL IN COMBINATION WITH DRUGS, R. B. Forney; F. W. Hughes, Traffic Digest and Review v12 n5 p22-24 (May 1964)

This paper contends that insufficient attention has been paid to the effects of combining alcohol with other drugs, especially tranquilizers; and that, while such drugs diminish anxiety they also may diminish performance. Tests on humans and animals to determine these effects were described. The drugs involved included: hydroxyzine, benzquinamide, chlorpromazine, meprobamate, chlordiazepoxide, reserpine, pentobarbital, morphine sulfate, d-propoxyphene, codeine, caffeine and ethanol. The difficulties associated with testing impairment of driving ability were also discussed.

IU-74-D0142

MARIJUANA AND DRIVING IN REAL-LIFE SITUATIONS, H. Klonoff, Science v186 n4161 p317-324 (25 Oct 1974)

Attempts were made to determine the effects of low and high doses of marihuana on driving performance in both a restricted, traffic-free area (i.e., a driving course) and on the streets of Vancouver, (British Columbia, Canada), including the downtown area, during peak hours of traffic flow, and the effect of marihuana and driving on heart rate.

The smoking of marihuana by human subjects did have a detrimental effect on their driving skills and performance in a restricted driving area, and this effect was even greater under normal conditions of driving on city streets. The effect of marihuana on driving was not uniform for all subjects, however, but was

in fact bidirectional; whether or not a significant decline occurred in driving ability was dependent both on the subjects capacity to compensate and on the dose of marihuana. For those subjects who improved their performance, the explanation may lie in overcompensation, and possibly the sedative effect of the drug.

IU-74-D0143

MARIHUANA AND DRIVING AMONG TEENAGERS. REPEATED USE PATTERNS, EFFECTS, AND EXPERIENCES RELATED TO DRIVING, J. A. Waller; K. R. Lamborn; R. A. Steffenhagan, Accident Analysis and Prevention v6 n2 p141-161 (Oct 1974)

49% of 1271 incoming college freshmen reported using marijuana during the previous year. A majority of marijuana users simultaneously consume alcohol at least on occasion, and many of them have enough alcohol at those times to be impaired by the alcohol alone. Among users who smoke weekly or more often, 25% of driving while "high" occurs under the combined effect of marijuana and medium to heavy alcohol use. Most users reported marijuana effects on driving which are judged to be hazardous, such as altered attention, vision or time perception.

In an estimated 15,000 driving trips while "high" on marijuana two crashes occurred which were definitely attributable, and two possibly attributable to marijuana use. Also, 42 persons (13% of drivers) reported near crashes while "high." Since this is not a comparison study, it is not known whether or not this reported experience is excessive for this age group. Drivers who encountered trouble while driving after marijuana said 59% of the time that the incidents were caused by the marijuana, 27% by alcohol, and in 14% that they could not assess which drug was responsible.

IU-59-D0144

DRUGS AND THE MOTORIST, M. Weatherall, Medico-Legal Journal v27 p44-52 (1959)

This article is concerned with drugs used for therapeutic purposes and their possible dangers to automobile drivers. Among the drugs discussed are: insulin, hypotensive agents, carbon monoxide, depressants, stimulants, tranquilizers, barbiturates, and sedatives. Methods of studying the effects of various drugs on drivers are outlined, and the advantages and disadvantages of each are explained. The author concludes that there is very little, if any, completely watertight evidence of the effects of any drugs on drivers, but that any drug which depresses the brain is more likely than not to impair performance. A group discussion of these issues follows.

IU-73-D0145

MEDICO-LEGAL ASPECTS OF DRUG INTERACTIONS, E. M. Goldstein, Journal of Forensic Sciences v18 n4 p335-343 (Oct 1973)

Adverse drug reactions and drug interactions due to improper prescribing and failure to heed warnings accompanying a drug are largely predictable and preventable. Clinically significant undesirable results of drug interactions are becoming more and more the basis for malpractice claims.

The author sets out recommendations for physicians who wish to protect themselves against liability and their patients against drug toxicity. These rules include prescribing fewer agents, refraining from prescribing contraindicated combinations, developing an order of priority of need, and prescribing drugs for a limited time only.

IU-75-D0146

EFFECT OF TRICYCLIC ANTIDEPRESSANTS AND ALCOHOL ON PSYCHOMOTOR SKILLS RELATED TO DRIVING, T. Seppälä; M. Linnoila; E. Elonen; M. J. Mattila; M. Mäki, Clinical Pharmacology and Therapeutics v17 n5 p515-522 (May 1975)

Twenty healthy subjects took amitriptyline, doxepin, and placebo for 2 weeks each in a double-blind crossover trial, and another 20 subjects similarly took nortriptyline, chlorimipramine, and placebo. The antidepressants were given three times daily in doses generally used for neurotic patients. The presence of antidepressants in tissues was checked with the tyramine pressor test. On the seventh and fourteenth days of each period, psychomotor skills (choice reaction, coordination, and attention) were measured after the administration of drugs in combination with an alcoholic or placebo drink.

Dose-response graphs for the tyramine pressor effect were shifted to the right during the antidepressant treatment, indicating a blockade of the membrane pump in peripheral sympathetic terminals. This antityramine effect of antidepressants did not correlate with their psychomotor effects.

No drug alone importantly impaired psychomotor skills. Amitriptyline in combination with alcohol increased cumulative choice reaction times, and doxepin in combination with alcohol increased both cumulative choice reaction times and inaccuracy of reactions. Coordination was impaired after both of these combinations on the seventh day. It seemed to the authors that doxepin and amitriptyline, but not nortriptyline or chlorimipramine, in combination with 0.5 gm/kg of alcohol, may be especially dangerous in driving.

IU-73-D0147

EFFECTS OF DOXEPIN, ALONE AND TOGETHER WITH ALCOHOL, IN RELATION TO DRIVING SAFETY, G. Milner; A. A. Landauer, Medical Journal of Australia v1 n17 p837-841 (28 Apr 1973)

Doxepin (an antidepressant-antianxiety compound) was tested in a laboratory setting for its effects on skills related to driving safety. Subjects were tested when sober and also when intoxicated by alcohol. Twelve subjects received doses of 25 mg/m^2 of body surface area, 10 received half the above dose, and 12 received a placebo. Subjects took 2 doses at an interval of 12 hours. The amount of alcohol used gave a mean blood alcohol level of 73.6 mg/100 ml (Breathalyzer reading mean, 0.069%). Physiological measures, questionnaires and a battery of psychomotor skill tests, including two driving simulators, were used to assess the results.

The only significant drug effect was an improvement in performance on one driving simulator by the subjects on the higher dose of doxepin. It seemed to the authors that the antianxiety effects of doxepin were to some extent antagonistic to the well-documented detrimental effect which alcohol has on the performance of these tasks. They subsequently stressed the need for caution by prescribers of this drug.

IU-71-D0148

"BREATHALYZER" FAULTS. PRINCIPLES AND PRACTICE, G. Milner; A. A. Landauer, Medical Journal of Australia v1 n24 p1280-1284 (12 June 1971)

Breath-analyzing equipment measures blood-alcohol levels (BAL's) only indirectly; if "Breathalyzer" legislation is based on the view that driver-failure is related to a specific minimum BAL, then it should be framed in such a manner as to ensure that there is a negligible chance of an accused person being unjustly found guilty. This may happen because of a discrepancy between breath-alcohol and blood-alcohol levels.

Comparative studies in Australia, as well as in other countries, show that Breathalyzer readings tend on an average to be lower than the blood-alcohol concentration recorded directly from a specimen of blood taken from a vein in the arm. The usual underestimation is about 10 mg/100 ml (.01% BAL), but an occasional overestimation has been recorded, and in one case cited this was by as much as 28 mg/100 ml. In this paper, various aspects of this problem are discussed and some desirable modifications of Breathalyzer legislation are suggested.

IU-71-D0149

POISONINGS AND PRESCRIBING HABITS, Medical Journal of Australia v1 n5 p233-235 (30 Jan 1971)

Problems in the prescription of psychotropic drugs include accidental poisoning and suicide attempts. Although barbiturates are responsible for most cases of poisoning, there has been a recent increase in the use of antidepressants and tranquilizers, with a resultant increase in poisoning cases.

The importance of the choice of which drug to prescribe for a patient is stressed, and poisoning hazards, adverse reactions, consideration of the patient's usual way of life, and family situation must all be balanced. The physician must examine the complex equation between the biochemical activity of the drug and individual patient factors before a drug is prescribed.

IU-74-D0150

EFFECT OF MEDAZEPAM AND ALCOHOL ON COGNITIVE AND MOTOR SKILLS USED IN CAR DRIVING, A. A. Landauer; D. A. Pocock; F. W. Prott, Psychopharmacologia (Berlin) v37 n2 p159-168 (21 June 1974)

Questionnaires, motor-skill and cognitive tests were given to three groups of 12 healthy young men after administration of either 0, 10 or 20 mg of medazepam (Nobrium)®. Tests were given both before and after experimental intoxication with 1 ml/kg bodyweight of diluted ethanol.

On most tests medazepam did not interact with alcohol: no synergistic or antagonistic drug reaction was observed. A greater subjective fatigue rating by the drug groups was not confirmed by objective measures. The use of psychoactive drugs with ambulant patients is discussed and it is concluded that medazepam medication has no detrimental effect on driving ability.

IU-68-D0151

ARZNEIMITTEL UND VERKEHRSTÜCHTIGKEIT (DRUGS AND DRIVING ABILITY), G. Stopp, Pharmazeutische Praxis n8 p194-197 (Aug 1968)

Based on a review of the literature with regard to drug effects on a variety of behavioral tests such as concentration, problem-solving, risk-taking, and decision-making, the author concludes that a wide variety of therapeutic agents are likely to have adverse effects on motor vehicle operation.

IU-70-D0152

PHARMAKA, ARZNEIMITTELABHÄNGIGKEIT UND VERKEHRSTÜCHTIGKEIT (PHARMACEUTICS, DRUG RELIANCE AND DRIVING ABILITY. DRUG CONDITIONED INFLUENCING OF PSYCHO-PHYSICAL FUNCTIONS AND ITS EFFECT ON STREET TRAFFIC), B. Dokert, Pharmazeutische Praxis n1 p1-5 (Jan 1970)

Many drugs may be expected to have adverse effects on motor vehicle operation by virtue of their actions on psycho-physical aspects of performance and behavior. Of primary importance can be considered compounds that are classified

as: analgesics (antipyretics and opiates), antiepileptics, antihistamines, antiallergics, antiemetics, antihypertensives, anticoagulants, hypnotics, sedatives, insulin, oral antidiabetic agents, muscle relaxants, local anesthetics, and psychotherapeutic agents (tranquilizers, neuroleptics, antidepressants, psychostimulants). In addition, many of these drugs interact with alcohol in an adverse manner. Physicians and pharmacists should be made aware of these problems and should so inform their patients.

IU-67-D0153

DER NACHWEIS VON ARZNEIMITTELN IN LEICHENORGANEN NACH THERAPEUTISCHEN DOSEN MIT VERSCHIEDENEN FORENSISCH-TOXIKOLOGISCHEN METHODEN (DEMONSTRATION OF PHARMACOLOGIC AGENTS IN CADAVER ORGANS AFTER THERAPEUTIC DOSAGE BY VARIOUS FORENSIC TOXICOLOGIC METHODS), G. Falzi; N. Gruden; E. Marozzi, Deutsche Zeitschrift f. die gesamte gerichtliche Medizin v61 n3 p81-94 (Dec 1967)

The authors have used a variety of analytical procedures, including TLC, GLC and UV absorption, to characterize and identify drugs in tissues obtained from cadavers after therapeutic dosage of various agents.

IU-66-D0154

ARZNEIMITTEL UND VERKEHRSTÜCHTIGKEIT (DRUGS AND DRIVING ABILITY), H. Linke, Deutsche Gesundheitswesen v21 n2 p49-56 (13 Jan 1966)

Besides their obviously manifested advantages, a great number of drugs possess psychic and somatic side effects. Under conditions of out-patient treatment the latter may have detrimental and even fatal consequences, as far as the patient's efficiency in public street traffic is concerned. In this paper the author discusses the most important groups of drugs with regard to their influence exerted on driving fitness and traffic efficiency. He refers to some possibilities which appear adequate from the doctor's point of view to improve traffic safety in our streets.

IU-51-D0155

INFLUENCE OF CERTAIN ANTI-MOTION-SICKNESS DRUGS ON PSYCHOMOTOR AND MENTAL PERFORMANCE, R. A. MacKay; J. K. W. Ferguson, Aviation Medicine p194-195 (June 1951)

This study was designed to test the effects of certain motion sickness drugs on the cerebral functions of healthy young aircrew cadets. 6 treatments, a placebo and 5 drugs, were tested; the 60 subjects received only two of these, one week apart. The treatments were given 2 hrs after the evening meal, and 2 performance tests were conducted 1 hr later.

The results indicated that tripellenamine HCL (100 mg)(Pyribenzamine)® caused drowsiness and some impairment of performance of rapid calculations. Dimenhydrinate (100 mg)(Dramamine)® caused some drowsiness, but not a significant impairment of calculating ability. Although there was no effect on a complex motor coordionation test, the authors stated that they would hesitate to conclude that this drug, in the doses used, is free from hazard to flying personnel while in charge of an aircraft because of the drowsiness observed.

IU-65-D0156

METHAMPHETAMINE AND PENTOBARBITAL EFFECTS ON HUMAN MOTOR PERFORMANCE, G. A. Talland; G. C. Quarton, Psychopharmacologia (Berlin) v8 n4 p241-250 (16 Nov 1965)

Speed in three types of repetitive motor performance, and manual reaction time was tested at different levels of task complexity, on 36 students who

served as their own control over repeated sessions, in which they received intravenous doses of methamphetamine, pentobarbital, and placebo adjusted to their body weight.

The simpler the task the more likely was methamphetamine to speed up and pentobarbital to slow down performance rate. Compared with placebo, pentobarbital significantly affected rate in counter pressing, and tended to retard performance in a manual skill of finer coordination as well as in a cancellation test. Methamphetamine significantly speeded counter pressing with the dominant hand, but exercised that effect on the other hand only over the first minute of performance. Activity rate in the manual dexterity test was significantly faster on methamphetamine than on pentobarbital. Individual variability in work rate over successive time samples, and decrement over time, tended to be highest with methamphetamine. The favorable effect of methamphetamine on performance rate may thus stem primarily from an initial spurt that cannot be sustained, although it may revive after intervals longer than those investigated in the present study.

No methamphetamine effect could be determined in several tests of reaction time, but pentobarbital slowed down responses, whether warning signals were provided or not. A slow rate in repetitive motor performance with barbiturates may, therefore, be partly attributable to a delay in monitoring cues for response.

IU-65-D0157

EFFECTS OF CHLORPROMAZINE AND SECOBARBITAL UNDER TWO CONDITIONS OF REINFORCEMENT ON THE PERFORMANCE OF CHRONIC SCHIZOPHRENIC SUBJECTS, A. Latz; C. Kornetsky, Psychopharmacologia (Berlin) v7 n2 p77-88 (15 Feb 1965)

The performance of chronic schizophrenic subjects on tests of sustained attention, response latency, psychomotor output and cognition was investigated under the following treatment conditions: no treatment; placebo; 100 and 200 mg of chlorpromazine; and 100 and 200 mg of secobarbital. Positive reinforcement in the form of chocolate bars and cigarettes was given. The drugs were given once weekly in single doses and each drug condition was repeated twice.

Reinforcement improved performance on all tests, the magnitude of improvement being similar in the presence of placebo and the active drugs. Performance after placebo did not differ from performance after the no-treatment condition. Although both doses of chlorpromazine and secobarbital impaired performance on all tests, some of the differences in performance after placebo and the drug conditions were not statistically significant. With a few exceptions, the higher dose of each drug had a significantly greater effect on performance than the lower dose.

The secobarbital effects were most evident 30-60 min after administration, while the chlorpromazine effects were most evident after 210-240 min. At time of peak effect, both chlorpromazine doses had a greater effect on sustained attention than the same secobarbital doses, but the differences were not statistically significant. At time of peak effect, the 100 mg doses of the two drugs were equipotent with respect to their effect on response latency, psychomotor output and cognition, but the 200 mg dose of secobarbital had a significantly greater effect on psychomotor output and cognitive functioning.

IU-64-D0158

RESEARCH NOTE ON SOME OF THE CRITICAL FACTORS ON THE DISSIMILAR EFFECTS OF CHLORPROMAZINE AND SECOBARBITAL ON THE DIGIT SYMBOL SUBSTITUTION AND CONTINUOUS PERFORMANCE TESTS, C. Kornetsky; M. H. Orzack, Psychopharmacologia (Berlin) v6 n1 p79-86 (6 July 1974)

The effects of single doses of chlorpromazine and secobarbital on performance of normal subjects on four behavioral tests were compared. The tests were the continuous performance test (CPT) and experimenter paced test requiring continued vigilance on the part of the subject; the Digit Symbol Substitution Test, a self-paced, cognitive test; the Subject-Paced Test, a test designed to in-

clude the same visual stimuli as those used in the CPT with the subject having control of the speed of presentation of the visual stimuli; and the Symbol Copying Test, a test designed to have all the motor, visual, and self-pacing components of the DSST with the cognitive aspect removed. The results supported the hypothesis that chlorpromazine causes more decrement in performance than does secobarbital on experimenter-paced tests where sustained attention is necessary. On self-paced tests where sustained attention is not necessary, secobarbital caused more decrement in performance than did chlorpromazine.

IU-70-D0159

NACHWEIS UND BESTÄNDIGKEIT VON ARZNEISTOFFEN IN BLUTPROBEN (DETECTION AND DECOMPOSITION TIME OF DRUGS IN BLOOD SPECIMENS), E. Vidic, Archiv für Toxikologie v27 n3 art 27 p19-39 (24 Apr 1970)

An extraction and isolation procedure has been developed for use in traffic cases which permits detection of acidic, neutral and basic drug substances in a single operation without dividing the blood sample. The procedure is also suitable for toxicological examination of small samples of blood and tissue for post mortem tests. Thin layer chromatographic systems and reagents are quoted for the isolation and detection of various drugs. Experiments were also carried out to establish the extent to which certain pharmacentral substances undergo alteration during storage of blood samples for 6 months or 2-1/2 years. In this connection, it was demonstrated that Carbromal® could no longer be detected in its unchanged form after 1-2 months; the same applied for Bromisoval® after 3-4 months. Other drugs proved to be more stable.

IU-72-D0160

CANNABIS AND ALCOHOL. EFFECTS ON SIMULATED CAR DRIVING AND PSYCHOLOGICAL TESTS. CORRELATION WITH URINARY METABOLITES, O. J. Rafaelsen; P. Bech; J. Christiansen; L. Rafaelsen, Psychopharmacologia (Berlin) v26 supp p125 (Aug 1972)

The effects of cannabis and alcohol on simulated car driving were studied. The cannabis was baked into cakes in the amounts of 200, 300, and 400 mg resin (8, 12, and 16 mg Δ1-THC). The alcohol dose was 70 g pure ethanol in 500 ml juice.

The following parameters were subject to measurement in a car simulator: brake time, start time, time, distance and speed. Additionally, the subjects were trained to estimate time and distance in two ways. The psychological test battery included: memory and concentration tests, consciousness and mood scales, and personality tests.

Both cannabis and alcohol, it was judged, influenced driving in the car simulator considerably. The following conclusions were drawn from the simulated driving and from the psychological tests: 1. Cannabis and alcohol produce two different kinds of intoxication. 2. Dose-response effects of cannabis are seen on behavioural and phenomenological aspects. 3. Cannabis has such pronounced effects on skills and judgements essential for driving to make motoring during cannabis intoxication a hazardous undertaking.

It was noted that in a subsequent part of the study a correlation of these findings to urinary excretion of cannabis metabolites assayed by two-dimensional thin-layer chromatography will be undertaken.

IU-71-D0161

BEHAVIOURAL AND PHYSIOLOGICAL EFFECTS OF CIGARETTE SMOKING IN A MONOTONOUS SITUATION, M. Frankenhaeuser; A. L. Myrsten; B. Post; G. Johansson, Psychopharmacologia (Berlin) v22 n1 p1-7 (20 Oct 1971)

Sustained performance in a visual reaction time test was examined in 12 mod-

erate smokers. In a control condition without smoking, efficiency decreased over time. In a condition, where 3 cigarettes were smoked at 20-minute intervals, the subjects were able to maintain their initial level of performance throughout the session, mean reaction times being significantly shorter in the smoking than in the control condition smoking produced a significant increase in adrenaline excretion and heart rate.

IU-72-D0162

PERFORMANCE TESTS IN A STUDY OF PHENOTHIAZINES IN SCHIZOPHRENIA. CAVEATS AND CONCLUSIONS, N. R. Schooler; S. C. Goldberg, Psychopharmacologia (Berlin) v24 n1 p81-98 (2 Mar 1972)

A battery of performance tests was administered to acutely ill schizophrenic patients prior to treatment and repeatedly during a 26-week course of treatment with one of three phenothiazines (acetophenazine, chlorpromazine or fluphenazine). Included were measures of simple reaction-time, cognitive stimulus generalization, sway suggestibility, definition of affectively toned words and subjective uncertainty. Each of these measures were chosen to reflect a specific aspect of schizophrenic deficit or dysfunction. Changes in performance over time and correlations with symptom rating scales of psychopathology presumably tapping the same schizophrenic dysfunctions were examined.

Most changes in performance occurred between the initial and first repeated testing. Correlations with clinical ratings were seen primarily in symptoms of withdrawal and cognitive disturbance.

IU-68-D0163

PHYSICIAN'S GUIDE FOR DETERMINING DRIVER LIMITATION, American Medical Association (1968)

This guide was prepared to assist physicians in examining patients and advising them concerning the relationship of health and motor vehicle safety. Physical and mental disorders likely to impair driving ability are specifically enumerated along with problems resulting from medicaments and alcohol. Factors discussed include: medicine; cardiovascular disease; ophthalmology; otolaryngology; musculoskeletal problems; neurological, emotional and psychiatric disorders; and alcohol.

IU-73-D0164

THE EFFECT OF MARIJUANA ON TRACKING TASK PERFORMANCE, W. T. Roth, J. R. Tinklenberg, C. A. Whitaken, C. F. Danley, B. S. Kopell, L. E. Hollister, Psychopharmacologia, (Berlin) v33 p259-265 (1973)

A 5-min paced contour tracking task was performed before and after receiving brownies containing either placebo or marijuana calibrated to a Δ^9 tetrahydrocannabinol content of 20 mg. The error patterns of 19 young male subjects who received placebo and 18 who received marijuana were compared. After marijuana there was an increase in total errors as measured by the standard deviation ($P < 0.01$) and the mean deviation ($P < 0.02$) error scores. Although marijuana is reputed to create a fluctuating effect, under the conditions of this experiment the variability of error scores between successive 15-second time periods in the marijuana group was not significantly greater than in the placebo group. In addition the marijuana deficit did not show significant time trends during the task.

IU-66-D0165

PSYCHOPHARMAKA UND VERKEHRSTAUGLICHKEIT (PSYCHOACTIVE DRUGS AND DRIVING FITNESS), W. Keller, Pharmazeutische Praxis n7 p158-161 (July 1966)

Most drugs considered as psychoactive and prescribed for the therapy of behavior disorders are likely to have some adverse effects on motor vehicle operation, either through alteration of behavioral patterns or through effects on sensory input. In particular, elevations or depressions of overall mood and central tone (caused by psychoactive agents) may have dramatic effects on driver performance and may be responsible for unsafe operation.

IU-70-D0166

VERHALTEN DER REAKTIONSZEITEN UNTER OVOSISTON-EINFLUB (BEHAVIOR OF REACTION OF TIMES UNDER THE EFFECT OF OVOSISTON), H. J. Seewald; G. Klinger; E. Hempel, Zentralblatt für Gynäkologie v92 n22 p708-711 (30 May 1970)

In a study of 235 women, ages 20-40, taking oral contraceptive medication on a chronic basis, reaction time was significantly increased.

IU-68-D0167

ARZNEIMITTEL UND STRABENVERKEHR (DRUGS AND ROAD TRAFFIC), K. Mayer, Die medizinische Welt v28 n29 p1614-1621 (20 July 1968)

The influence of narcotics, hypnotics, sedatives, analgesics, psychotropic drugs, antihistamines, antimetics, anticonvulsives, antihypertonics, insulin and oral antidiabetics on an individual's ability to drive a motor vehicle was reviewed. The effect on the entire personality is more of a problem than the effect on a particular psychic function. Regularly administered psychotropic drugs over a long period of time are less dangerous to driving safety than a single administration of a small dose. While psychotropic drugs can in individual instances contribute to safer driving, it is dangerous to postulate a chemotherapy for safer driving. Each drug under certain conditions can endanger driving safety. Drugs, it was concluded, should not be taken before and while driving.

IU-72-D0168

DIE WIRKUNG VON BELLERGAL® AUF DIE FAHRTAUGLICHKEIT (EFFECT OF BELLERGAL® ON FITNESS FOR DRIVING), R. Seus; H. Seus, Medizinische Klinik v67 n26 p923-927 (30 June 1972)

Bellergal® may have adverse effects on driving through its effects on visual systems, on alertness, or on coordination. However, the effects of the drug itself are complicated by the problems (mental behavior) of the subjects to whom it is given.

IU-68-D0169

PSYCHOPHARMACA IN VERKEER (PSYCHOPHARMACEUTICAL AGENTS AND TRAFFIC), F. A. Nelemans, Nederlandsch tijdschrift voor geneeskunde v112 n41 p1862-1867 (12 Oct 1968)

The author discusses the likelihood that various classes of drugs will have adverse effects on the ability of patients to operate motor vehicles. Without presenting any data or references, he suggests that the following drugs or drug classes may be likely to cause problems: antipsychotic agents (reserpine, phenothiazines, butyrophenones), lithium, anxiolytic agents (benzodiazepines, meprobamate, antihistamines) sedatives, anticonvulsants, antidepressants (tricyclics, monoamine oxidase inhibitors), and stimulants.

IU-66-D0170

STRABENFÄHIGKEIT NACH AMBULANTEN NARKOSEN IN DER ZAHN- UND KIEFERHEILKUNDE (TRAFFIC COMPETENCY AFTER AMBULATORY ANESTHESIA IN ORAL SURGERY), W. Kapp, Deutsche zahnärztliche Zeitschrift v21 n10 p1244-1247 (1 Oct 1966)

All barbiturates, even the so-called "ultra short acting" have a significant post-anesthetic hangover. With fluothane®, after effects are seen for as long as 6 hours; with barbiturates for as long as 24 hours.

IU-66-D0171

HABEN REZEPTFREIE ANALGETICA UND PLACEBOS EINE VERSCHIEDENE WIRKUNG AUF DAS SUBJEKTIVE SELBSTEMPFINDEN, DIE PERSÖNLICHKEITSLAGE UND DIE PSYCHOMOTORISCHE LEISTUNG? (DO PATENT ANALGETICS AND PLACEBOS HAVE A DIFFERENT EFFECT ON SUBJECTIVE FEELINGS, PERSONALITY TESTS AND PSYCHOMOTOR PERFORMANCE?), K. Bättig; H. Fischer, Schweizerische Medizinische Wochenschrift v96 n17 p570-575 (30 Apr 1966)

These experimenters reported that in a group of 29 students, 3 tablets of Saridon® and 3 tablets of placebo alike failed to have any significant effect on performance in 6 different psychomotor tests or on the results of a quantitatively measurable personality test. In another quantitative test of subjective feelings, the placebo produced significant changes in mood (sedation and euphoria). The effect of Saridon® was weaker than that of the placebo, although a similar tendency was noticeable. In none of the cases was the difference between the two treatments significant.

IU-73-D0172

REAKTIONSZEITMESSUNGEN BEI ZAHNÄRZTLICHCHIRURGISCHEN EINGRIFFEN IN ANALGOSEDIERUNG (REACTION TIME MEASUREMENT IN DENTAL SURGERY USING ANALGO SEDATION), P. Tetsch, Deutsche zahnärztliche Zeitschrift v28 n5 p618-622 (May 1973)

Investigations of patients in which dental surgery was carried out under analgo-sedation (analgetics and psychopharmacologic agents) showed, in addition to prolonged reaction times, considerable disturbances in coordination and hypocrisy due to medication. These results were discussed in relation to driving ability and application of analgo-sedation in outpatient treatment.

IU-73-D0173

PHYSIOLOGISCHE VERÄNDERUNGEN UND REGELLEISTUNGSVERHALTEN ÄLTERER PROBANDEN WÄHREND KONTINUIERLICHER TRACKING-TATIGKEITEN NACH ZUFUHR EINER ZENTRAL AKTIVIERENDEN SUBSTANZ (PHYSIOLOGICAL CHANGES IN THE PERFORMANCE OF OLDER TEST PERSONS DURING CONTINUOUS TRACKING TASKS FOLLOWING ADMINISTRATION OF A CENTRAL NERVOUS SYSTEM STIMULANT), H. Strasser; W. Müller-Limmroth, Arzneimittel Forschung v23 n3 p406-415 (Mar 1973)

A balanced and controlled cross-over double-blind investigation into the effects of a central nervous stimulant and placebo on tracking behavior and physiological parameters was designed.

By statistical analysis 5-phenyl-2-imino-4-oxo-oxazolidine (premoline, Tradon®) was determined to have uniquely increasing stimulating influences showing improvements in three tracking tasks and a slight deterioration in one adaptive method. The impairment of tracking behavior in the one test in which the task varied as a function of how well the operator performed, approximating performances scores under placebo, does not contradict but indirectly confirms the effect of psychopharmacon.

It could be demonstrated that performance after premoline was significantly different from that after placebo as well as "true" percentage improvements

in the two trials during the second and third hour compared to the controls within the first hour. After placebo there were no significant improvements but partly deteriorations, for mental stress of the tracking tasks caused fatigue effects.

IU-71-D0174

ANALGETICA UND VERKEHRSTÜCHTIGKEIT. WIRKUNG EINER KOMBINATION VON 5-ALLYL-5-ISOBUTYLSÄURE DIMETHYLAMINOPHENAZON UND COFFEIN NACH EINMALIGER UND WIEDERHOLTER APPLIKATION (ANALGESIC DRUGS AND TRAFFIC ABILITY. EFFECTS OF SINGLE AND REPEATED APPLICATIONS OF A COMBINATION OF 5-ALLYL-5-ISOBUTYLBARBITURIC ACID, DIMETHYL-AMINOPHENAZONE AND CAFFEINE), H. Wegener; L. Kötter, Arzneimittel Forschung v21 n1 p47-51 (Jan 1971)

The effects of the analgesic Optalidon®, a combination of 5-allyl-5-isobutyl-barbituric acid, dimethylaminophenazone, and caffeine, were tested in 20 randomly selected healthy male students (19-30 years) by means of experimental methods in the psychological laboratory. Criteria used were influence on ability of uptake and reaction to optic and acoustic stimuli, on psychomotor coordination, mental coordination and concentration, and on a number of subjective judgments of condition following acute or chronic application of the drug. Twenty students selected randomly after application of placebo served as controls. The tests were performed 1 1/2, 3 and 6 1/2 h following application.

Analyzing the influence on 33 individual items, it appears that on the average no alarming acute or chronic effects of the drug occur. The observable trends show that in general the test subjects increase precaution and work control so that reactions eventually are slower, but by no means less certain.

This means that normally an impairment of traffic behavior by Optalidon® need not be expected. With certain reservations this is also valid for cumulated drug effect. If, however, the patient is under the additional influence of some other drug or such an influence has to be reckoned with, this compound must be used with caution.

IU-71-D0175

INFLUENCE OF ALCOHOL AND MARIHUANA ON MOTOR AND MENTAL PERFORMANCE, J. E. Manno; G. F. Kiplinger; N. Scholz; R. B. Forney; S. E. Haine, Clinical Pharmacology and Therapeutics v12 n2 part1 p202-211 (Mar-Apr 1971)

Twelve healthy male volunteers smoked marihuana cigarettes calibrated to deliver 0, 2.5, or 5 mg. of delta-9-tetrahydrocannabinol (THC) either alone or in combination with either a plain fruit-flavored beverage or the same beverage containing 15 ml. of alcohol per 50 pounds of body weight. Each subject received all 6 possible combinations in a double-blind randomized block experiment. The parameters measured were four pursuit meter tests, nine delayed auditory feedback tests, pulse rate, conjunctival injection, and subjective effects.

It was found that the high dose of THC produced significant impairment in performance of both mental and motor tasks and that alcohol induced an additional effect. There was little difference between the response to 2.5 and 5.0 mg. of THC on these parameters. Conjunctival injection, pulse rate, and subjective effects were dose dependent and alcohol was additive.

IU-70-D0176

VERGLEICHENDE EXPERIMENTELLE UNTERSUCHUNG DER WIRKUNG VON BENCYCLAN BEI KRAFTFAHRERN (COMPARATIVE EXPERIMENTAL STUDY ON THE EFFECT OF BENCYCLANE IN DRIVERS), L. G. Horváth, Arzneimittel Forschung v20 n10a p1455-1457 (Oct 1970)

Examining 11 parameters, partly divided into subgroups, it was found in 25 normal drivers aged 18-20 years that N-[3-(1-benzyl-cycloheptyl-oxy)-propyl]-N, N-dimethyl-ammonium-hydrogenfumerate (bencyclane, Fluidilat®) had no adverse ef-

fect on functional ability received in street and rail traffic. On the contrary, a general enhancement of sensomotorics was found, as was a significant increase in capacity and statistically secured reduction of mistakes. With the larger dosage, capacity of perceiving information and the semantic and pragmatic functions were influenced favorably. This may be explained by increased cerebral blood circulation.

IU-70-D0177

AMANTADIN-HCL UND SEIN EINFLUB AUF DIE FAHRTAUGLICHKEIT (AMANTADINE-HCL AND ITS EFFECT ON DRIVING ABILITY), H. Seus; R. Seus, Arzneimittel Forschung v20 n2 p274-277 (Feb 1970)

1-amino-amantadine hydrochloride (amantadine HCL) was studied in 40 healthy, young students at a dose of 2x1 capsule (100 mg each) per day. The experimental method was selected because it reflected the functional working ability that was considered relevant in driving a car or in meeting the demands of highly technical work.

Amantadine HCL demonstrated no influence on reactional behavior, or on the somatic variants of blood pressure behavior, phoria and adaption to darkness. No significant effects were seen on the course of concentration, on the capability of persistent concentration and on visual attention. According to the authors, since none of the psychophysical functions tested was effectively impeded by amantadine HCL in healthy young test persons with this dosage, no negative influence is to be expected on driving ability and the solving of occupational problems.

IU-72-D0178

CHANGES IN BEHAVIORAL AND PHYSIOLOGICAL ACTIVATION INDUCED BY CIGARETTE SMOKING IN HABITUAL SMOKERS, A. L. Myrsten; B. Post; M. Frankenhaeuser; G. Johansson, Psychopharmacologia (Berlin) v27 n4 p305-312 (1972)

Performance in tasks on visual simple and choice-reaction time was studied in six healthy habitual smokers. Results from a non-smoking condition and a condition in which each subject smoked four cigarettes, indicated that smoking had a beneficial effect on performance efficiency in both tasks: a) simple reaction time increased over time in the nonsmoking condition, but remained at the same level in the smoking condition, and b) choice-reaction time increased slightly in the non-smoking condition and decreased in the smoking condition. The difference between conditions was statistically significant for simple-reaction time. Hand steadiness was impaired by smoking. Heart rate and systolic pressure increased in the smoking condition, while catecholamine secretion remained relatively unaffected by smoking. Self-estimates of wakefulness and mood showed that smoking was judged to have favorable effects.

IU-69-D0179

CLINICAL USE OF PSYCHOTHERAPEUTIC DRUGS. CURRENT STATUS, L. E. Hollister, Clinical Pharmacology and Therapeutics v10 n2 p170-198 (Mar-Apr 1969)

The clinical efficacy of present psychotherapeutic drugs varies among the various types. Antianxiety agents are most controversial, as a great many confounding, metapharmacological variables influence the results obtained. The use of such drugs in traditional doses and dosage schedules also may not employ them to best advantage. Antidepressants must increasingly be considered in relation to the clinical type of depressive reaction being treated. Tricyclic drugs are clearly indicated for retarded or endogenous depressions; in exceptional cases, monoamine oxidase inhibitors may merit a trial in such patients. Depressions characterized by much attendant anxiety may respond better to phenothiazines or to antianxiety agents. Consequently, the scope of "antidepressants" may be larger than simply one or two drug classes.

Antipsychotics are clearly effective. A large number of peer drugs are available, although it seems clear that, for reasons still to be elucidated, individual patients may respond better to one than to another. Drug therapy of other types of psychiatric disorder, such as mental retardation, childhood and adolescent behavior disorders, alcoholism, and psychoses associated with old age, is of limited value. Lithium salts may represent a significant advance in the management and prevention of manic attacks.

IU-73-D0180

DIE WIRKUNGSWEISE EINES ANTIHISTAMINIKUMS AUF KRAFTFAHRSPEZIFISCHE LEISTUNGSQUALITÄTEN UND IHRE BEEINFLUSSUNG DURCH DIE VERPACKUNG (ACTION MECHANISM OF AN ANTIHISTAMINIC ON SPECIFIC AUTOMOBILE DRIVING CAPACITIES AND THEIR INFLUENCING THROUGH PACKAGING), P. Kowar, Weiner medizinische Wochenschrift v123 n47 p701-704 (24 Nov 1973)

No significant effects of the antihistamine Tavegyl® were observed on a variety of performance skills tests related to driving. When two different dosage forms of the drug were compared to each other, the only difference was in the time of onset of action.

IU-67-D0181

BEEINFLUSSUNG DES FAHRVERHALTENS DURCH EINE MEDIUM - TRANQUILLIZER. OBJEKTIVIERENDE STUDIEN (INFLUENCING OF DRIVING PERFORMANCE BY AN INTERMEDIATE TRANQUILIZER. OBJECTIFYING STUDIES), B. Biehl; U. Seydel, Münchener medizinische Wochenschrift v109 n5 p253-258 (3 Feb 1967)

Mesoridazin was tested on decreased ability to operate a motor vehicle in 85 subjects with different dosage levels and different periods of administration. With short term and high dosage levels a significant performance decreasing effect on the responsiveness in terms of reactions and a tendency to affect sensory and motor coordination was demonstrated. With more prolonged administration and lower dosage levels the experimenters observed a decrease of the reaction speed to single optical signals, but felt that this only had a slight bearing on the ability to drive.

The results obtained seemed to indicate that mesoridazine given in the recommended dosage of 3 times daily 5 mg. does not restrict driving ability. However, the experimenters felt that higher doses were contraindicated for operators of motor vehicles. Administration of the drug for 7 days did not show significant cumulative effects.

IU-73-D0182

VERKEHRSMEDIZINISCHE PROBLEME BEI OPERATIVEN EINGRIFFEN IN LOKALANAESTHESIE UNTER B-RECEPTORENBLOCKADE (MEDICAL PROBLEMS IN AUTOMOBILE DRIVING FOLLOWING SURGICAL INTERVENTIONS WITH LOCAL ANESTHESIA UNDER BETA RECEPTOR BLOCKADE), P. Tetsch; E. Esser; A. Stumborg, Anaesthesist v22 n6 p251-254 (14 Aug 1973)

This study concerns itself with evaluation of traffic-fitness and reaction times. In patients upon whom minor oral surgical procedures under local anesthetics were undertaken, elected reaction times with or without B-receptor blockers were determined and the results compared with those premedicated with diazepam and atropine. The results show that the B-receptor blockers do not influence the psycho-physical capabilities.

IU-72-D0183

HASCHISCH UND FAHRVERHALTEN. EINE EXPERIMENTELLE UNTERSUCHUNG (HASHISH AND DRIVING BEHAVIOR. AN EXPERIMENTAL STUDY), P. Kielholz; L. Goldberg; V. Hobi; D. Ladewig; G. Reggiani; R. Richter, Deutsche medizinische Wochenschrift v97 n20 p789-794 (19 May 1972)

In a double blind study 54 volunteers were tested for their car driving ability before and after taking delta-9-tetrahydrocannabinol (THC) at doses of 350,400 or 450 ug/kg and a placebo. Medical examination of these in the THC group revealed injected conjunctival vessels, increased pain sensitivity as well as a significant pulse rate increase and rise in diastotic blood pressure. There were three prominent effects in the self-assessment of the THC group - a definite inward turning of consciousness followed by an impairment of attention and concentration capacities; change in motor functions, co-ordination and associations; and a failing to come to terms with the environmental situation. It was felt that THC, because of its inhibiting as well as stimulating effects, influences psychological and physiological functions important for driving in a manner different from alcohol. It changes and worsens adaptability especially if there is simultaneous stress when rapid decisions and actions were required, prolongation of reaction time and an increased frequency of wrong and inadequate responses were observed. The degree of impairment, though, depended on the initial personality structure and individual effects of the drug on basic mood and attitude. The intensity of action of THC was still measurable five to six hours after intake. The subjects still noticed a definite effect eight to ten hours after intake, and a discrete late effect as long as 24 hours later.

IU-71-D0184

DESIPRAMINE AND IMIPRAMINE, ALONE AND TOGETHER WITH ALCOHOL IN RELATION TO DRIVING SAFETY, A. A. Landauer, G. Milner, Pharmakopsychiatrie Neuro-Psychopharmakologie v4 n5 p265-275 (Sept 1971)

A brief survey of drug-alcohol interaction studies in animals and humans was presented, as well as reports of drug effects on driving skills. The importance of such research was stressed in the context that precise knowledge may help reduce the road toll.

An investigation of desipramine and imipramine was described: The drugs being given, together with placebo, to 27 medical students in a double-blind, controlled trial. Questionnaires, psychomotor skills tests and driving simulator performance were used to measure drug effects before and after the ingestion of ethanol (BAL 74 mg/100 ml). Neither drug exhibited any adverse effects, in contrast to a previous study involving amitriptyline. Alcohol caused a significant performance decrement on most tests. However, this effect was to some small, but statistically significant, degree reversed by negative joint drug-alcohol effects on one measure with the driving simulator task. It was concluded that desipramine and imipramine are generally likely to be safe for use with most patients who continue to drive, though no driver should be under the influence of alcohol.

IU-65-D0185

DRUGS AND DRIVING, Traffic Law Commentary n1 p1-18 (30 Apr 1965)

The comparison of state laws presented in this commentary is prefaced with a general review of various types of drugs, their convential uses, and the possible impairing effects they can have on physical and mental functioning. Drugs discussed include: narcotics, sedatives and hypnotics, tranquilizers, antihistamines, stimulants, hallucinogens, anti-infectives, and combinations of these drugs.

Abstract [illegible]

State laws are compared with the Uniform Vehicle Code by habitual use of narcotic drugs, under the influence of narcotic and other drugs, under the combined influence of drugs and alcohol, the legal use of a drug as a defense, the drug and alcohol provisions combined, place of application, type of vehicle, act prohibited, and miscellaneous provisions.

IU-73-D0186

DRUG EFFECTS ON PSYCHOMOTOR SKILLS RELATED TO DRIVING. INTERACTION OF ATROPINE, GLYCOPYRRHONIUM AND ALCOHOL, M. Linnoila, European Journal of Clinical Pharmacology v6 n2 p107-112 (Aug 1973)

Atropine 0.5 mg and glycopyrrhonium 1.0 mg in combination with alcohol or a placebo drink were administered double blind to 170 healthy young volunteers, and certain psychomotor skills were measured by a choice reaction test, 2 co-ordination tests, and an attention test. The drugs were administered 30 min. before the test and the tests were repeated 90 and 150 min. after dosing. Both atropine and glycopyrrhonium shortened reaction time and either left co-ordination unaffected or slightly improved. Anticholinergics or alcohol alone impaired attention. The combination of anticholinergics and alcohol further impaired attention while leaving reaction times and co-ordination unaffected. The interaction of atropine and alcohol differed only slightly from that of glycopyrrhonium and alcohol.

IU-73-D0187

DRUG INTERACTION ON PSYCHOMOTOR SKILLS RELATED TO DRIVING. DIAZEPAM AND ALCOHOL, M. Linnoila; M. J. Mattila, European Journal of Clinical Pharmacology v5 n3 p186-194 (1973)

The effects of combinations of diazepam (5 and 10 mg) and alcohol (0.5 and 0.8 g/kg) on skills related to driving were studied in 200 volunteer students. A choice reaction test and 2 co-ordination tests were employed, one of which was carried out at a fixed speed, and in the other the speed was chosen by the subject himself. On their own these drugs either did not affect or even slightly improve the skills measured, but their various combinations definitely impaired the subjects' performances. This effect was greatest before the peak levels of blood alcohol were reached. The combination of these drugs is considered dangerous for driving. The practical effect of taking one of these drugs on its own is more difficult to assess.

IU-73-D0188

EFFECTS OF ANTIHISTAMINES, CHLORMEZANONE AND ALCOHOL ON PSYCHOMOTOR SKILLS RELATED TO DRIVING, M. Linnoila, European Journal of Clinical Pharmacology v5 n4 p247-254 (1973)

The effects of diphenhydramine, meclastine and chlormezanone, alone or in combination with alcohol, on psychomotor skills related to driving were investigated in 300 healthy volunteers. A choice reaction test and 2 coordination tests were employed. Diphenhydramine caused sedation, partly independent of the dose, and slightly impaired psychomotor performance. Some subjects were exceptionally sensitive to diphenhydramine induced impairment of skills. It enhanced the effects of alcohol. Meclastine did not impair psychomotor performance. A 1.5 mg. dose did not enhance the effects of alcohol, but 3 mg. did, although it was less potent than 50 mg of diphenhydramine. Chlormezanone 200 mg. had a relaxing effect which became apparent as a shortened reaction time at 30 min. Chlormezanone 400 mg did not affect psychomotor performance, nor did it enhance the effects of alcohol on psychomotor skills.

IU-73-D0189

UBER DEN EINFLUB DER ERMUDUNG AUF DIE OPTISCHE REAKTIONSZEIT DES MENSCHEN (ON THE EFFECT OF FATIGUE ON THE OPTICAL REACTION TIME OF MAN), I. Brazil, Acta biologica et medica Germanica v30 n4 p489-493 (1973)

The influence of weariness on the optical reaction time of man was investigated. Physiologically caused symptoms of fatigue considerably lesser reaction time. The effect can be drastically enhanced by administration of the hypnotic methaqualon and can be completely suppressed by ephedrine hydrochloride. Measurements of the time of reaction appeared to be an appropriate means for testing drugs with central-nervous action.

IU-73-D0190

EFFECTS OF DIAZEPAM, CHLORDIAZEPOXIDE, THIORIDAZINE, HALOPERIDOLE, FLUPENTHIOXOLE AND ALCOHOL ON PSYCHOMOTOR SKILLS RELATED TO DRIVING, M. Linnoila, Annales medicinae experimentalis et biologiae Fenniae v51 n3 p125-132 (Mar 1973)

The effects of diazepam, chlordiazepoxide, thioridazine, haloperiodole and flupenthioxole, alone or in combination with alcohol, on psychomotor skills related to driving were investigated in 400 healthy volunteers. A choice reaction test, two coordination tests and an attention test were employed.

Benzodiazepines alone relaxed the subjects and they had additive effects in combination with alcohol on reaction and coordination. Thioridazine had a more deleterious effect on attention than the benzodiazepines, and it had slight additive effects with alcohol on coordination.

Haloperidole and flupenthixole scarcely altered reactive or coordinative skills, and they did not interact with alcohol. Their effects on attention were deleterious.

It was concluded that the strong interaction of benzodiazepines with alcohol should be considered in medical practice, particularly in treating neurotic patients, who often use drugs in combination with alcohol.

IU-74-D0191

EFFECT OF DRUGS AND ALCOHOL ON PSYCHOMOTOR SKILLS RELATED TO DRIVING, M. Linnoila, Annals of Clinical Research v6 n1 p7-18 (Feb 1974)

This paper discusses driving and many of the variables affecting it in a general manner. It concludes that driving is a divided attention task requiring gathering of information, mainly by vision, processing the useful part of this information, and compensatory motor functions. The main limitation to driving is human information processing capacity. The use of drugs and consumption of alcohol are serious problems both in traffic and at work. The drug users among drivers in western societies are in the order of 15%.

The possible risk caused by drugs in traffic is difficult to evaluate, because the drug users are often people with multiple problems. They have about twice the accident risk of normal drivers in traffic, and the mortality risk in traffic due to alcohol increases exponentially with blood alcohol concentration. Laboratory data indicate that at the beginning of treatment even low doses of neuroleptics (including amphetamines, cannabis, LSD, hallucinogens, antihistamines, muscle relaxants, etc.) impair the human information processing capacity and that the benzodiazepines have a strong additive interaction with alcohol.

Every physician should warn his patients about the potential risk for driving caused by psychotropic drugs especially at the beginning of the treatment.

IU-73-D0192

INTERNATIONAL SEMINAR. RESEARCH ON ALCOHOL, DRUGS AND DRIVING. 25TH-27TH OCTOBER, HELD AT THE UNIVERSITY-PSYCHIATRIC CLINIC, BASLE, SWITZERLAND, P. Kielholz, Pharmakopsychiatrie Neuro-Psychopharmakologie v6 n2 p65-66 (Mar 1973)

This is the introductory-welcoming address by the author to the International Seminar. He states among other things that a 80mg% blood alcohol level leads, even with skilled motorists, to a significant impairment of driving ability.

IU-73-D0193

SURVEY ON DRIVER BEHAVIOUR ALCOHOL AND DRUG, J. D. J. Havard, Pharmako-psychiatrie Neuro-Psychopharmakologie v6 n2 p67-70 (Mar 1973)

This paper discusses the practical application of research results on alcohol and drug effects. Attention is brought to the necessity for distinguishing between the therapeutic use of drugs and medicines and their inappropriate use or abuse.

The fact that the number of vehicle drivers and the use of drugs and medicines within this group are increasing, places demands on the medical profession which it is not yet able to fulfill. Discussion is given to the idea of examining the influences of drugs and medicines on driver behavior before the drug is approved for use and reference is made to the fact that physicians must be informed on these results. Advice for patients is also mentioned.

The factual differences between ethyl alcohol and other drugs are mentioned and the critical blood-alcohol concentration of 0.8% is mentioned with regard to normal, social drinking and the increased danger of accidents. Emphasis is given to the fact that the basic problem of alcohol must be treated before one receives his driver's license back after suspension for driving under the influence of alcohol. The author notes that with the exception of the effects of alcohol, very little is known about the human factors which influence the risk of becoming involved in an accident and that, therefore, given the increasing mortality and injury rates in traffic accidents in technically developed countries, efforts must be intensified to increase effective measures against driving under the influence of alcohol.

IU-73-D0194

SIMULATED CAR DRIVING INFLUENCED BY CANNABIS AND ALCOHOL, O. J. Rafaelsen; P. Bech; L. Rafaelsen, Pharmakopsychiatrie Neuro-Psychopharmakologie v6 n2 p71-83 (Mar 1973)

Simulated car driving was studied with oral administration of cannabis resin containing 4% THC in three doses equivalent to 8, 12 and 16 mg THC. Alcohol was given orally in one standard dose of 70 g. Both cannabis and alcohol increased brake time and start time, whereas alcohol increased, and cannabis decreased, the number of gear changes. Mean speed was unchanged, but bigger variations in actual speed were observed with both drugs.

Cannabis showed a much stronger effect than did alcohol on the estimation of time and distance. The effect of cannabis was more marked on the 'subjective' than on the 'objective' estimation. A dose-response type of effect was seen on cannabis both behaviorally and phenomenologically. It was concluded that Cannabis has pronounced effects on some skills and judgments essential for driving and that cannabis and alcohol produce two different kinds of intoxication phenomenologically.

IU-73-D0195

EXPERIMENTAL INVESTIGATION ABOUT THE EFFECTS OF CANNABIS ON CAR DRIVING BEHAVIOR, P. Kielholz; V. Hobi; D. Ladewig; P. Miest; R. Richter, Pharmakopsychiatrie Neuro-Psychopharmakologie v6 n2 p91-103 (Mar 1973)

Under double-blind conditions the behavior of 54 voluntary cannabis-unexperienced professional persons (mean age:34) was tested. The administered dose of Δ9-tetrahydrocannabinol ranged from 350 or 450 ug/kg p.o. The investigation consisted of a neuro-psychiatric status, the application of a self-estimation scale, of a personality inventory (FPI), and a battery of tests measuring some parameters of driving performance (tapping, tracking, a.o.) and perception (Exnerspirale a.o.). The tests have been conducted 4 times during 24 hours.

The medical examination of the THC-group showed injected conjunctival vessels, increased sensitivity to pain as well as a significant increase of pulse frequency and diastolic blood pressure. The self-judgement of the THC-probands has especially emphasized: 1. A clear tendency to introversion with succeeding limitation of the perception and concentration capacity. 2. A change of psychomotoricity, coordination and association. 3. A more difficult rendered integration into reality as a result of a discrete depersonalization syndrome.

An alteration under THC, especially under simultaneous stress could be demonstrated. In situations with a high intensity of information a significant increase of false reactions and longer reaction times were to be noted.

IU-73-D0196

INTERNATIONAL SEMINAR RESEARCH ON ALCOHOL, DRUGS AND DRIVING, R. B. Forney, Pharmakopsychiatrie Neuro-Psychopharmakologie v6 n2 p104-113 (Mar 1973)

In this paper the author reports on the test battery he has developed and employed over the years to investigate the influences of drugs and alcohol on driving skills and ability. In it he states: Because of the difficulty in using the actual driving of automobiles on highways to measure driver impairment produced by alcohol and/or drugs, laboratory devices for this purpose were investigated. Both mental and motor performance were important to measure in terms of numbers for statistical evaluation.

The delayed auditory feedback (DAF) system was adapted for mental performance under stress using verbal, arithmetic and a color discrimination test. Motor performance was measured by means of a pursuit meter (PM) utilizing a dual beam oscilloscope. The movement of one beam was adjusted by means of two function generators into a problem pattern. The subject controlled the second beam with a steering wheel and attempted to superimpose his controlled beam on the problem beam. Using a recorder with an integrating channel the difference between the two beams could be recorded as an error. A "wobble board" was linked to an electronic counter and measured standing steadiness. These devices are sensitive to the impairment produced by blood concentrations of ethanol of 0.05 percent in some people. The effect of other drugs alone or in combination with ethanol have been evaluated using these devices.

IU-73-D0197

DRUG INTERACTION ON DRIVING SKILLS AS EVALUATED BY LABORATORY TESTS AND BY A DRIVING SIMULATOR, M. Linnoila; M. J. Mattila, Pharmakopsychiatrie Neuro-Psychopharmakologie v6 n2 p127-132 (Mar 1973)

In this paper the authors presented the results of a number of successive studies they conducted in order to investigate interactions between centrally active drugs and alcohol on driving skills. The total subject population involved numbered 1600. The drugs discussed included: minor tranquilizers,

diazepam, chlordiazepoxide, chlormezanone; major tranquilizers, thioridazine, haloperidole, flupenthixole; hypnotics, nitrazepam, ethinamate, bromvaletone; anticholinergics, atropine, glycopyrrhonium; isoniazid; and ethanol.

The authors also cited a study of theirs by which they were able to deduce that the interaction of diazepam with alcohol may be primarily due to events at the receptor sites. They concluded that since the diazepam-alcohol interaction demonstrated by the laboratory tests pattern was confirmed simulated by driving, it suggests that carefully selected psychomotor tests can be used, and should be used, to provide data about the actions and interactions of drugs and alcohol on driving skills.

IU-73-D0198

RESEARCH ON ALCOHOL, DRUGS AND DRIVING. CONCLUDING SUMMARY BY THE CHAIRMAN, J. D. J. Havard, Pharmakopsychiatrie Neuro-Psychopharmakologie v6 n2 p132-136 (Mar 1973)

This is the concluding address by the author to the International Seminar held at the University-Psychiatric Clinic, Basle, Switzerland on October 25th-27th, 1972. He summarized some of the important points made during the seminar, noting one which clinicians have known for some time: with many drugs the observable effects bear very little relationship to the concentration of the drug in the body at any fixed point in time. The author suggests that one of the most important tasks yet to be done is to inform the health professions which drugs or medicines are likely to impair driving ability, and to indicate clearly the nature of the advice which should be given to patients under treatment.

IU-73-D0199

EXPERIMENTELLE UNTERSUCHUNGEN ÜBER DEN EINFLUB EINES ANTIMYKOTIKUMS (BAY b 5097) AUF DIE PSYCHOPHYSISCHE LEISTUNGSFÄHIGKEIT (EXPERIMENTAL EXAMINATION OF THE INFLUENCE OF AN ANTIMYCOTIC [BAY b 5097] ON PSYCHOPHYSICAL EFFICIENCY), M. Staak; J. Haberer, International Journal of Clinical Pharmacology, Therapy and Toxicology v8 n3 p198-206 (Nov 1973)

The Antimycotic agent, Bay-b-5097 [bisphenyl-(2-chlorophenyl)-imidazolmethane] had a statistically significant impairment effect on the functional abilities required to operate in street traffic. Based on studies in 10 normal students, persistence of attention and velocity of isolated acoustic impressions were decreased.

IU-68-D0200

COMPARATIVE EFFECTS IN HUMAN SUBJECTS OF THREE HYPNOTICS AND PLACEBO ON MENTAL AND MOTOR PERFORMANCE, H. L. Kaplan; R. B. Forney; F. W. Hughes; A. B. Richards, Archives internationales de pharmacodynamie et de thérapie v174 n1 p181-191 (July 1968)

The relative effects of ethchlorvynol, glutethimide, secobarbital and placebo on mental and motor performance were measured in subjects aroused after 4 and 8 hours of drug-induced sleep. Each of 8 subjects received one of the 4 agents at bedtime on 4 non-consecutive nights. Mental performance was measured with a delayed auditory feedback system utilizing 9 separate tests.

After 4 hours there was some impairment of mental activity with glutethimide, compared to each of the other three drug treatments; less variation in mental performance was found with these drugs. After 8 hours, mental acuity was generally better after placebo than after ethchlorvynol, glutethimide, or secobarbital.

Attentive motor performance was measured with a Pursuit Meter. After 4 hours there was significant motor impairment in two tests with glutethimide compared

to secobarbital, and in one test compared to ethchlorvynol. After 6 hours, there was a trend towards greater impairment of motor performance by secobarbital than with the other drugs.

IU-72-D0201

MÉDICAMENTS PSYCHOTROPES, ALCOOL ET CONDUITE AUTOMOBILE (DRUGS, ALCOHOL AND DRIVING), Mönnerot-Dumaine, Nouvelle Presse médicale v1 n25 p1685-1686 (June 1972)

In reviewing the basic concepts in this area, the author concludes that a variety of therapeutic agents, alone, in combination with each other, or in combination with alcohol, may have an adverse effect on motor vehicle operation.

IU-73-D0202

DRUG USE IN AMERICA. PROBLEM IN PERSPECTIVE. SECOND REPORT OF THE NATIONAL COMMISSION ON MARIHUANA AND DRUG ABUSE, National Commission on Marihuana and Drug Abuse, Government Printing Office, Washington, D.C. (1973)

This report is an effort to examine the roots of the drug problem in the United States, to analyze the assumptions upon which present policy is based, and to recommend policy directions for both the public and the private sections. The phenomena of drug use, drug-induced behavior and drug dependence were discussed and a process for assessing their social impact was established in the three sections following the introductory section. Concrete recommendations for a coherent social policy in the present were submitted in section 4 and speculations about the policies which may prove useful in the future were presented in the final section. The Commission believed that policy should be focused on the behavioral concomitants of drug use rather than on the drugs themselves. It was felt that by doing so policy makers can refine national objectives and devise more effective strategies for reducing the social costs of drug misuse.

IU-68-D0203

ETHAMBUTOL, Drug and Therapeutics Bulletin v6 n19 p73-74 (13 Sep 1968)

Ethambutol, a new antituberculosis drug, can cause eye damage resembling retrobulbar nervitis and may be either of two types. In the first, reduced visual acuity is associated with a central scotoma and loss of ability to distinguish green from red. The patient readily recognizes this toxicity since visual acuity is impaired. In the second, the peripheral fields of vision are constricted, but color vision usually remains normal and since visual acuity is little affected, the patient may not notice it. In both types the fundi and discs appear normal. The ocular effects are reported to be reversible.

The degree of toxicity is related to dose. Patients taking more than 15 mg/kg per day should be examined ophthalmologically, including tests of visual acuity and visual fields, before they receive ethambutol, and at least every month throughout treatment. More importantly, whatever the dose, all patients should be warned to stop taking the drug at once if any disturbance of vision occurs, and to report this to the doctor.

IU-68-D0204

CONTRIBUTIONS FROM PSYCHOLOGY TO THE STUDY OF DRINKING AND DRIVING. J. A. Carpenter, Quarterly Journal of Studies on Alcohol, p245-251 of p234-251, supp4 (1968)

This section is concerned with drugs taken in combination with alcohol and the resulting effect on driving ability. The following observations and conclusions were reached: Complicating the drinking-driving problem are the un-

known numbers of drinkers who also use other drugs. A first step in studying drug combinations is the classification of drugs that would lead to priorities of testing in combination with alcohol. Because of the number of drugs that can occur in combination, theories of joint action leading to mathematical models are essential. Critical combinations arrived at from a model known to be appropriate, "dry run" by computer and tested in subjects to determine their concurrence with expectation, could help make the problem of joint action manageable. Conclusions about drug interaction (e.g., as additive or synergistic) can be made only with precise knowledge of the dose-response relationships of each drug. Minimum experimental conditions must be satisfied before data can be used to evaluate combined action or build test models. These include the number of doses of each drug, kinds of drug combinations that can be used, some of the formal characteristics of responses, consideration of the concept of tolerance (thresholds) and the organism to be used. Unless the study is put together correctly, conclusions about joint action and behavior are pointless and invalid. Laboratory experiments are sufficient for developing models of joint action, but because of lack of knowledge about driving itself, it would be premature to attempt joint-action studies in driving.

IU-71-D0205

EFFECTS OF NITROUS OXIDE ON THE AUDITORY EVOKED RESPONSE IN A REACTION TIME TASK, M. J. Jarvis; M. H. Lader, Psychopharmacologia (Berlin) v20 n3 p201-212 (18 June 1971)

Reaction times and evoked electroencephalographic responses to tone stimuli were measured using a LINC-8 computer on-line. The effects of inhaling 10, 20, and 30% nitrous oxide in oxygen were compared with those of pure oxygen in twelve normal subjects. Each subject gave 50 responses under each drug condition. Nitrous oxide prolonged reaction time and diminished all components of the evoked responses in a regular dose-related manner. The form of the evoked response was also related to speed of reaction time.

IU-68-D0206

RESEARCH REPORT ON THE ANTI-FATIGUE EFFECTS OF MAGNESIUM PEMOLINE, M. H. Orzack; C. L. Taylor; C. Kornetsky, Psychopharmacologia (Berlin) v13 n5 p413-417 (23 Dec 1968)

The effects of magnesium pemoline on the performance of a nonmotivated task which required continuous attention were compared to those of caffeine and methylphenidate. The drug treatment consisted of 25 or 50 mg magnesium pemoline, 100 or 200 mg caffeine, 15 mg methylphenidate or a placebo. Ten unhospitalized volunteers were each tested six times, once on each treatment. The significant increase in errors which occurred under placebo conditions did not occur with 50 mg. magnesium pemoline, with 200 mg. caffeine, or with 15 mg. methylphenidate. These results supported the contention that magnesium pemoline acts as a nonspecific CNS stimulant.

IU-68-D0207

SOME OBSERVATIONS SUGGESTING PRESERVATION OF SKILLED MOTOR ACTS DESPITE DRUG-INDUCED STRESS, H. Heimann; C. F. Reed; P. N. Witt, Psychopharmacologia (Berlin) v13 n4 p287-298 (4 Nov 1968)

Measures of skilled motor performance, both of a task-oriented and incidental nature, were recorded for a sample of 20 healthy young adults before and after a single administration of perphenazine, opipramol, imipramine and placebo at levels commonly supposed to produce mood or behavioral effects. The performance measures were little affected by the drugs, despite their sensitivity to drug-independent improvement in performance.

IU-68-D0208

DRUG EFFECTS ON MOTOR COORDINATION, N. Watzman; H. Barry, 3rd., Psychopharmacologia (Berlin) v12 n5 p414-423 (27 May 1968)

In this study the rotarod test of motor coordination in mice was modified by increasing the rotation speed every 30 sec. until the animals fell off. This procedure yielded a stable, proficient level of performance after four brief trials. The approximately normal distribution of performance times provided an equivalent measure of either improvement or impairment caused by drugs, and permitted the use of parametric statistical tests.

A total of 240 mice were assigned to 20 different groups of 12 each, administered oral doses of placebo or different drugs, prior to trial 4. The use of a ratio score provided a measure of drug-induced changes, and controlled for individual differences among animals in the overall level of performance. Two phenothiazines (chlorpromazine and perphenazine) impaired performance at low doses, with a progressively greater decrement at increasing doses (4, 8, 16 mg/kg); 2 barbiturates (pentobarbital and amobarbital) showed an all-or-none effect, with no significant decrement at the lower doses (20 and 40 mg/kg), but almost complete incapacitation at the highest dose of 80 mg/kg.

Performance superior to the placebo condition was obtained with the two lower doses of pentobarbital and with 3 d-amphetamine doses (4, 8, 16 mg/kg). An analysis of individual differences showed that the animals which were inferior in prior performance were more susceptible to both improvement and impairment of performance under the influence of these drugs.

IU-66-D0209

USE OF ELECTROENCEPHALOGRAPHY TO MEASURE RECOVERY TIME AFTER INTRAVENOUS ANAESTHESIA, A. Doenicke; J. Kugler; A. Schellenberger; T. Gürtner, British Journal of Anaesthesia v38 p580-590 (Aug 1966)

Depth of anesthesia and tendency to sleep were assessed by means of electroencephalography in healthy volunteers following the administration of different intravenous anesthetics. Graphs of sleep depth were constructed from the records.

Characteristic differences were observed in the postanesthetic course between methohexitone, thiobarbiturates, neuroleptanalgesics, and propanidid. Whereas the effects of propanidid rapidly diminished, this was not the case with the other drugs, and even after 12 hrs the potentiating effect of a small quantity of alcohol was discernible after methohexitone, thiopentone and thiobutobarbitone. The results suggest that after intravenous barbiturate anesthesia for outpatient procedures, the patient should be cautioned about driving and drinking alcohol for 24 hrs, but after propanidid a 2-hr period is sufficient.

IU-67-D0210

EFFECTS OF (-)Δ^9-TRANS-TETRAHYDROCANNABINOL IN MAN, H. Isbell; C. W. Gorodetzsky; D. Jasinski; U. Claussen; F. V. Spulak; F. Korte, Psychopharmacologia (Berlin) v11 n2 p184-188 (9 June 1967)

(-)Δ^9-trans-tetrahydrocannabinol was isolated from hashish and administered orally (120 ug/kg) or by smoking (50 ug/kg) to patients familiar with the effects of crude marijuana. The effects of the drug were recognized by all patients as being similar to those of marijuana. Euphoric changes in mood were consistently reported and other effects included alteration in time sense and in visual and auditory perception.

With doses of 300-480 ug/kg orally or 200-350 ug/kg by smoking, marked distortion in visual and auditory perception, depersonalization, derealization

and hallucination occurred in most patients. Δ^9-trans-tetrahydrocannabinol effects were dose-dependent and, it was considered by the author to be a psychotomimetic.

IU-62-D0211

DRUGS AND THE DRIVER, K. E. Jolles, Medical World v97 n2 p338-342 (Oct 1962)

This article mentions the attending evils of mixing psychoactive drugs and driving. Drugs considered in this behalf, both prescription and over-the-counter, taken licitly or illicitly, included: barbiturates, tranquilizers, codeine, amphetamines, phenmetrazine (Preludin®), antihistamines, alcohol, atropine, hyoscine, and antacid mixtures containing belladonna or its derivatives. The subjects of carbon monoxide poisoning, barbiturate use in epilepsy, the possible untoward effects of tolbutamide, chlorpropamide and insulin in diabetes, and drug-alcohol synergism, were broached with respect to the resulting effects on driving ability.

IU-71-D0212

NITROUS OXIDE--A STUDY OF PHYSIOLOGICAL AND PSYCHOMOTOR EFFECTS, N. Trieger; W. J. Loskota; A. W. Jacobs; M. G. Newman, Journal of the American Dental Association v82 p142-150 (Jan 1971)

The effects of nitrous oxide analgyesia were measured through objective tests on 20 volunteer dental students. Baseline pulse rate, respiration, blood pressure, and psychomotor ability were established before induction, and were monitored throughout the experiments.

Small but significant changes in blood pressure, pulse rate, and respiration were observed after administration of N_2O; coordination and psychomotor ability were impaired, but tolerance to continuous electrical stimulation increased. Under the conditions N_2O is administered in denistry, with no less than 25% oxygen being used and the patient remaining conscious during the procedure, it was concluded that N_2O analgyesia was beneficial in the treatment of an apprehensive patient.

IU-69-D0213

DANGER! DRIVERS AT RISK. 1, K. E. Jolles, Nursing Times v65 p1615-1617 (18 Dec 1969)

The dangers of driving while under the influence of drugs were mentioned, as also were the effects of aspirin, paregoric and amphetamines. An appeal was made to casualty, opthalmic and dental nurses, to make sure that patients who come in for treatment don't drive their cars after taking pupil-dilating drugs or having been under light anesthesia.

IU-69-D0214

DANGER! DRIVERS AT RISK. 2, K. E. Jolles, Nursing Times v65 p1652-1654 (25 Dec 1969)

In this article dangers of driving while under the influence of drugs were mentioned, as also were the effects of marijuana, tranquilizers, antihistamines, motion-sickness drugs (hyoscine-scopolamine), opiates, antispasmodics, nicotine, caffeine and amphetamines on the unsuspecting driver. Synergism was mentioned in the context of the alcohol-barbiturate pair. Drug-drug interactions were noted in the case of the combination of M.A.O. inhibitors and cheese (high in tyrosine content), and in the case of M.A.O. inhibitors and phenylpropanolamine-a common constituent of popular cough and cold remedies.

IU-67-D0215

DRUGS AND DRIVING, J. C. Krantz, Jr., Maryland State Medical Journal v16 p52-54 (Jan 1967)

This paper considers some of the classes of drugs which people take in abundance, and how they may affect the driving skill of an individual. These classes involved: analgesics, hypnotics, depressants, stimulants, antihistaminic drugs, psychotropic or tranquilizing drugs, (anti-psychotic drugs, minor tranquilizing drugs), psychometric drugs and alcohol. It concludes that people should take, and physicians should prescribe, drugs that affect the central nervous system only when they are definitely indicated. The patient should be warned of adverse effects especially when the individual is operating a motor vehicle.

IU-69-D0216

DRUGS AND DRIVING, G. D. Dobrzycki, Maryland State Medical Journal v18 p101-102 (May 1969)

This article discusses the need for physicians to be aware of the potential hazards a medication will have if a patient drives, and the desirability of adequately warning the patient of such. A brief resume of a few of the more important groups of drugs that can cause untoward reactions which affect driving ability was given. The groups of drugs included: anti-motion sickness agents and antihistamines, CNS depressants, CNS stimulants, hypnotics and sedatives, tranquilizers, and sulfonamides.

IU-71-D0217

EFFECT OF AMANTADINE ON SOME PSYCHOMOTOR PERFORMANCES IN PARKISONISM. A DOUBLE BLIND STUDY, L. V. Laitinen; J. Vilkki, Annals of Clinical Research v3 p207-211 (Aug 1971)

The effect of amantadine on two psychomotor performances was tested in 20 parkinsonian patients in a double-blind cross-over placebo-controlled study. In the Purdue pegboard test, the effect of amantadine was slightly beneficial, although its superiority to placebo was not statistically significant. In a motor reaction time test amantadine had a more beneficial effect than the placebo; and the difference was statistically significant. The author concludes that amantadine influences the gross sensorimotor coordination of the arms, rather than the five somatosensory and motor functions of the hands and fingers.

IU-70-D0218

EFFECT OF PHENOTHIAZINES ON REACTION TIME IN SCHIZOPHRENICS, J. M. Held; R. L. Cromwell; E. T. Frank, Jr.; W. E. Fann, Journal of Psychiatric Research v7 p209-213 (Feb 1970)

The effect of phenothiazine and phenothiazine-like drugs on simple motor reaction time was examined in 29 hospitalized schizophrenics, 11 serving as drug control patients and 18 as placebo patients. A 2-week substitution of placebos for routine phenothiazine therapy did not appear to affect reaction time.

IU-72-D0219

DRUG ABUSE, ALCOHOL AND MARIHUANA PROBLEMS. ERRORS, COSTS AND CONCEPTS, G. Milner, Medical Journal of Australia v2 p285-290 (11 Aug 1973)

The author's opinions concerning erroneous concepts, underlying confusion and apparent contradictions about drug use were detailed. Decisions on the control

of perceived drug problems were discussed in terms of social cost-social benefit accounting, thresholds of acceptable use for the individual and the community, and community goals. Current treatment inadequacies were said to stem from the "disease-concept" of "alcoholism", "addiction" or "dependency". Alcohol, illicit drugs, cigarettes and prescribed drugs were considered, and arguments against any measures which might increase the use of marihuana were presented. The errors were listed under: the emotional approach; failure to appreciate the complexity of drug effects; assuming linearity of dose-response; false definitions and categorization; perception of distribution of drug use; multiple versus single drug use; and incorrect evaluation.

The author states his case against legalizing or using marihuana with arguments listed under: adverse effects; driving hazards; multiple drug use; incorrect evaluation; consumer culture; alcohol and marijuana; example to children; rights of the less-privileged; prejudiced assessments; community testing; legal control difficulties; social group alienation problems; regard for the law; and social goals.

IU-69-D0220

COMBINED EFFECT OF ALCOHOL AND AMITRIPTYLINE ON SKILLS SIMILAR TO MOTOR-CAR DRIVING, J. Patman; A. A. Landauer; G. Milner, Medical Journal of Australia v2 p946-949 (8 Nov 1969)

In a double-blind study, 12 normal subjects were given amitriptyline, in a dosage of 50 mg every 12 hours, for five days and were tested by means of a motor skill battery with and without alcohol administration. Comparisons with an equally constituted control group showed that some decrements in performance were due to alcohol consumption. Amitriptyline administration did not significantly affect test performance, nor was any significant interaction effect noted. The importance of testing for interaction between the commonly prescribed psychotropic agents and alcohol was discussed since potentiation of alcohol effects may at times contribute to traffic accidents and the hazards of drug overdosage.

IU-71-D0221

ADVERSE REACTIONS AND THE SPECIFICITY OF ANTIDEPRESSANT DRUG EFFECTS, G. Milner, Medical Journal of Australia v2 p272-274 (31 July 1971)

This paper discusses the many and varied pharmacological actions of a number of drugs, and the factors which influence them. Specific drug classes and drugs considered include: antipsychotics or major tranquilizers, phenothiazines (chlorpromazine, promethazine, thioridazine), non-phenothiazines (haloperidol), antianxiety agents or minor tranquilizers, benzodiazepines (diazepam, chlordiazepoxide), antidepressants, tricyclic antidepressants (imipramine, desimipramine, amitriptyline, nortriptyline), doxepin, CNS depressants, and sedative/hypnotics (barbiturates).

IU-69-D0222

CHLORPROMAZINE AND THIORIDAZINE. A COMPARISON OF THEIR EFFECTS, PARTICULARLY IN POTENTIATING ALCOHOL, G. Milner, Pakistan Medical Review v3 p19-24 (Feb 1969)

This paper describes controlled studies of the effects of thioridazine, chlorpromazine, and alcohol alone and in combination, on the confinement motor activity (CMA) of albino mice. After log transformation of the raw data, each of these psychotropic agents was found to produce a progressive linear decrease of CMA as higher doses were given. Recovery of basal activity levels was most rapid after alcohol and slowest with chlorpromazine. Thioridazine and chlorpromazine added to and prolonged the depression of CMA caused by alcohol, thioridazine being much less potent than chlorpromazine.

It was suggested that, because of the relatively low incidence of side effects (e.g. photosensitivity reactions to sunlight) and the possibility that thioridazine is less potent in increasing the sedative effects of alcohol than is chlorpromazine, thioridazine may be more suitable for use with out-patients.

IU-68-D0223

ZUR FORENSISCHEN BEURTEILUNG VON HYPOGLYKÄMIEN UNTER BEHANDLUNG MIT ORALEN ANTIDIABETICA (ON THE FORENSIC EVALUATION OF HYPOGLYCEMIA DURING TREATMENT WITH ORAL ANTI-DIABETICS), E. Böhm, Deutsche Zeitschrift f. die gesamte gerichtliche Medizin v64 p217-227 (12 July 1968)

In diabetic patients receiving therapy with sulfonylurea drugs such as acetohexamide, carbutamide, chlorpropamide or tolbutamide, hypoglycemic episodes may occur which would cause impairment of driving ability. The effects of the antidiabetic agents may be exacerbated by concomitant ingestion of anti-inflammatory agents (such as phenylbutazone or aspirin), by anticoagulants (such as coumarin) or by alcohol.

IU-70-D0224

EFFECTS OF CHLORPROMAZINE ON SOME COMPONENTS OF PSYCHOMOTOR PERFORMANCE IN SCHIZOPHRENICS, J. Remr, Activitas nervosa superior (Praha) v12 n3 p253-254 (1970)

The effect of chlorpromazine on the accuracy and the speed of the fine manipulative movements of schizophrenics was investigated. A single-blind, placebo-controlled, cross-over design was used involving 12 schizophrenic subjects with dominating paranoid symptomatology, aged 19-31 years. The subjects were tested in two conditions: under chlorpromazine (4.3 mg/kg p.o.) for at least 4 weeks prior to testing, and under placebo for the same period of time. The same tests were applied to 12 non-patients matched for age and sex and selected at random from a large group fulfilling the experimental criteria.

The behavior of the schizophrenics taking the drug was significantly better than with placebo in two of the tests. The other tests revealed no significant differences. There was a much greater difference in performance between schizophrenics and non-patients than between schizophrenics under drug and under placebo. The author suggests that the improvement in the two tests under the influence of chlorpromazine was a result of the beneficial regulative influence of the drug on neuromuscular coordination, and its relaxant effect.

IU-72-D0225

ASSESSMENT OF THE EFFECTS OF FLURAZEPAM AND NITRAZEPAM ON VISUO-MOTOR PERFORMANCE USING AN AUTOMATED ASSESSMENT TECHNIQUE, J. E. Sambrooks; M. J. MacCulloch; C. J. Birtles; C. Smallman, Acta Psychiatrica Scandinavica v48 p443-454 (1972)

The effects of two hypnotic drugs, nitrazepam and flurazepam hydrochloride, on performance of visuo-motor tasks were reported. Accuracy on the tests was not impaired; nitrazepam caused a significant increase in response latency 1 hr. after ingestion compared to flurazepam, placebo and "no-drug" conditions. Flurazepam did impair speed of performance, but the effect was not statistically significant. Flurazepam apparently had a more consistent effect on the response times of individual subjects than did nitrazepam. Because its effects are more consistent, flurazepam may be preferred to nitrazepam with some patients.

IU-72-D0226

EFFECT OF OCTOCLOTHEPINE ON SENSORIMOTOR COORDINATION OF FINE MOVEMENTS IN CHRONIC SCHIZOPHRENICS, J. Remr, Activitas nervosa superior (Praha) v14 n2 p90-91 (1972)

In this study the effect of chlorpromazine and octoclothepine on the speed and coordination of fine manipulatory movements in chronic schizophrenic patients was compared. The patients, diagnosed as chronic schizophrenics, were randomly assigned to 3 groups who started the tests either under the influence of placebo, chlorpromazine or octoclothepine. The patients were given a 6 weeks' therapy, receiving all three compounds in 14-day intervals. The tests were uniformly applied in the third week of therapy in the sequence required by the balanced latin square. The compounds were administered orally as follows: chlorpromazine in a daily dose of 4.3 mg/kg and octoclothepine in a total daily dose of 6-30 mg which was gradually increased individually.

It was concluded that octoclothepine prolonged the values of reaction time to visual stimuli in comparison to placebo. It also reduced significantly the accuracy and coordination of manipulatory movements, and increased the number of misses in the dotting test, both in comparison with placebo and chlorpromazine. There was no difference between chlorpromazine and octoclothepine in their influence on the speed of stereotype activities and automatic movements.

IU-68-D0227

MODIFICAZIONE DI ALCUNE ATTITUDINI PSICOMOTORIE E PERCETTIVO-MOTORIE DOPO SOMMINISTRAZIONE DI INSIDON (CHANGES IN SOME PSYCHOMOTOR AND PERCEPTIVE-MOTOR APTITUDES AFTER ADMINISTRATION OF INSIDON®), P. Leoni, Minerva medica. Gazzeta settimanale per il medico pratico v59 p2614-2618 (6 June 1968)

Psychomotor and perceptive-motor tests were performed on 21 subjects without drug administration, after administration of a placebo and after administration of a diazepinic derivative (Insidon®). The results showed a constant improvement in performance 1 hour after administration of the drug. The improvement was slight, but was not due to any excitant effect of the drug. Rather it was ascribed to a greater mastery of psychomotor control induced by Insidon.

IU-65-D0228

UNTERSUCHUNGEN ÜBER DIE STRABENVERKEHRSTAUGLICHKEIT NACH ZAHNÄRZTLICH-CHIRURGISCHEN EINGRIFFEN UNTER LOKALANÄSTHESIE (STUDIES ON TRAFFIC SAFETY OF PATIENTS AFTER DENTAL SURGERY UNDER LOCAL ANESTHESIA), H. C. Massing; A. Schönberger, Deutsche Zahn-, Mund- und Kieferheilkunde mit Zentralblatt v44 n3 art4 p105-119 (1965)

Studies of dental patients after extractions or oral surgery carried out under local anesthesia indicate that a post-operative waiting period of 1 hour should be recommended before the patient operates a motor vehicle. Impairment of performance during the immediate post-surgical period may be due to the effects of drugs (local anesthetics, analgesics), to the trauma of the operation, to the overall stress associated with the procedure, or to some combination of these.

IU-72-D0229

DIABETES UND FÜHRERSCHEIN (DIABETES AND DRIVERS LICENSE), P. Petrides, Wiener medizinische Wochenschrift v122 supp4 p4-7 (1972)

Diabetic patients, especially those dependent upon insulin therapy, may show sufficient variability in blood sugar levels to be a potential hazard as motor vehicle operators. While patients on oral-hypoglycemic agents such as tolbutamide are less likely to show as wide variations in blood glucose as those on insulin, the possibility of adverse interactions of other drugs with the highly plasma protein bound tolbutamide is a complicating factor.

IU-72-D0230

DIABETES MELLITUS UND FÜHRERSCHEIN. ERGEBNIS EINES RUNDTISCHGESPRÄCHES AM 16. NOVEMBER 1970 (DIABETES MELLITUS AND DRIVERS LICENSE [ROUND-TABLE DISCUSSION]), Weiner medizinische Wochenschrift v122 supp4 p3-15 (1972)

Variations in blood glucose levels of diabetics with or without therapy may lead to episodes of loss of consciousness that would have adverse effects on motor vehicle operation. The diabetic should be clearly identified as such on drivers' license applications.

IU-68-D0231

MEDIKAMENT, AUGE UND VERKEHR (DRUGS, EYE AND TRAFFIC), B. Gramberg-Danielsen, Klinische Monatsblatter für Augenheilkunde v153 p280-288 (August 1968)

By reviewing the literature, the author concludes that a large variety of drugs, alone or in combination with each other or with alcohol, will have adverse effects on performance phenomena related to driving. Drug effects may occur through actions on central or peripheral mechanisms. In addition, a wide variety of disease states may also have adverse effects on motor vehicle operation, as may a number of over-the-counter drugs or "non-drug" agents such as coffee, cigarettes or soft drinks.

IU-73-D0232

INTERACTION OF ISONIAZID AND ALCOHOL ON PSYCHOMOTOR SKILLS RELATED TO DRIVING, M. Linnoila, Scandinavian Journal of Clinical Laboratory and Investigations v31 n130 p19 (1973)

In a double-blind study with 100 young male students isoniazid (INH)(10 mg/kg), alone and in combination with alcohol (0.5 g/kg), was given to groups of 20 subjects and their psychomotor skills were tested at 30, 90 and 150 min. A choice reaction test, two coordination tests and an attention test were employed. The INH inactivator phenotype did not affect serum INH levels within the test period.

Alcohol alone, providing blood alcohol concentrations of 0.35 to 0.50 mg/ml, shortened reaction time ($p<0.05$) at 30 min. but not later. Alcohol did not modify the coordinative skills, but significantly restricted the attention of the subjects at 30 min. and 90 min. INH alone shortened reaction time at 30 min., but not later. It improved coordinative skills measured at 90 and 150 min., but restricted attention at 90 min. In combination with alcohol INH neither restricted nor improved reactive and coordinative skills, but it enhanced the alcohol-induced impairment of attention at every test time.

It was noted that the relevance of the results from this test battery had later been confirmed with 70 subjects by using a more complete test arrangement for driving simulation.

IU-72-D0233

COMBINED EFFECTS OF DIAZEPAM AND ALCOHOL ON SKILLS RELATED TO DRIVING, M. Linnoila; M. J. Mattila, Scandinavian Journal of Clinical Laboratory and Investigations v29 n122 p24 (1972)

To evaluate drug interaction on psychomotor skills, 200 volunteer students were administered alcohol (0.5 or 0.8 g/kg) and diazepam (5 or 10 mg) alone or in combinations. The experiments were double blind. Commercially available choice reaction tests and coordination tests were applied to measure skills. Some groups were subjected to the clinical test for the state of drunkenness.

Diazepam alone improved performance, particularly in the choice reaction test,

and raised self-confidence. Alcohol did the same to a lesser extent. Alcohol did not clearly improve the coordination performance which correlates best to a real driving situation. Any combination of alcohol and diazepam depressed the skills measured. This harmful effect was mild with lower doses of drugs in combination, while large doses of drugs in combination proved deteriorating. The strongest interaction was found at 30 min. after the drug intake, and declined at 90 and 150 min. By 30 min. the serum levels of the drugs had not reached their peak. When 0.5 or 0.8 g/kg of alcohol was given with or without 10 mg of diazepam before the clinical test for drunkenness, diazepam did not alter the blood alcohol level, which peaked at 90 min. Diazepam increased the effect of 0.5 g/kg of alcohol at 30 min. but not later, the subtraction and finger-to-finger tests being most sensitive. Diazepam did not increase the effect of 0.8 mg/kg of alcohol. It was concluded that the disagreement with the coordination test data might have resulted from different sizes of groups, and from different parameters in these two tests.

IU-72-D0234

ARZNEIMITTEL UND VERKEHRSTAUGLICHKEIT (DRUGS AND AUTOMOBILE DRIVING FITNESS), G. Schulz, Therapie der Geganwart. Monatschrift für den praktischen Arzt v111 p1363, 1365 (Sep 1972)

Problems in motor vehicle operation may be caused by drugs alone, alcohol alone, drugs in combination with alcohol, or drugs in combination with each other.

IU-71-D0235

EFFECTS OF CHLORPROMAZINE ON FINE PSYCHOMOTOR PERFORMANCE WITH A SIMULTANEOUS SECONDARY TASK IN SCHIZOPHRENICS, J. Remr, Activitas nervosa superior (Praha) v13 p179 (1971)

In situations with a secondary task there was an impairment after chlorpromazine in six characteristics and an improvement in four in comparison with placebo. On the whole, however, the difference could not be proved statistically, and was smaller than under basal conditions. In cases in which performance deteriorated after chlorpromazine in comparison with placebo, the secondary task potentiated the impairment.

IU-70-D0236

MARIJUANA-THE NEW PROHIBITION, 2ND ED., J. Kaplan, World Publishing Co., Ch. 8, Marijuana and Alcohol, the Problem of Automobile Driving, p276-286 (1970)

This excerpt is a comparison of the effects of alcohol and marijuana on driving ability. Although information on marijuana effects is quite scanty in comparison to alcohol, experimental research has revealed two things: marijuana does not dilate pupils and does not impair reflexes. The author evaluates the Crancer study which provided evidence that the marijuana-using driver is a much less serious problem than the alcohol user. Various other marijuana studies are discussed, and the article concludes with a brief discussion of a possible new test for marijuana use.

IU-64-D0237

ARZNEIMITTEL ALS UNFALLURSACHE IM STRABENVERKEHR (DRUGS AS A CAUSE OF ACCIDENTS IN TRAFFIC), K. Soehring, p167-170 (1964)

With regard to drugs and the problem of traffic/highway safety, the author concludes that a complex problem exists with both legal and medical aspects. A particular problem lies in the forensic science area where correlation of effects with drug presence/levels in body fluids is virtually unknown.

IU-64-D0238

MIBBRAUCH UND SUCHT IM HINBLICK AUF DEN VERKEHR (ABUSE AND ADDICTION IN CONNECTION WITH DRIVING), K. Wagner; H. J. Wagner, p402-423 (1964)

In reviewing the literature relevant to drug effects on travellers, the author cites a variety of agents as having adverse effects from the point of view of safety: alcohol, nicotine, caffeine, and prescription agents including analgesics, hypnotics, sedatives, diuretics, cardiac drugs, antidepressants, stimulants, and anorexigenic agents. Incidence rates for drug usage are compared to age grouping of subjects. Only a few direct correlation data for drugs and driving are given.

IU-61-D0239

ARZNEIMITTEL UND VERKEHR AUS DER SICHT DER VERSICHERUNGSMEDIZIN (DRUGS AND TRAFFIC FROM THE VIEWPOINT OF INSURANCE MEDICINE), W. Dracklé, p35-47 (1961)

In reviewing the literature relative to drug effects on physical performance, the author finds that a variety of therapeutic agents, as well as alcohol or alcohol plus drugs, are reported anecdotally to have adverse effects. However, few if any, well-designed studies have been reported; this he considered to be a serious shortcoming.

IU-64-D0240

BEEINTRÄCHTIGUNG DER VERKEHRSSICHERHEIT DURCH BARBITURAT-MEDIKATION UND DURCH DIE KOMBINATION BARBITURAT/ALKOHOL (IMPAIRMENT OF TRAFFIC SAFETY BY BARBITURATE MEDICATION, AND BY THE COMBINATION BARBITURATE/ALCOHOL), M. Spranger, (1964)

In a doctoral dissertation, the author describes the effects of combinations of barbiturates and alcohol given to humans in various behavioral test systems related to motor vehicle operation. In virtually all test systems, the combination resulted in a potentiation effect. Since the dosages administered (200 mg butabarbital and 0.5 liter beer) are not excessive, the implications for motor vehicle operation are serious.

IU-64-D0241

PSYCHOSEN UND IHRE BEHANDLUNG IN VERKEHRSMEDIZINISCHER SICHT (PSYCHOSES AND THEIR TREATMENT FROM THE VIEWPOINT OF TRAFFIC MEDICINE), H. Koester, Die Medizinische Welt v46 n36 p1895-1902 (5 Sep 1964)

In a review of the literature, the author concludes that all psychoactive drugs have the capability of adversely affecting motor vehicle operation by virtue of their ability to influence behavior/personality. In addition, most of these drugs interact adversely with alcohol, adding a further complication. Unfortunately, most patients do not recognize the problems, unless the effects are obvious, such as those of barbiturates or other depressant agents. The interactions of drugs/driving, drugs/personality, and personality/driving must all be considered, together with their mutual interactions.

IU-70-D0242

INTERACTION BETWEEN BARBITURATES, ALCOHOL AND SOME PSYCHOTROPIC DRUGS, G. Milner, Medical Journal of Australia v1 n24 p1204-1207 (13 June 1970)

Barbiturates are often described as the most common agent for self-destruction, but alcoholism affects 5% of the Australian population. Alcohol, exaggerating aggressiveness and diminishing judgment and skills, underlies 50% of road deaths.

The effects of a drug represent a complex interaction between the chemical agent, the individual, and the environment in which the drug is taken. The

environment for the majority of adults includes the use of alcohol and the control of complex machinery, especially cars. Barbiturates have been shown to add to the deleterious effects of alcohol, and a positive joint drug action increases the hazards of accidental and suicidal overdosage. Studies of the effects of alcohol and other drugs on driving skills are only just being undertaken.

An estimate is given of the relative potency of different psychotropic agents (which are being ever more widely prescribed) in adding to the effects of alcohol. The dangers of barbiturates far outweigh their usefulness, particularly when they are compared with some more modern drugs. It is stated that barbiturates are often prescribed casually and to excess, and that doctors need more information about drug-alcohol interaction in order to be able to warn patients as to how a drug may affect their day-to-day behavior.

IU-64-D0243

ERFAHRUNGEN MIT DEM ANTIHISTAMINIKUM FENISTIL ALS ANTIPRURIGINOSUM UND IN VERKEHRSMEDIZINISCHER SICHT (EXPERIENCES WITH THE ANTIHISTAMINE FENISTIL AS AN ANTIPRURITIC, AND FROM THE VIEWPOINT OF TRAFFIC MEDICINE), R. Dechant, Munchener medizinischer Wochenschrift v106 n26 p1187-1188 (1964)

Fenistil® has been used successfully in the treatment of 110 patients with pruritus of different etiology. No side-effects have been found in 85% of all cases; 15% noted mild sedative effects which, however, never hindered working or driving capacities. Nevertheless and as a matter of principle, it was recommended to test each individual for the effects of sedation and inattention prior to prescribing Fenistil or other drugs with possible sedative action.

IU-59-D0244

DIE MEDIKAMENTÖSE BEEINFLUSSUNG DER LEISTUNGSFÄHIGKEIT UND IHRE BEDEUTUNG FÜR DIE VERKEHRSSICHERHEIT (INFLUENCE OF MEDICATION ON PERFORMANCE, AND ITS SIGNIFICANCE FOR TRAFFIC SAFETY), H. J. Wagner, Münchener medizinische Wochenschrift v101 n7 p275-282 (Jan 1959)

Based on an exhaustive review of the literature, the author suggests that drugs that are likely to have adverse effects on motor vehicle operation include: caffeine, nicotine, glutamic acid, iproniazid, methamphetamine, sedatives, hypnotics, analgesics, neuroleptics, and tranquilizers. He recommends that practicing physicians be made aware of these problems so that they can communicate warnings to their patients.

IU-63-D0245

ZUR STRABENFÄHIGKEIT NACH INTRAVENÖSEN KURZNARKOSEN (DRIVING EFFICIENCY AFTER SHORT INTRAVENOUS ANESTHESIA), D. Klebelsberg; K. Steinbereithner, Weiner Klinische Wochenschrift v75 n47 p840-842 (1963)

Short-acting intravenous barbiturate anesthetics have a deleterious effect on a variety of behavioral tests in humans, especially at dosages that do not produce anesthesia. The results indicate that caution should be exercised in permitting patients to operate motor vehicles after minor surgery where such drugs are utilized, since a carry-over adverse effects on performance may occur.

IU-62-D0246

DIE WIRKUNG EINES FLUPHENAZIN-DIHYDROCHLORIDS AUF DIE FAHRTAUGLICHKEIT (EFFECT OF A FLUPHENAZINE DIHYDROCHLORIDE ON DRIVING ABILITY), W. Dorsch; B. Hebenstreit, Arzneimittel-Forschung v12 n11 p1074-1079 (Nov 1962)

Application of normal therapeutic doses of 1-(2-hydroxyethyl)-4,3-(2-trifluromethyl-10-phenothiazinyl)-propyl-piperazine-dihydrochloride (OMCA®, 1

mg/die) was not found to cause significative reduction of performance. Tests of concentration and perception showed no deviations from normal values. The reaction capacity was not significantly impaired, although some deviations were noted.

No significant changes were observed with regard to the psychophysical resistance or the course of continuous performance curves. No subjective or objective signs indicating increased physical or psychic fatigue were observed. On the whole, both the momentary and continuous findings showed no signs of impairment relevant to driving, following the application of normal doses of OMCA.

IU-57-D0247

PSYCHOTECHNISCHE UNTERSUCHUNGEN AN AUTOFAHRERN UNTER MEDIKAMENTENEINWIRKUNG (PSYCHOTECHNICAL INVESTIGATIONS OF DRIVERS UNDER THE INFLUENCE OF DRUGS), B. Melander, Münchener medizinische Wochenschrift v99 n37 p1340-1342 (1957)

A set of automobile driving simulators was used to investigate the extent to which a barbiturate, pentymal-N.F.N., and a tranquilizer, meprobamate, affect or influence judgment and driving performance of drivers. According to statistical treatment of the available data meprobamate did not affect driving capacity. After pentymal-N.F.N. driving performance was adversely affected.

IU-59-D0248

ZUR PHARMAKOPSYCHOLOGIE VON VERKEHRSUNFÄLLEN (PSYCHOPHARMACOLOGY OF TRAFFIC ACCIDENTS), W. Laves, Munchener Medizinische Wochenschrift v101 n35 p1427-1430 (1959)

The significance of short narcotics, analgetics, tranquilizers, modern antidiabetics and antihypertensive agents are discussed from the point of view of primary symptoms and the differential diagnosis. Proof of slight intoxication by these compounds was given.

IU-62-D0249

NEUE ANAESTHETIKA DER ZAHNÄRZTLICHEN CHIRURGIE UND VERKEHRSSICHERHEIT AUS GERICHTSMEDIZINISCHER SICHT (NEW ANESTHETICS USED IN DENTAL SURGERY, AND TRAFFIC SAFETY FROM THE VIEWPOINT OF FORENSIC MEDICINE), K. Wagner; H. J. Wagner, Deutsche zahnärztliche Zeitschrift v17 n4 p267-275 (1962)

The dangers of diminished responsibility on the roads were discussed when patients are given analgesics and narcotics in the course of dental treatment. The author concludes that the usual analgesics are harmless insofar as they contain no barbituric acid and are taken in moderation over limited periods. Greater danger to road safety springs from the use of so-called tranquilizers, especially if they contain barbiturates. Taking into account the usual local anesthesia and the effects of surgical intervention, an interval of two to three hours is recommended before the patient drives a vehicle. Special caution is advocated after light anesthesia with barbiturates. The dentist should remind his patients of reduced driving efficiency and advise them to avoid using their car after the consumption of alcohol, either before or after treatment, for this entails additional dangers.

IU-63-D0250

INFLUENCE OF VARIOUS DRUGS ON PROPRIOCEPTIVE MECHANISMS OF VISUAL PERCEPTION DURING DRIVING, B. Pannain; R. Santanelli, C. Serra, Rivista Sperimentale Di Freniatria E Medicina Legale Delle Alienazioni Mentali v87 n2 p855-857 (1963)

The influence of proprioceptive impulses arising from the particular tonic-kinetic conditions of neck muscles on perceptive mechanisms can be evaluated

by means of the autokinetic phenomenon of light point test (A.P.L.P.). Such a test can, in addition to demonstrating the influence of proprioceptive mechanisms of eye and neck muscles on kinesthetic perception, be considered as a routine examination among the aptitudinal tests for drivers.

The influence of various factors, especially drugs such as alcohol, caffeine, chlorpromazine, and sympathomimetic amines, on muscle tonus and activity can be repeatedly demonstrated by such a test. By means of such a test the perceptual fatigue after a long-deviation period of driving can also be calculated, and the influence of various drugs on the occurrence of such fatigue can be evaluated.

IU-60-D0251

EXPERIMENTELLE UNTERSUCHUNGEN IN FORM VON PHARMAKOLOGISCHEN ARBEITSVERSUCHEN (EXPERIMENTAL STUDIES IN THE FORM OF PHARMACOLOGICAL TESTS DURING WORK), G. Jansen, Medicina Experimentalis v2 n2-4 p209-216 (1960)

Using the Graf equipment to investigate coordination performance, attempts were carried out to analyze the learning process. A characteristic curve was obtained. Once a coordination achievement has been learned, it becomes automatic and it is not disturbed in its course by repeated stress. Automatic coordination performance underlies daily fluctuations. High grade performance changes or breakdown of coordination occur under the influence of drugs like alcohol, caffeine, Pervitin®, Preludin®, and Somnifen®. The worsening caused by alcohol in coordination efficiency can be compensated by Pervitin and also partly by caffeine.

IU-59-D0252

ÜBER DIE KOMPENSATION VON ALKOHOLWIRKUNGEN DURCH COFFEIN UND PERVITIN BEI EINER PSYCHOMOTORISCHEN LEISTUNG (COMPENSATION OF THE ALCOHOL EFFECT BY CAFFEINE AND PERVITIN® IN A PSYCHOMOTOR PERFORMANCE), J. Rutenfranz; G. Jansen, Internationale Zeitschrift Für Angewandte Physiologie Einschliesslich Arbeitsphyciologie v18 p62-81 (1959)

In studies with humans, the authors find that the combination of doses of 500 mg/kg of ethanol with 9 mg of methamphetamine or 200 mg of caffeine had no effect on the metabolism of ethanol, although some of the adverse behavioral effects of the ethanol were reversed. Their conclusions suggest that stimulants such as caffeine or methamphetamine can permit the subject to partially overcome the depressant actions of ethanol.

IU-63-D0253

BEEINTRÄCHTIGUNG DER FAHRSICHERHEIT DURCH MEDIKAMENTE (IMPAIRMENT OF DRIVING ABILITY BY DRUGS), G. Schmidt, Bayerisches Ärzteblatt v18 n7 p485-489 (1963)

The author reviews the literature and concludes that a variety of drugs can have adverse effects on motor vehicle operation, either through direct effects (narcotics, hypnotics, sedatives, neuroplegics, ataractics, analgesics, antiepileptics) or through side effects (antipyretics, spasmolytics, antihistaminics, antihypertensives, antialcoholic agents, antidiabetics, stimulants, appetite depressants, tubuculostatics). The direct effects are generally central depression while the side effects represent a diversity of central and peripheral phenomena.

IU-62-D0254

ÜBER DIE VERKEHOSTÜCHTIGKEIT EINES MENSCHEN NACH APPLIKATION VON HYPNOTIKA UND NARKOTIKA IN DER AMBULANTEN ÄRZTLICHEN PRAXIS (DRIVING ABILITY OF A PERSON AFTER ADMINISTRATION OF HYPNOTICS AND ANESTHETICS IN OUTPATIENT MEDICAL PRACTICE), R. Frey, Die Therapiewoche v12 n9 p345-348 (1962)

By reviewing the available literature, the author concludes that physicians who deal with administration of or prescription of drugs to ambulatory patients should be aware of the possible adverse effects of such agents on physical performance. A variety of agents may be involved, including hypnotics, narcotics, and psychotherapeutic agents. The author suggests the possible use of tests for "normalcy" prior to permitting the patient to leave the office or clinic.

IU-64-D0255

WESEN DER VERKEHRSMEDIZIN (NATURE OF TRAFFIC MEDICINE), H. Hartmann, Zeitschrift für Unfallmedizin und Berufskrankheiten v57 p125-134 (1964)

The author considers it necessary for a variety of disciplines to be involved in any consideration of factors influencing safe operation of automobiles, boats, and aircraft. In particular, he suggests that such multidisciplinary approaches be used in forensic and legal approaches to the problem.

IU-61-D0256

PRÜFUNG EINES ANALGETICUMS HINSICHTLICH BEEINFLUSSUNG DER FAHRTÜCHTIGKEIT (TESTING OF AN ANALGETIC WITH RESPECT TO ITS INFLUENCE ON DRIVING SAFETY), D. Klebelsberg, Zeitschrift für Verkehrssicherheit v2 n7 p131-135 (1961)

In studies of a variety of performance tasks, including some driving simulator studies, the author found that the analgesic drug Neokratin® had a significant adverse effect only on the Graphic Rating Scales test.

IU-48-D0257

ALCOHOL TOLERANCE IN INDIVIDUALS WITH CHRONIC PRODUCER-GAS INTOXICATION, K. Bjerver; L. Goldberg, Quarterly Journal of Studies on Alcohol v9 n3 p329-352 (Dec 1948)

One subjective symptom of "chronic producer-gas intoxication," believed to be due to prolonged exposure to carbon monoxide, has been reported to be a lowered tolerance to alcohol. The alcohol tolerance in 11 patients with chronic producer-gas intoxication was established quantitatively by a number of tests in relation to the alcohol curve in the blood after ingestion. The results were compared with those in a control group of 7 healthy subjects, examined during the same experiment, and to the findings in a larger control group of 49 subjects, determined previously.

The tolerance to alcohol in the patients (experimental subjects) was the same as in the healthy control subjects. No difference was found between the patients with chronic producer-gas intoxication and the control subjects either in regard to the blood alcohol curve, or in regard to alcohol tolerance. The threshold for a battery of tests showed the same values in the patients as in the controls.

IU-60-D0258

DRIVING IMPAIRMENT THROUGH USE OF DRUGS, C. J. Rehling, Traffic Digest and Review v8 n10 p12-15 (Oct 1960)

Although alcohol is the well-known and justly publicized culprit, other substances commonly embraced in the broad term "drugs" are also quite capable of causing a drunken or intoxicated condition, and are today presenting an ever-increasing problem to traffic enforcement. Drugs which may impair driving ability include narcotics, barbiturates, tranquilizers, antihistamines, and amphetamines.

IU-62-D0259

DRUGS MAGNIFY TRAFFIC PROBLEM, S. Franzmeier, Traffic Digest and Review v10 n10 p4-6, 25-26 (Oct 1962)

The widespread use of drugs is adding to the complexity of an already complex traffic supervision problem in this country. In this article the consequences of misuse, overuse, and illegal use of drugs in California are discussed, and many anecdotal reports of accidents caused by their use are presented.

The drugs which driver license personnel and police are concerned with produce marked changes in a person's physical reactions, such as reduction of reasoning ability, reduction or removal of inhibitions with accompanying "hopped-up" feelings, lack of coordination, drowsiness, and dizziness.

IU-63-D0260

JOINT ACTION OF TRANQUILLIZERS AND ALCOHOL ON DRIVING, J. A. Carpenter; M. Varley, Alcohol and Road Traffic p156-161 (1963)

The authors have reviewed the experimental papers on driving when alcohol, tranquilizers, or both are used. All results, but especially those with tranquilizers, are quite limited by the kinds of tests of driving in use. The evidence from alcohol experiments indicates that impairment of functions occurs at blood alcohol levels near .05%. Evidence of the effect of tranquilizers on driving skill is not clear and changes, when they occur, are small.

Only three papers were discovered in which alcohol and tranquilizers have been used together. One experiment in which a single mild dose of meprobamate was followed by a small amount of alcohol (one fluid ounce) produced no observable change in behavior. Severe behavioral deterioration was reported in one paper when alcohol in small amounts (blood alcohol level: .05%) was consumed after one week of therapeutic doses of meprobamate; impairment was greater than with either drug alone. Similar but less drastic changes were reported for chlorpromazine under nearly identical conditions.

It was felt that the detection of drug effects would be increased if more thought was given to experimental and analytical procedures. Problems in the interpretation of results were discussed. A mathematical theory of joint action of drugs, similar to that developed for use with insecticides, may prove helpful in determining the nature of interactions and pointing out a general way the kind of mechanism which underlies them.

IU-63-D0261

ALCOHOL, ROAD TRAFFIC, AND DRUGS IN DENMARK, 1960, J. Wangel, Alcohol and Road Traffic, J. D. J. Harvard, ed., p162-165 (1963)

The aim of this study was to determine whether drivers who consume ordinary therapeutic doses of drugs become more intoxicated by alcohol than do drivers with the same concentration of alcohol in the blood, but without consumption of drugs. 6,067 road traffic cases in Denmark were evaluated.

It was found that the average concentration of alcohol in the blood was practically the same for the group consisting of drivers with a daily consumption of therapeutic doses of drugs as for the group without the drug consumption. The consumption of some drugs was considerably higher in the group consisting of all drivers found to have alcohol in the blood, than in the group consisting of drivers without alcohol in the blood. This is valid as far as three groups of drugs are concerned -- the analgesics, antipyretics and antirheumatics, hypnotics, especially barbiturates; and the psychopharmacological drugs, including meprobamate.

IU-63-D0262

DANGER: DRIVING WHILE DRUGGED, Family Safety v22 n3 p21-22 (Fall 1963)

The influence of drugs on driving is becoming an increasingly serious problem, and few people realize that common medications can impair their ability to drive and thus endanger their lives on the road. According to the American Medical Association, the six kinds of medication which are most likely to impair driving ability are pain relievers and sedatives, tranquilizers, antihistamines, motion-sickness drugs, nerve stimulants, and "wonder drugs" or infection-fighting medications.

Three rules are outlined which are meant to help protect the unwary drug user. First, the physician prescribing drugs should be consulted about the drug's side effects; if the drugs are bought over the counter, the pharmacist should be questioned. Second, the driver should be especially alert after drugs have been taken, and should pull off the road immediately at the first sign of any unusual reaction. Third, drivers should determine the amount of time it takes for the effects of the drug to wear off, and be patient until these effects are completely gone.

IU-56-D0263

SLEEPY DRIVER AS A PREVENTIVE MEDICINE PROBLEM, J. R. Rodger, GP v14 n2 p90-94 (Aug 1956)

Sleepiness during automobile driving is a problem in preventive medicine for the family physician. In counseling his driver-patients, he may suggest: avoidance of driving situations that induce fatigue; periods of rest; caffeine; and, for selected patients, sensible doses of amphetamine drugs.

If amphetamine sulfate is to be prescribed, precautions include a trial dose before the actual driving situation is encountered, and restriction of dosage. (A 5-mg. tablet of amphetamine sulfate usually gives an adequate boost for two to four hours.) If the driver gets tired in spite of drug therapy he had better stop and sleep.

IU-60-D0264

THEY STAY AWAKE -- TO DIE, L. Root, Today's Health v38 p32-33, 65 (Oct 1960)

The use of bootlegged amphetamines by truck drivers and others is becoming a national menace that some medical authorities consider more dangerous than the traffic in narcotics. The history of amphetamines is traced in this article, and the immensity of the problem described. Various effects of the drugs are discussed, and the author expresses concern over the growing use of amphetamines among teenagers.

IU-62-D0265

DRUGS AND DRIVING, R. H. Walker, Memphis and Mid-South Medical Journal v37 p101-105 (Mar 1962)

A great variety of drugs are quite capable of causing derangement in cerebration and are today presenting an ever-increasing problem in traffic accidents. This problem is not limited to the illicit use of the amphetamines or narcotics, but also involves commonly used drugs prescribed in recommended therapeutic or prophylactic dosage by physicians. Some of the more important groups of drugs which are considered major offenders in the problem of road traffic include: central nervous system depressants; hypnotics, sedatives, and anesthetics; tranquilizers; central nervous system stimulants; antihistamines; motion sickness drugs; and antibiotics.

The problem of alcohol is also discussed, and the author recommends that physicians educate themselves and their patients on the basic factors of alcohol and drug consumption and driving in order to help prevent traffic accidents.

IU-55-D0266

DRUGS AND SELF-MEDICATION, C. W. Fullerton, Medical Aspects of Traffic Accidents. Proceedings of Montreal Conference H. Elliott, ed., p399-400 (1955)

The author believes that there is nothing in the medical literature to either prove or disprove that drug use by automobile drivers contributes to traffic accidents; rather, it is probable that drugs are only very rarely responsible. However, the potential dangers of drug intake are well-recognized, and include side effects and induced mood changes which may result in impaired judgment and driving ability, thus contributing to accident involvement.

An experimental design is suggested in which a large number of accident-involved drivers is interviewed as to their use of drugs prior to the accident. The author feels that only in this way can any statistical evidence of value be obtained.

IU-55-D0267

PHYSICIAN'S RESPONSIBILITY IN THE PREVENTION OF AUTOMOBILE ACCIDENTS AND DEATHS, F. D. Woodward; C. N. Moon, Jr., Medical Aspects of Traffic Accidents. Proceedings of Montreal Conference, p389-396 (1955)

Physicians have three responsibilities to the general public with regard to traffic safety. First, they must urge and work for the introduction of compulsory courses in safe driving in all schools. Second, they must endeavour to have established certain basic safety measures which should be incorporated in all cars and required of all manufacturers. And third, there should be a review of diseases, physical conditions, and drugs which should be considered by the physician and licensing bureaus before driving permits are issued or renewed.

Various factors which may affect driving ability are listed and discussed under the general areas of: nervous system, special senses, cardiovascular, miscellaneous, physical conditions, and drugs. The authors feel that patients should be warned of likely and unlikely drug reactions which might hamper driving skill, and with some drugs, the patient should be ordered not to drive until stability is reached. It is recommended that the American Medical Association set up a special committee to investigate medical standards for automobile and truck drivers and to distribute the results to all state automobile licensing bureaus and state health departments.

IU-62-D0268

INFLUENCE OF DRUGS ON DRIVING, W. H. Neil, Texas State Journal of Medicine v58 p92-97 (Feb 1962)

Many drugs can affect an individual's ability to safely operate a motor vehicle, either advantageously or adversely. With the exception of alcohol, which accounts for between 20 and 50% of all fatal accidents in the United States today, statistics are not available on the effects of these drugs on the overall accident rate. Statistics of this nature are sorely needed but will be difficult, if not impossible, to obtain. Legislative remedial action probably is not indicated, except in the case of alcohol, unless and until the influence of these medications on the overall accident rate can be shown to be a significant factor.

IU-62-D0269

PSYCHOTROPIC DRUGS AND VOLUPTUARY POISONS (STUPEFACIENTS) AS POSSIBLE FACTORS OF ROAD ACCIDENTS, P. Mascherpa, Highway Research Abstracts v32 n6 p8 (1962)

In this abstract, the role that drugs, used either for therapeutic or voluptuary reasons, may play in road accidents as far as the injurer and the injured are concerned, is described. Drugs discussed include psychotropic drugs used in physiological and pathological conditions, non-prescription drugs, and stupefacients.

IU-57-D0270

AMPHETAMINES AND THE SLEEPY DRIVER, C. D. Leake, Ohio State Medical Journal v53 n2 p176-178 (Feb 1957)

The problem of the sleepy driver is an increasingly important subject, and the physician is in a peculiarly strategic position to advise about care and sleepiness in driving. Effective preventive medicine may be practiced by careful advice, and by judicious prescribing of caffeine or the amphetamines. Dosages should be kept to a minimum and trial doses should be taken to observe the symptoms. Examination into the causes of the fatigue or sleepiness may reveal factors that might require definite medical care.

IU-63-D0271

DRUGS AND AUTOMATISM, D. Napley, Medicine, Science and the Law v3 n4 p247-256 (July 1963)

This article is a discussion of the British case of Watmore v. Jenkins in which defendant, a diabetic, was charged with driving a motor vehicle while under the influence of a drug, insulin. He was eventually acquitted, the judges being satisfied that he had no warning or reasonable grounds for apprehension that automatism may have resulted. The author recommends that a diabetic who takes a correct dosage of insulin should not be subjected to prosecution, but if he drives under circumstances which reasonably give rise to the probability that a hypoglycaemic episode or coma may develop, he should be charged with dangerous driving at the point before automatism supervened.

IU-47-D0272

PSYCHOMOTOR EFFECTS OF ANALEPTICS AND THEIR RELATION TO "FATIGUE" PHENOMENA IN AIRCREW, D. R. Davis, British Medical Bulletin v5 p43-45 (1947)

The advantages and disadvantages of the use of analeptics by both rested and fatigued aviators and drivers are discussed in this article. A series of investigations is considered which incriminate stress and the resultant anxiety, rather than prolongation of work and fatigue, as the conditions under which errors are made.

In some experimental subjects a dose of 15 mg amphetamine may produce striking changes in the performance of psychomotor tasks, and in several of the tests which measure the effects of analeptics, both the speed and the accuracy of the performance may vary. The author concludes that many of the arguments used to justify the use of amphetamines by aircrew are irrelevant, and instead recommends judicious prescribing of analeptics, which should be based on consideration of the patient's personality and character structure.

IU-60-D0273

DRUGS AND THE DRIVER, C. J. Rehling, Traffic Safety v57 n4 p14-15, 47 (Oct 1960)

Although alcohol is the well-known and justly publicized culprit, other substances commonly embraced in the broad term "drugs" are also quite capable of causing a drunken or intoxicated condition, and are today presenting an ever-increasing problem to traffic enforcement. Drugs which may impair driving ability include narcotics, barbiturates, tranquilizers, antihistamines, and amphetamines.

IU-64-D0274

DRUGS AND SAFE DRIVING, L. G. Norman, Pharmaceutical Journal v192 n5235 p189-190 (29 Feb 1964)

The prescribing practitioner has a duty to inform patients of the possible dangers of driving after taking a drug which may adversely affect psychomotor functioning, and the pharmacist is also in a position to provide his driver-customers with a word of warning. Under the British Road Traffic Act of 1962, driving under the influence of drugs is one of the six offenses for which a driver is automatically disqualified for at least one year. The Lord Chief Justice has ruled that insulin is a drug within the meaning of the Act, and diabetics should be fully aware of this. Other drug classes with possible deleterious effects also covered by the Act are the barbiturates, non-barbiturate hypnotics, anti-convulsants, narcotics, tranquilizers (major and minor), thymoleptics, antihistaminics, and hypotensive agents. Specific drugs in each class are mentioned in this article, as are their most common side effects.

IU-55-D0275

CHLORPROMAZINE AND ALCOHOL, Pharmaceutical Journal v175 n4800 p423 (29 Oct 1955)

The dangers of prescribing a drug for a patient without warning of the possible effects if alcohol is consumed are highlighted by this case, in which a man was found guilty of driving under the influence of alcohol. Chlorpromazine had been prescribed by the patient's physician, but he was not warned of the powerful effect it would have when combined with three beers.

IU-64-D0276

DRUGS AND DRIVING, L. G. Norman, Lancet v2 n7356 p411 (22 Aug 1964)

In this letter the author recounts a case in which a man lost his license and job because of an accident he had which was caused by an increase dose of insulin prescribed by his physician. Although the responsibility is on the driver, the author feels that doctors also have a responsibility to warn patients of the possible effects on their driving of any drugs prescribed.

IU-61-D0277

DRINK AND DRUGS, British Medical Journal v1 p1555 (27 May 1961)

The synergistic action of alcohol and drugs such as barbiturates, tranquilizers, antihistamines, and amphetamines is discussed, and the dangers of combining alcohol and drugs, particularly cerebral depressants, before driving are stressed.

IU-66-D0278

PSYCHOTROPIC DRUGS AND MOTORIST, W. D. Rees, Practitioner v196 p704-706 (May 1966)

A survey was made in a rural English area to determine the proportion of drivers who were taking sedative, tranquilizing and anti-depressant drugs. It was found that 3.4% of the drivers had taken the drugs for periods exceeding three months during the previous five years, and 2.3% of the drivers were taking the drugs currently. 0.8% of the female drivers and 1% of the male drivers were receiving drugs for somatic diseases, and 2% of the male drivers and 4.2% of the female drivers were taking the drugs for psychiatric reasons.

IU-62-D0279

SUCHTERKRANKUNG UND VERKEHRSGEFÄHRDUNG (ADDICTION AND TRAFFIC RISK), H. Koester, Ärztliche Mitteilungen v47 n15 p832-834 (14 Apr 1962)

In chronic disease states such as alcoholism, not only must the effects of the drug per se be considered, but investigators must also consider biological changes that may occur as a result of the chronic disease itself. Such changes may be a result of the drug use and may cause alterations in normal physiological, neurological and behavioral patterns. The effects of these changes on driving behavior must be considered, along with the effects of the drug and of any therapeutic agents used.

IU-61-D0280

BEACHTUNG VERKEHRSMEDIZINISCHER GESICHTSPUNKTE BEI VERORDNUNG VON PSYCHOPHARMAKA (OBSERVANCE OF TRAFFIC MEDICINE CONSIDERATIONS IN THE PRESCRIBING OF PSYCHOPHARMACOLOGICAL AGENTS), B. Knick; H. J. Wagner, Ärztliche Mitteilungen v46 n35 p1952-1956 (30 Sep 1961)

Based on a review of the literature, the authors found that a variety of psychoactive drugs have adverse effects on visual function including: Rauwolfia alkaloids, phenothiazine derivatives, iminodibenzyl derivatives, monoamine oxidase inhibitors, propanediol derivatives, benzodiazepines, and anticonvulsants. However, dose- and time-response factors are most important in the magnitude of the effects observed.

IU-62-D0281

UBER DIE EINWIRKUNG VON COFFEIN AUF DIE READAPTATIONSZEIT VON KRAFTFAHRERN NACH BLENDUNG (EFFECT OF CAFFEINE ON THE READAPTION TIME OF DRIVERS FOLLOWING GLARE), G. Bohné, Zentralblatt für Verkehrs-Medizin, Verkehrs-Psychologie Luftund Raumfahrt-Medizin v8 n4 p225-231 (Dec 1962)

The effect of caffeine on dark-light visual adaptation is significant, especially for binocular vision. Readaptation occurs faster at 60 and 100 min. after a dose of 250 mg of caffeine.

IU-63-D0282

ALKOHOL UND TABLETTEN (ALCOHOL AND PILLS), W. Blumenröther, Polizei, Technik, Verkehr v3 p73-76 (Feb 1963)

The author has reviewed a series of personal observations and material obtained from police and hospital records regarding the combination use of alcohol and over-the-counter medications. The specific combinations found to be hazardous to motor vehicle operation are: aminopyrine, barbiturates, salicylates, sulfonamides, and opiates. In general, the drug combination effects are those of sedation, drowsiness, lack of attention, and delayed responding.

IU-64-D0283

BEURTEILUNG DER FAHRTÜCHTIGKEIT BEI DEM ZUSAMMENWIRKEN VON MEDIKAMENT UND ALKOHOL AUS DER RICHTERLICHEN SICHT (EVALUATION IN COURT OF DRIVING ABILITY IN CASES OF INTERACTION BETWEEN DRUGS AND ALCOHOL), A. Schneider, Blutalkohol v2 p415-424 (1964)

The effects of a variety of drugs on motor vehicle operation will be enhanced by alcohol or will enhance the effects of alcohol. Based on a review of the available literature, the following classes of drugs should be considered as significant: sedative/hypnotics, psychotherapeutic agents, antiepileptic drugs, antihistamines, stimulants/appetite depressants, central muscle relaxants, and antihypertensives.

IU-63-D0284

WIRKEN SICH MITTLERE DOSEN VON KAFFEE UND KOFFEIN AUF PSYCHISCHE FUNKTIONEN DER FAHRTUCHTIGKEIT AUS? (DO MODERATE DOSES OF COFFEE AND CAFFEINE AFFECT PSYCHIC FUNCTIONS WITH RESPECT TO DRIVING SAFETY?), D. Klebelsberg; A. Mostbeck, Psychologie und Praxis v1 n7 p23-25 (Jan-Mar 1963)

In a variety of tests designed to measure the effects of drugs on psychomotor skills and behavioral performance, doses of caffeine (either as pure drug or in coffee) less than 100 mg cannot be detected. At doses greater than 100 mg the effects are basically those of a stimulant of mental and physical activity.

IU-59-D0285

A PROPOS DE L'IVRESSE AU VOLANT. L'IVRESSE BARBITURIQUE ET LA SYNERGIE ENTRE L'ALCOOL ET LES BARBITURIQUES (ON INTOXICATION AT THE WHEEL. BARBITURATE INTOXICATION AND THE SYNERGISM BETWEEN ALCOHOL AND BARBITURATES), E. Dumont, Revue De Droit Dénal Et De Criminologie v39 p348-351 (1959)

The author reports that the synergistic effect of barbiturates, in combination with alcohol, may cause the operator of a motor vehicle to be significantly impaired at blood alcohol levels lower than those set for legal purposes.

IU-60-D0286

MEDIKAMENTE UND FAHRISICHERHEIT (DRUGS AND DRIVING SAFETY), F. Dubitscher, Medizinische Sachverständige v56 n6 p131-132 (June 1960)

In a discussion of the general problem of disease states and/or medications that may have adverse effects on motor vehicle operation, the author recommends that information be communicated to the subject by various sources: physician, pharmacist, spouse, and dentist regarding the specific problems to be expected as well as the possible interactions with alcohol.

IU-63-D0287

ALKOHOL, PSYCHOPHARMAKA UND VERKEHRSSICHERHEIT (ALCOHOL, PSYCHOPHARMACOLOGICAL AGENTS, AND TRAFFIC SAFETY), H. J. Wagner, Monatskurse für die Ärztliche Fortbildung v13 n8 p454-457 (Aug 1963)

In addition to alcohol, the author feels that the following classes of psychopharmacological agents can have deleterious effects on motor vehicle operation: neuroleptics (antipsychotic agents such as phenothiazines, thioxanthines, and Rauwolfia alkahoids), tranquilizers (anxiolytic agents such as meprobamate and benzodiazepines), antidepressants (such as iminodibenzyls, dibenzocycloheptadienes, and monoamine oxidase inhibitors) and psychostimulants (psychotomic agents). In addition, narcotic analgesics may be a problem because of their psychoactive effects.

IU-62-D0288

VERKEHRSMEDIZINISCHE BEDEUTUNG VON ARZNEIMITTELN (IMPORTANCE OF DRUGS WITH RESPECT TO TRAFFIC MEDICINE), W. Keller, Verkehrsmedizin und Ihre Grenzgebiete v9 n12 p575-588 (1962)

Studies of the behavior of people under the influence of drugs in modern traffic are of great practical importance because of the great demands of modern traffic, and the wide application of pharmacologically effective substances by our population at large. The present survey attempted to sum up the results of various publications about this problem.

Experimental work based on examinations of a large number of test subjects are available only in small numbers. Nevertheless, traffic safety is threatened by uncontrolled intake of drugs in the same way, if not to the same extent, by the use of alcohol. In addition to intensive research work on drugs and driving, the population, especially drivers, must be informed about the dangers of the use or misuse of drugs. This must be done first by the physician who prescribes those remedies.

IU-60-D0289

FAHRTAUGLICHKEIT BEI DIABETIKERN, DIE INSULIN VERWENDEN (DRIVING FITNESS OF DIABETICS WHO USE INSULIN), K. Oberdisse, Hefte zur Unfallheilkunde v62 p25-30 (1960)

The author recommends that care be taken to advise patients with diabetes, especially those who use insulin, that sudden alterations in blood glucose levels may cause hypoglycemic loss of consciousness. Should such an event occur while driving, the results could be loss of control of the vehicle. In some patients, paroxysmal hypo- or hyperglycemic may occur at irregular intervals.

IU-62-D0290

UNTERSUCHUNGEN ÜBER DAS AUSMAB DER MEDIKAMENTEINNAHME BEI KRAFTFAHRERN (STUDIES ON THE EXTENT OF DRUG INTAKE BY AUTOMOBILE DRIVERS), H. J. Wagner, Hefte zur Unfallheilkunde v71 p154-159 (1962)

In a study of 119 drivers (112 male, 7 female) involved in serious or fatal accidents, 11 admitted on questioning to having taken some medication in the 24-hour period prior to the accident. Paper chromatographic examination of the urine showed 15 drivers to have positive qualitative reactions for drugs, as follows: analgesics-10, sedative/hypnotics-2, and 1 each of narcotic analgesics, cardiac glycosides, and anabolic agents.

IU-73-D0291

HALOPERIDOL AND DIAZEPAM, ALONE AND TOGETHER WITH ALCOHOL, IN RELATION TO DRIVING SAFETY, G. Milner; A. A. Landauer, Blutalkohol v10 p247-254 (1973)

In a double-blind experiment three groups of twelve healthy volunteers received two doses of either 0.5 mg haloperidol, 5 mg diazepam or placebo. They were tested before and after experimental ethanol intoxication. Performance on motor-skill tests related to driving ability was not affected by either drug. The observed decrement in performance could be attributed to the effect of alcohol.

The possible hazards of drug use for the driver were noted, as were the difficulties of extrapolating from the results of laboratory experiments to actual driving. The need was stressed for research on therapeutic drugs, and drug-alcohol effects, in relation to driving safety.

IU-72-D0292

AVAILABLE TECHNIQUES FOR ANALYZING IMPAIRING DRUGS IN BLOOD AND URINE, M. L. Selzer; P. L. Clayton, Journal of Safety Research v4 n4 p179-188 (Dec 1972)

The increased use of licit and illicit psychoactive and sedative drugs has caused concern regarding their potential role in the etiology of traffic accidents. The relevance of drug use or abuse to traffic safety can only be determined by appropriate field research which will require analysis of blood or urine.

The feasibility and techniques for analyzing blood and urine specimens for barbiturates, common tranquilizers, narcotics, hallucinogens, amphetamines, and antihistaminic drugs are reviewed. In general, relatively practical and inexpensive methods are available for the detection of these drugs in urine and blood. Since the drugs are usually present in blood in lower concentrations, more sensitive procedures are required. A major deficiency thus far has been the lack of reliable procedures for the quantitative determination of the hallucinogens in body fluids.

IU-74-D0293

MARIHUANA AND DRIVING RISK AMONG COLLEGE STUDENTS, R. G. Smart, Journal of Safety Research v6 n4 p155-158 (Dec 1974)

Studies of the accident involvement of cannabis users have given somewhat contradictory results. This study investigated the frequency of driving, accident involvement, and driving charges after marihuana use among college students.

While 42% of the licensed drivers had used marihuana, only 62% of those reported driving soon after that use. Few reported accidents or moving violations after marihuana use, especially in comparison to after alcohol use. The frequency of marihuana-driving occasions is only about 35% that of alcohol driving occasions, however. It is possible that if legalization resulted in increased exposure, marihuana would not be safer than alcohol for driving.

IU-74-D0294

COMBINED EFFECTS OF ALCOHOL WITH METHAPYRILENE AND CHLORDIAZEPOXIDE ON DRIVER EYE MOVEMENTS AND ERRORS, S. R. Schroeder; J. A. Ewing; J. A. Allen, Journal of Safety Research v6 n2 p89-93 (June 1974)

Thirty healthy male students tracked a training film in a driving simulator after administration of combinations of alcohol and chlordiazepoxide or methapyrilene, or combinations of any of the 3 drugs with a placebo. Although none of the combinations produced significant increases in driving errors, driver eye movements were affected.

Alcohol suppressed eye movement frequency and restricted the useful field of view. Chlordiazepoxide had a moderate antagonistic effect and methapyrilene had a strong antagonistic effect on the suppression of saccadic frequency by alcohol. Eye movement parameters are seen as a sensitive measure of the synergistic effects of alcohol in combination with other drugs.

IU-57-D0295

EXPERIMENTAL STUDIES OF BEHAVIORAL EFFECTS OF MEPROBAMATE ON NORMAL SUBJECTS, D. G. Marquis; E. L. Kelly; J. G. Miller; R. W. Gerard; A. Rapoport, Annals of New York Academy of Sciences v67 art-10 p701-711 (9 May 1957)

The primary finding of these studies is that meprobamate alone, even in double the usual dosage, produces no behavioral toxicity in the subjects as measured by

tests of driving, steadiness, and vision. Meprobamate significantly increases sweating, an unexpected and unexplained finding. The study also indicates that, while alcohol definitely impairs performance on some tests, combining meprobamate with the alcohol does not significantly add to this unfavorable effect on any test.

The data give no grounds for preventing persons under the usual dosages of meprobamate from driving automobiles, or even from driving under meprobamate after drinking alcohol in amounts that would not ordinarily affect driving ability.

IU-69-D0296

ALCOHOL AND AMITRIPTYLINE EFFECTS ON SKILLS RELATED TO DRIVING BEHAVIOR, A. A. Landauer; G. Milner; J. Patman, Science v163 n3874 p1467-1468 (28 Mar 1969)

A double-blind study of the combined action of amitriptyline and alcohol was undertaken with 21 volunteer students who were divided into 3 groups: Group A received amitriptyline on the night before and on the day of the test; group B, placebo at night and amitriptyline on the test day; group C, placebo on both occasions. Motor skill was tested by simulated driving (SD), dot-tracking (DT), and a pursuit rotor (PR).

Differences were found only on the PR, in which group C performed better; mean time on target by groups A, B and C, respectively, was about 33, 38 and 50 sec. Then, for 30 to 45 min. all subjects drank alcoholic beverages of their choice in amounts calculated to achieve a blood alcohol concentration of 0.08%. The tests were repeated. The proportion of errors on the SD did not change in group C, but increased in group B and in group A. On the DT group C showed a practice effect, but groups B and A scored significantly worse after alcohol. Mean time spent on target in the PR was significantly less after alcohol in groups B and A than in group C (approximately 30, 25 and 51 sec. respectively).

It is concluded that the potentiating effects of amitriptyline and alcohol are evident after only 1 dose of amitriptyline, but particularly pronounced after 2. Since it had been found that this potentiating effect does not affect motor skills after 3 or 4 days, the greatest hazard for the patient being treated with amitriptyline occurs on the first 2 days of therapy.

IU-69-D0297

EFFECT OF B-ADRENERGIC BLOCKADE AND ALCOHOL ON SIMULATED CAR DRIVING, V. Goldman; B. Comerford; D. Hughes; G. Nyberg, Nature v224 n5225 p1175-1178 (20 Dec 1969)

This study was designed to determine whether alprenol, a B-adrenergic blocking agent, would affect cardiac action precipitated by the stress of driving, and whether it would impair driving, alone or in combination with alcohol. Six healthy volunteers took part in the trial, which was designed as a double-blind cross-over comparison with placebo. Alprenolol (100 mg) and placebo in identical tablets were given in random order in a single oral dose, following a light breakfast, on two subsequent days. 90 minutes later the subjects performed two runs in a Link Trainer for simulated driving, two volunteers driving one run simultaneously. Between the first and second run, 100 ml of whiskey diluted in soda water was taken during 15 min. The second run was performed in the same way as the first, but using a different film.

No significant differences in recording driving errors between drug and placebo were apparent, either with or without alcohol. Thus the authors concluded that alprenol may be of benefit to drivers with ischemic heart disease, for it does not significantly impair performance nor potentiate the effects of alcohol.

IU-58-D0298

COMPARATIVE SEDATIVE EFFECTS OF A BARBITURATE AND SOME TRANQUILIZER DRUGS ON NORMAL SUBJECTS, T. A. Loomis; T. C. West, Journal of Pharmacology and Experimental Therapeutics v122 n4 p525-531 (Apr 1958)

The comparative sedative effects of meprobamate (400 mg), chlorpromazine (50 mg), phenaglycodol (300 mg), secobarbital (100 mg), and placebo were evaluated on trained normal human subjects using a simulated automobile driving test apparatus. Data were obtained which indicated that conventional doses of all these drugs, except the placebo and phenaglycodol, produced a significant impairment of performance on the test apparatus.

Secobarbital produced the most intense impairment of function. Chlorpromazine produced impairment after a delayed onset of action. Meprobamate produced delayed impairment after the first dose, and prompt impairment after the second dose.

IU-62-D0299

ÜBERPRÜFUNG DES LEISTUNGSVERHALTENS UNTER DER EINWIRKUNG VERSCHIEDENER ANTIHISTAMINICA (TESTING OF PERFORMANCE UNDER THE INFLUENCE OF DIFFERENT ANTIHISTAMINES), H. J. Wagner, Arzneimittel-Forschung v12 n11 p1065-1070 (Nov 1962)

23 antihistamine drugs were investigated for the number and extent of possible side-effects which might impair the capacity to drive. The drugs investigated include: antazoline, tripelennamine, chloropyramine, N-phenyl-N-benzyl-4-amino-1-methylpiperidine, thenaldine, promethazine, thiazinaminium, alimémazine, B-dimethylaminoethyl-(p-chlor-a-methyl-benzhydryl)-ether, diphenylhydramine, dimenhydrinate, meclozine, pheniramine, 1-phenyl-1-p-tolyl-3-dimethylamino-propan, brompheniraminemaleate. If treatment with these drugs is necessary, the patient should be advised not to drive a vehicle for the duration of treatment in view of the possibility of impaired function resulting in inability to meet the demands of traffic.

Special traffic-medical studies on isothipendyl and bromazine showed no signs of marked impairment of performance, so no objections against driving a car exist, provided the drugs are applied in very small doses after a period of test treatment. The same applies to a complex compound of human y-globulin and histamine, to another drug containing standardized protective substances obtained from the intestinal mucosa and to metaphenilene. Studies on mebhydroline, chemizole and phenindamine were carried out and the results obtained indicate that no objections exist against driving a vehicle during treatment with very small doses of these drugs.

IU-61-D0300

DIE BEDEUTUNG DER UNTERSUCHUNG VON BLUT-BZW. HARNPROBEN AUF ARZNEIMITTEL NACH VERKEHRSUNFÄLLEN AUF GRUND DER ÜBERPRÜFUNG VON 2060 PERSONEN (SIGNIFICANCE OF BLOOD AND URINE TESTS FOR DRUGS AFTER TRAFFIC ACCIDENTS ON THE BASIS OF THE EXAMINATION OF 2060 PERSONS), H. J. Wagner, Arzneimittel-Forschung v11 n11 p992-995 (Nov 1961)

2060 drivers under the influence of alcohol were medically examined and questioned for drugs taken within 24 hrs. of the offense. The percentage of persons under the influence of drugs increased with age, from 15.9% in persons between 40 and 60 years of age, to 19.4% in persons above 60.

The following types of drugs were found: mild analgetic drugs 50%, drugs with gastro-intestinal action 12%, sedatives 9.6%, cardiac and circulatory drugs 7%, drugs with metabolic effect 4.8%, spasmolytic drugs 4.3%, antibiotics and sulfonamides 3,9%, and hypnotic drugs 3%. Sedatives were used most frequently by the individuals between 25 and 40 (27.3%) and 40-60 (50%), as were drugs

with circulatory or cardiac effect, of which 25% were taken by persons of 25-40 of age, 56.3% by individuals between 40 and 60 years and 12.4% by individuals above 60.

The findings, as well as experiments on the influence of various drugs on traffic safety, and the potentiation of the effects of various drugs by alcohol indicate that the dangers in traffic incurred through uncontrolled application of analgetic, hypnotic and sedative drugs are by no means negligible. The authors strongly advocate further investigations, especially with individuals not under the influence of alcohol.

IU-64-D0301

BEGUTACHTUNG BEI SICHERER UND FRAGLICHER MEDIKAMENT-EINWIRKUNG (APPRAISALS OF SAFE AND QUESTIONABLE DRUG ACTION), E. Osterhaus, Arzneimittel-Forschung v12 n8 p923-929 (Aug 1964)

In penal procedures concerning traffic violations, the question frequently arises as to what extent a defendant was under the influence of drugs at the time of the alleged offense. Certification of drug influence, whether definite or dubious, should be based on identical criteria, even if the defendant at the same time was under the influence of alcohol. The mere evidence of drug ingestion alone cannot be regarded as sufficient to establish absolutely traffic incompetence in the judicial sense. Likewise, the mere evidence of ingestion of a drug has no essential significance in establishing responsibility for a person's actions.

To judge whether the competence of an accused automobile driver was seriously impaired by the influence of drugs, calls for consideration of the entire circumstances, the individual's personality and a meticulous medical examination. An opinion can only be reached after due consideration of all the factors involved as to unreliability in traffic, or impairment of the sense of responsibility at the time of the traffic violation. The same principles apply to certification in cases of drug ingestion along with alcohol consumption.

IU-62-D0302

ZUR FRAGE DES CHEMISCHEN NACHWEISES EINER DURCH MEDIKAMENTE BEDINGTEN FAHRUNSICHERHEIT FÜR DIE FORENSISCHE BEURTEILUNG UND ZUM SCHULDVORWURF (IMPORTANCE OF CHEMICAL EVIDENCE OF INCAPACITATING EFFECTS OF DRUGS IN THE FORENSIC EVALUATION OF TRAFFIC OFFENSES), E. Osterhaus, Arzneimittel-Forschung v12 n11 p1079-1081 (Nov 1962)

In this article the author concludes that evaluation of the capacity to participate in traffic at a given time may not be based solely on the results obtained by chemical evaluation of the urine. Chemical investigation only shows that a drug has been applied; in order to evaluate whether incapacity through application of a drug existed it is essential to take recordings of the accident, the behavior of the person involved, of witness reports and of a detailed medical examination.

Chemical investigation will be more valuable if it is possible to identify all drugs in question from a blood specimen since references of the defendant concerning the application of drugs prior to or after the consumption of alcohol cannot be disputed.

IU-62-D0303

DIE VERKEHRSTÜCHTIGKEIT UNTER DER WIRKUNG VON ANAESTHETICA, HYPNOTICA, ANALGETICA UND ATARACTICA (DRIVING ABILITY UNDER THE INFLUENCE OF ANESTHETICS, HYPNOTICS, ANALGESICS, AND ATARACTICS), H. Kreuscher; R. Frey, Arzneimittel-Forschung v12 n11 p1056-1059 (Nov 1962)

The various investigations described in this report show that intravenous application of barbiturate type narcotic drugs is not suited for purposes of administering narcosis to out-patients if the capacity to participate in traffic is to be re-attained within a few hours. It may be generally stated that the capacity to participate in traffic is not re-attained for the remainder of the day following barbiturate narcosis, i.e. not before a normal night's rest.

Following inhalation narcosis with nitrous oxide and oxygen, the capacity to participate in traffic will be re-attained after about 1 hr., provided no premedication has occurred. Following cyclopropane narcosis or halothane-nitrous oxide narcosis, the respective value is 3 hrs., provided the duration of narcosis did not exceed 4-5 minutes. These data apply to the capacity to participate in traffic, driving a vehicle included. The capacity to walk, i.e. the possibility to dismiss a patient accompanied by a responsible individual, is attained as soon as the patient is feeling well and restored, and does not show signs of disturbance of equilibrium.

These simple rules concerning the evaluation of the capacities of a patient following treatment in narcosis should be observed by anesthesists in order to protect the patients and the surrounding individuals from after-effects, and to avoid legal consequences.

IU-62-D0304

VERKEHRSTÜCHTIGKEIT NACH GEBRAUCH ZENTRALER STIMULANTIEN (PERFORMANCE IN TRAFFIC UNDER THE INFLUENCE OF CENTRAL STIMULATING DRUGS), H. G. Kraft, Arzneimittel-Forschung v12 n11 p1071-1074 (Nov 1962)

Case histories are cited to point out the possibility of dangerous driving caused by the application of various central stimulating drugs. Some of these substances may cause, in dependence of the dose applied and the basic condition of the vegetative nervous system, impairment of psychomotor performance (inaccuracy) followed by reactive fatigue (hangover). These drugs generally do not influence the rapidity of decomposition of alcohol. Some new drugs which do not show the usual circulatory and psychic side-effects of stimulants are mentioned.

IU-64-D0305

WIRKUNG UND NEBENWIRKUNGEN MODERNER ANTIHYPERTONICA UNTER VERKEHRSMEDIZINISCHEM ASPEKT (EFFECT AND SIDE-EFFECTS OF MODERN ANTIHYPERTENSIVES FROM THE ASPECT OF TRAFFIC MEDICINE), B. Knick, Arzneimittel-Forschung v14 n8 p902-905 (Aug 1964)

The effect and side effects of modern hypotensives used in clinics and private practice from various pharmacological groups (Rauwolfia derivatives; carbonic anhydrase inhibitors; salureties; elective sympathetic blocking agents of the guanethidine type; ganglion blocking agents; phthalazine derivatives; monoamine oxidase inhibitors; aldosterone antagonists; a-methyldopa) are individually discussed in reference to the gradual and variable effect on hypertensive states.

From the viewpoint of traffic medicine and safety none of these drugs is free from adverse side effects. It is therefore contended that manufacturers should call the attention of physicians to this aspect, as well as offer precise dosage schemes with direction for medical observation and checking of functional fitness.

IU-64-D0306

RECHTSFRAGEN ZUM THEMA "ARZNEIMITTEL UND VERKEHR" (LEGAL QUESTIONS ON THE TOPIC "DRUGS AND DRIVING"), K. Händel, Arzneimittel-Forschung v14 n8 p915-922 (Aug 1964)

In forensic practice, the relation of drug ingestion to traffic incompetency seldom arises. When it does, it is generally a defense contention -- based on a calculated risk -- against a charge of excessive alcoholic consumption, advancing the plea that the defendant was unaware of the increased potency of alcohol when consumed along with certain drugs. Some actual cases of traffic violations and judicial pronouncements thereon are cited.

Stemming from a situation involving a hypothetical punishable traffic offense, the contingent legal capability of the prescribing physician and the drug manufacturer are weighed where an automotive vehicle is driven or controlled in traffic by a person under the influence of a drug which can impair competence. In respect of the person in charge of a vehicle, culpability is linked to previous knowledge and experience of the effects of the drug, or to a warning issued either by the prescribing physician or the drug manufacturer. For the physician, there is indeed no specific legal obligation to give such a warning, although it could be argued that such an obligation derives from a general professional duty. To directly involve the physician would create problems which are discussed -- such as failure by the patient to observe the physician's warning.

The author relieves the manufacturer of any general burden of responsibility to test a drug for all possible reactions and specifically in respect of impairment of traffic competence. More realistic currently is the obligation of a manufacturer to issue a warning of such a possible repercussion where he is aware, or should in duty bound be aware, of such a reaction.

IU-61-D0307

KONZENTRATION EINES THIOBARBITURATS IM SERUM WÄHREND DER ERSTEN 24 H NACH IV. VERABREICHTEN KURZNARKOSEN (CONCENTRATION OF A THIOBARBITURATE IN SERUM DURING THE FIRST 24 HOURS AFTER INTRAVENOUS SHORT NARCOSIS), H. H. Frey; A. Doenicke; G. Jäger, Arzneimittel-Forschung v11 n11 p1010-1011 (Nov 1961)

Following intravenous narcosis with a thiobarbiturate, the decrease of concentration was followed up during the first 24 hrs. The concentrations of unchanged barbiturate still present in the serum after this interval are potentially apt to impair the capacity to manage the situations of modern traffic. Thus the demands formulated by Soehring concerning abstention from participation in traffic for 24 hrs after short narcosis are confirmed.

IU-64-D0308

PRÜFUNG DER VERKEHRSSICHERHEIT NACH VERABREICHUNG VON FLUPHENAZINDIHYDROCHLORID UND ALKOHOL (TESTS FOR TRAFFIC SAFETY AFTER ADMINISTRATION OF FLUPHENAZINE DIHYDROCHLORIDE AND ALCOHOL), A. Doenicke; W. Sigmund, Arzneimittel-Forschung v14 n8 p907-912 (Aug 1964)

The present study was designed to test traffic safety competence after the ingestion of the psychotropic drug 4-[3-(2-Trifluormethyl-10-phenothiazinyl)-propyl]-piperazinethanol-dihydrochloride (fluphenazine) along with alcohol. Volunteers for this study were tested on 3 different days at intervals of at least 8 days. First, a placebo was given, then 1/2 litre of beer. Later, the drug under reference was administered with 1/2 litre of beer 8 hrs. later. Thereafter, the volunteers were subjected to 7 psychic diagnostic experimental tests.

Results showed that the consumption of alcohol even 8 hours after ingestion of

the test drug can lead to impaired concentration, performance, reaction speed and affective reactions. This influence was most marked in the concentration test, reaction speed test, the maze, and projection tests. Therefore, the authors are of the opinion that drug manufacturers should draw attention in their packing leaflets not only to the potential impairment of traffic competency from the ingestion of hypnotics and alcohol, but also the combination of psychotropic agents (day-time sedative) and alcohol.

IU-62-D0309

BEEINTRÄCHTIGUNG DER VERKEHRSSICHERHEIT DURCH BARBITURAT-MEDIKATION UND DURCH DIE KOMBINATION BARBITURAT/ALKOHOL (INFLUENCE OF BARBITURATES AND BARBITURATES COMBINED WITH ALCOHOL ON DRIVING SAFETY), A. Doenicke, Arzneimittel-Forschung v12 n11 p1050-1054 (Nov 1962)

The capacity of participating in traffic was impaired for a period of 24 hrs. following ambulatory short narcosis with thiobarbiturates. Therefore, providing information to patients is necessary and supervision essential. In view of the potentiating effect of barbiturates, even small quantities of alcohol may cause inebriation. Therefore abstention from alcohol is essential up to 24 hrs. after application of barbiturates (e.g., sleeping tablets) and at least 48 hrs. after ambulatory intravenous thiobarbiturate narcosis. Pharmaceutic producers are requested to refer to the danger of alcohol consumption following the application of barbiturates.

IU-74-D0310

TRACE ANESTHETIC EFFECTS ON PERCEPTUAL, COGNITIVE, AND MOTOR SKILLS, D. L. Bruce; M. J. Bach; J. Arbit, Anesthesiology v40 n5 p453-458 (May 1974)

Forty male students were each exposed on two occasions to four hrs. of inhalation of either air or 500 ppm nitrous oxide with or without 15 ppm halothane in air. Immediately following exposure, a battery of tests of perceptual, cognitive and motor skills was administered.

Compared with responses after breathing of air, those after exposure to nitrous oxide and halothane showed significant decrements in performance of a task in which attention was divided between auditory and visual signals, a visual tachistoscopic test, and memory tests involving digit span and recall of word pairs. Subjects exposed to nitrous oxide alone scored significantly lower on the digit-span test only.

IU-73-D0311

ARZNEIMITTEL UND VERKEHRSSICHERHEIT (DRUGS AND TRAFFIC SAFETY), Die Pharmazie v28 n1 p73 (Jan 1973)

A variety of drugs may influence behavior and performance in such a way as to adversely affect motor vehicle operation. Variables such as level of consciousness, reaction time, decision-making, sensory responsivity, concentration, and affect are particularly sensitive to such drug actions.

IU-72-D0312

DIE AUSWIRKUNGEN VON LÄRM, EINEM TRANQUILLIZER UND ERSCHWERTER ARBEITSBEDINGUNG AUF EINE TRACKINGLEISTUNG UND DIE HERZFREQUENZ (EFFECTS OF NOISE, TRANQUILIZER AND INCREASED DELAY TIME ON TRACKING PERFORMANCE AND HEART RATE), H. Strasser, Pflüeger's Archiv; European Journal of Physiology v332 supp pR82 (1972)

Controlled single-blind trials were undertaken to investigate the effects of noise of about 80 dB and increased delay time on tracking performance and heart rate behavior under the influence of placebo and an oral dosage of 20 mg oxaze-

pam. It was found that the stressor noise did not affect test performance systematically but heart rate was superimposed by significant noise-reactive elevations.

The tranquilizing effects of oxazepam became apparent in depressions of mean heart rate values, but it was not possible to point out statistically significant differences. Probably as a result of relaxing influences, there were no significant noise-conditioned superimpositions of heart rate after drug administration. The sedating effects of oxazepam diminished mental capacity, thus increasing the impairment of tracking skills. Performance decrements were relatively more comprehensive under placebo than under psychotropic drug medication.

IU-73-D0313

EFFECTS OF DIAZEPAM AND CODEINE, ALONE AND IN COMBINATION WITH ALCOHOL, ON SIMULATED DRIVING, M. Linnoila; S. Häkkinen, Clinical Pharmacology and Therapeutics v15 n4 p368-373 (Apr 1974)

Effects of single oral doses of codeine, diazepam (Valium), and alcohol on simulated driving were investigated by using a modification of the English Sim-L-car. The driving time was 40 minutes; subjects were told to adapt speed to surroundings and traffic. Placebo increased the inaccuracy of speed estimations. Alcohol increased the numbers of steering wheel reversals and neglected instructions. Diazepam 10 mg. increased the number of collisions and neglected instructions, but the greatest increase in collisions was after 50 mg. of codeine. Diazepam generally enhanced the effect of alcohol.

IU-59-D0314

EFFECTS OF CHLORPROMAZINE AND ALCOHOL ON COORDINATION AND JUDGMENT, G. A. Zirkle; P. D. King; O. B. McAtee; R. Van Dyke, Journal of American Medical Association v171 n11 p1496-1499 (14 Nov 1959)

This study was designed to test the belief that simultaneous use of tranquilizing drugs and alcohol has a particularly bad effect on neuromuscular coordination and interferes with safety in automobile driving. A battery of tests was applied to 24 volunteer subjects under four experimental conditions achieved with combinations of alcohol and chlorpromazine, alcohol and placebo tablet, placebo drink and chlorpromazine, and placebo drink and placebo tablet.

The effect of alcohol and chlorpromazine taken together significantly impaired the performance of the subjects. The more complex tasks were most affected, and the subjects became aware of dullness, lethargy, and poor coordination. Chlorpromazine alone impaired performance, but the impairment caused by alcohol with chlorpromazine was significantly greater. Patients obliged to take chlorpromazine should be warned that the use of alcohol greatly increases the dangers of operating complex machinery, including automobiles.

IU-69-D0315

MEDICAL IMPAIRMENT AND HIGHWAY CRASHES, J. A. Waller, Journal of American Medical Association v208 n12 p2293-2296 (23 June 1969)

Impairment to drivers and pedestrians from chronic medical problems, frequently acting at a subclinical level, is believed to be a contributing factor in 15% to 25% of crashes. In addition, alcoholism is a factor in a third of all fatal crashes.

Most drivers with medical problems should be reported to motor vehicle authorities, but no more than a quarter of these drivers should have licenses revoked. For the rest, more effective control of the highway injury problem can result from efforts to simplify driving and walking tasks, to improve energy absorption capacity of vehicles and highways, and to improve emergency health services.

IU-72-D0316

MARIHUANA AND AUTOMOBILE DRIVING, J. H. Davis, Journal of Medical Association v221 n7 p714 (14 Aug 1972)

In this letter the author discusses what he considers to be a problem which has been minimized in the discussions over legalization of marihuana. Recent studies support the view that the drug has effects on driving skill which may prove extremely dangerous to the driver and others. There is a serious need for further studies on the effects of marihuana on driving performance, as well as chemical methods of measuring marihuana constituents in body fluids.

IU-57-D0317

TRANQUILIZERS AND OPERATION OF AUTOMOBILES, H. J. Robbins, Journal of American Medical Association v164 n10 p1171 (6 July 1957)

The effects of tranquilizers on the ability to operate an automobile is the topic of this letter to the editor. Although tranquilizers may be habit-forming, it was felt that they are unlikely to render their users a traffic hazard by any action on behavior. Studies of acute action, in which no decrease from normal in performance capacity was found after twice the usual dose of meprobamate, are now being extended to chronic use, but these results are not yet available.

IU-68-D0318

INTERACTION OF PSYCHOTROPIC DRUGS AND ALCOHOL, G. Milner, Australian and New Zealand Journal of Psychiatry v2 p65-66 (1968)

The effects of a drug represent a complex interaction between the chemical agent, the individual, and the environment in which the drug is taken. The environment for the majority of adults includes the use of alcohol and the control of complex machinery, especially the automobile.

An estimate is given of the relative potency of different psychotropic agents, which are being ever more widely prescribed, in adding to the effects of alcohol. Physicians are advised to warn all patients on a psychotropic drug that they must not drive after drinking even a small amount of alcohol.

IU-70-D0319

TOXICOLOGICAL FINDINGS IN AIRCRAFT ACCIDENT INVESTIGATION, P. W. Smith; D. J. Lacefield; C. R. Crane, Aerospace Medicine v41 n7 p760-762 (July 1970)

Toxicological findings in 202 pilot-fatalities resulting from 202 accidents in general aviation aircraft are summarized. Methods used in examination of specimens for drugs and toxic agents are described. Potent therapeutic agents were detected in 7 instances, an incidence of 3.5%. Blood ethanol levels in excess of .050% (50 mg percent) were found in 28 of the 202 cases (13.9 percent); only the latter category were included in this report.

IU-72-D0320

PREDICTION OF FLIGHT SAFETY HAZARDS FROM DRUG INDUCED PERFORMANCE DECREMENTS WITH ALCOHOL AS REFERENCE SUBSTANCE, K. E. Klein, Aerospace Medicine v43 n11 p1207-1214 (Nov 1972)

A procedure is described where hazard prediction is accomplished with ethanol as reference substance through the following steps: evaluation of a dose-effect-relationship for ethanol with the performance test to be applied in toxicological drug studies; examination of drugs with the "alcohol calibrated" test method; estimation of the alcohol intoxication level equipotential in its performance

decrement to the drug-dose studied ("alcohol-equivalent"); definition of the operational significance of the drug-induced performance changes by reference to the intoxication-hazard relationship established for alcohol; and prediction of the "critical" drug-dose through extrapolation.

The technique is applicable to quantitative test methods; it allows a direct comparison of toxicological studies performed with different methods. Results with sedative, neuroleptic, tranquilizing and stimulating drugs are demonstrated and the advantage and limitations of the reference procedure discussed.

IU-70-D0321

OPERATOR PERFORMANCE AS A FUNCTION OF DRUG, HYPOXIA, INDIVIDUAL AND TASK FACTORS, R. G. Pearson; G. L. Neal, Aerospace Medicine v41 n2 p154-158 (Feb 1970)

Groups of 3 subjects received drug capsules (placebo, Librium®, meprobamate) before and after overnight sleep. Alcohol and 12,000 ft. altitude treatments were introduced following initial, morning, task performance in a pressure chamber. Nine males performed under all experimental conditions which included appropriate alcohol and altitude controls. In a 3-hour post-treatment session, subjects rotated periodically among three tasks: tracking with concurrent meter and warning light monitoring, and reaction time assessed during rest periods; problem-solving; and auditory vigilance.

The principal and most surprising finding was the general lack of drug-alcohol effects on performance. Analyses did reveal high individual and test day variability, and, under certain experimental conditions, better performance under meprobamate. It was concluded that task loads, subject training, and performance feedback operated jointly to mitigate potential decremental effects of drugs and hypoxia. A separate "hangover" study revealed adverse effects of alcohol upon problem-solving time.

IU-67-D0322

HUMAN FACTORS IN GENERAL AVIATION ACCIDENTS, J. R. Dille; E. W. Morris, Aerospace Medicine v38 n10 p1063-1066 (Oct 1967)

During the twelve months ending October 31, 1965, there were 122 fatal general aviation accidents in the Western Region in which the Regional Flight Surgeon's office was notified and the wreckage was located within one week. Autopsies were obtained on 86 pilots and blood alcohol determinations were obtained on 83 of these. No accidents were found to be definitely due to medical conditions, but a psychiatric problem is the probable cause of one. In addition, 25 pilots wore corrective lenses and 20 had other recorded physical defects. Drugs were found on three but were not found to be a causal factor; possibly significant barbiturate levels were found in two accidents. Blood ethyl alcohol levels $\geq$ 30 mg % were found in 17 (20.5 per cent); five had levels greater than 250 mg %. The relationships of experience, occupation, local reputation and time of day to alcohol involvement are discussed. Carbon monoxide, agricultural chemicals, and fatigue are among other causes found for fatal accidents.

The role of medical conditions, alcohol and pesticides are discussed for the few non-fatal accidents that were medically investigated. The development of human factors accident investigation is briefly discussed. Increased aviation safety is possible with improved community and medical actions and increased medical participation in accident investigation.

IU-60-D0323

MEPROBAMATE AND SMALL AMOUNTS OF ALCOHOL. EFFECTS ON HUMAN ABILITY, COORDINATION, AND JUDGMENT, G. A. Zirkle; O. B. McAtee; P. D. King; R. Van Dyke, Journal of American Medical Association v173 n16 p1823-1825 (20 Aug 1960)

This study was designed to determine whether a combination of meprobamate and alcohol interferes with human ability, coordination, and judgment more than either of these drugs taken singly. Eight psychological tests were used to measure the effects of the drugs, which were administered blind to 22 normal subjects. Sufficient alcohol was used to produce a concentration of 0.05% in the blood. Meprobamate dosage was 400 mg four times daily for a week before the test. Four rotated drug conditions were provided: 1) placebo tablet and placebo drink, (2) meprobamate tablet and placebo drink, (3) alcohol drink and placebo tablet, and (4) meprobamate tablet and alcohol drink.

Over-all test performance was best in condition (1) and worst in (4). It is recommended that physicians who prescribe meprobamate warn their patients of the increased danger of consuming alcoholic beverages.

IU-65-D0324

EFFECTS OF SECOBARBITAL AND D-AMPHETAMINE ON PERFORMANCE DURING A SIMULATED AIR MISSION, R. E. McKenzie, Aerospace Medicine v36 n8 p774-779 (Aug 1965)

The operational deployment of high performance fighter aircraft on extended missions poses some significant problems related to the effects of drugs upon pilot proficiency. This study was designed to simulate a pre-mission crew-conditioning program and a 12-hour flight. The research goal was to determine the performance effects of secobarbital taken the night before and of d-amphetamine taken during the mission.

The results on 48 subjects indicated that performance decrement, unpredictable by selected psychologic test scores and not related to gross physiologic measures, occurred as a residual effect of secobarbital, using the SAM Multidimensional Pursuit Test as the measure of proficiency. Individuals receiving an hypnotic dose (200 mg) of secobarbital at bedtime demonstrated a performance decrement 10 hours later at the start of their simulated "flight" and continued to demonstrate degraded performance at the completion of their mission 12 hours later. Those subjects who received 5 mg of d-amphetamine "in flight" showed the often-documented enhancement of performance, but those who received secobarbital at bedtime and d-amphetamine "in flight" showed an altered performance response curve in terms of increased latency and lower peak performance.

IU-62-D0325

OBJECTIVE MEASUREMENTS OF THE EFFECTS OF DRUGS ON DRIVER BEHAVIOR, J. G. Miller, Journal of American Medical Association v179 n12 p940-943 (24 Mar 1962)

A battery of tests has been used to measure the effects of several drugs upon skills used in driving an automobile and in some other related activities. The tests included a driver trainer test, a steadiness test, and visual tests, and they were applied to both normal subjects and patients.

The effects of various dosages of drugs were determined; the list included meprobamate, dextro amphetamine sulfate, prochlorperazine, benactyzine HCl, chlordiazepoxide, isothipendyl HCl, syrosingopine, and others. It is suggested that objective tests of the kind used here be used regularly in evaluating new compounds that can affect the central nervous system.

IU-66-D0327

HANGOVER EFFECT OF SECOBARBITAL ON SIMULATED PILOTAGE PERFORMANCE, B. G. Hartman; R. E. McKenzie, Aerospace Medicine v37 n11 p1121-1124 (Nov 1966)

64 subjects performed a simulated flying task for 4 hours under one of 4 treatment conditions (3.0 gr. of secobarbital, 1.5 gr. of secobarbital, placebo, or control). The results showed that 3.0 gr. of secobarbital administered the previous evening, 10 hours prior to the "flight", produced degraded performance with associated subjective reports of a "hangover" effect. No degradation of performance was obtained with a dose level of 1.5 gr.

IU-65-D0327

COMPARISON OF DRUG-INDUCED PERFORMANCE DECREMENTS IN AIRCRAFT AND INSTRUMENT FLIGHT TRAINER, J. F. Zieglschmid; C. E. Billings; J. J. Eggsbuehler, Aerospace Medicine v36 n2 p169 (Feb 1965)

In this abstract of a study on the effect of the synthetic versus operational flight environment on pilot performance, it was found that the aircraft was a more sensitive indicator of drug-induced performance decrements than the instrument flight trainer. However, extrapolation of experimental findings generated in a synthetic environment is hazardous in the present state of the art.

IU-75-D0328

DRUG USE AMONG DRIVERS, W. D. Glauz; R. R. Blackburn, Midwest Research Institute (1975)

Randomly selected drivers were stopped at times and places of previous fatal crashes in Lincoln, Nebraska, and Dade County (Miami), Florida. Breath, urine, blood, and lip swab samples were requested for later analysis for drugs and medications. A cooperation rate of 78% was achieved for most aspects of the survey, and slightly less for obtaining a blood sample. Overall, 1,029 urine samples and 840 blood samples were collected and analyzed.

About 3% of the Lincoln drivers and 2% of the Dade County drivers evidenced one or more of the 41 drugs tested in the blood or at concentrations of 1 µg/ml or more in the urine. At least a trace amount was confirmed in about 4.3% of each driver group. Sedatives, particularly phenobarbital, were the most commonly found drugs. In addition to the 41 drugs, marijuana traces were found on the lip swabs of 3% of the Lincoln drivers and 9% of the Dade County drivers.

The living driver findings were compared with similar results from fatally injured drivers, obtained under a previous contract. The comparison indicates that users of drugs are about four times as likely to be fatally injured in a vehicular crash as nonusers.

IU-60-D0329

TWO EXPERIMENTS ON PSYCHOACTIVE DRUGS USING A SIMULATED AUTO-DRIVING DEVICE, T. A. Loomis; T. C. West, Drugs and Driving, p332-334 (1960)

Two studies were performed using a simulated driving apparatus. The first consisted of a study of the influence of alcohol on driving performance, the second of a barbiturate and some tranquilizer drugs on driving performance. Similar procedures were used in each study. The double blind method was employed in the second study, in which five drugs were tested: secobarbital sodium (100 mg), chlorpromazine hydrochloride (50 mg), meprobamate (400 mg), phenaglycodol (300 mg) and placebo (200 mg corn starch). All subjects received drugs in the same order of administration, and an interval of one week was allowed to pass between tests with the various drugs.

In the alcohol study, impaired performance was evident at a blood alcohol concentration of 0.05%. At a blood alcohol level of 0.15%, performance had decreased to approximately one-third of the control values. In the second study there were significant differences among the effects of the five drugs, among the subjects, and among the trials. Analysis by the t-test showed that neither the placebo nor phenaglycodol produced a significant effect. Chlorpromazine produced impairment of performance after a delayed onset. Meprobamate impaired performance 2 hrs after the first dose and 1 hr after the second. Secobarbital produced a prompt intense impairment of performance, which continued throughout the remainder of the day.

IU-60-D0330

SOME EFFECTS OF OXANAMIDE ON NORMAL BEHAVIOR, A. B. Kristofferson; R. H. Cormack, Drugs and Driving, p330-331 (1960)

Two experiments are reported on the effects of moderate doses of oxanamide, an antianxiety agent, on 6 behavioral variables involved in complex acts such as driving. Experiment I used 16 subjects in a double-blind design, with a single 800 mg dose of oxanamide versus placebo. Each subject served as his own control, counterbalanced, and tests began 50 min after taking the tablets. Experiment II was comprised of four conditions: no treatment, 2 oz of 100-proof whiskey; 400 mg of oxanamide 4 times a day for 2 days, the last dose being given 1 hr before testing; and placebo control on condition number 3. Each of the 24 possible sequences of the 4 conditions was assigned at random to each subject.

No significant differences were obtained in the first experiment, and no trend was found in the pattern of differences. In the second experiment, of the 6 scores, 4 showed more detrimental effects for alcohol than for no treatment, one showed more detrimental effects for drug than no treatment, and one had more detrimental effects for alcohol than for placebo. In all these differences, significance reached the p=.05 level. As in the first experiment, no trend appeared in the differences between drug and placebo, and no difference approached significance.

The investigators stated that from the results of these experiments there is no basis for concluding that oxanamide produces a greater decrement in performance than does a matching placebo. They added, however, that it is important to realize that the behavioral measurements made in these experiments are only a small sample of one of several behavioral domains relevant to driving.

IU-60-D0331

BEHAVIORAL TOXICITY AS MEASURED BY TESTS OF SIMULATED DRIVING AND OF VISION, J. G. Miller; L. Uhr, Drugs and Driving, J. G. Miller, L. Uhr, eds., p326-329 (1960)

The acute effects in normal subjects of double the normal doses of meprobamate, dextro-amphetamine sulfate, meprobamate plus alcohol (2 oz, 80 proof), and alcohol alone were tested. Accuracy, speed, judgment, and reaction-time were tested on a driver-trainer, and visual functions were tested with the Bausch and Lomb Ortho-rater. There was some evidence of unsteadiness under alcohol. No behavioral toxic effects were found with the other 3 treatments, as compared with placebo controls. Chronic meprobamate, prochlorperazine, and tranquil (a triple-bromide preparation) effects were also determined.

IU-69-D0332

PSYCHOACTIVE DRUGS AND TRAFFIC ACCIDENTS, R. G. Smart; W. Schmidt; K. Bateman, Journal of Safety Research v1 n2 p67-73 (June 1969)

This study examined the accident rates of 30 psychoactive drug abusers seen at a clinic in Toronto. The group included persons addicted to or dependent on

barbiturates, tranquilizers and stimulants; half were also dependent on alcohol. All 30 were interviewed as to their driving accidents and driving exposure (miles driven per year); accidents were checked with official records and good agreement was achieved. Expected accident rates per mile driven were computed for age and sex groups separately and the observed rates were compared with them.

The psychoactive drug abusers had accident rates about twice as high as expected for their age, sex, and driving exposure. Most of the excess was contributed by those addicted to amphetamines (alone or in combination), whereas those addicted to alcohol and barbiturates, barbiturates only or tranquilizers only had lower rates than expected.

IU-65-D0333

CHRONIC MEDICAL CONDITIONS AND TRAFFIC SAFETY. REVIEW OF THE CALIFORNIA EXPERIENCE, J. A. Waller, New England Journal of Medicine v273 n26 p1413-1420 (23 Dec 1965)

The records of 2672 people with chronic medical conditions known to the California Department of Motor Vehicles were compared with those of 922 California drivers renewing their licenses who were not known to have chronic medical conditions. The medical groups differed from the comparison sample in distribution according to age, sex, marital status and socioeconomic status.

Drivers with diabetes, epilepsy, cardiovascular disease, alcoholism and mental illness averaged twice as many accidents per 1,000,000 miles of driving and one and three-tenths to one and eight-tenths times as many violations per 100,000 miles as drivers in the comparison group on an age-adjusted basis. Drivers convicted for illegal use of drugs averaged one and eight-tenths times as many violations but no more accidents than those in the comparison group.

The author felt the results of the study suggest that the present emphasis on epilepsy as the major medical handicap to safe driving is too narrow an approach. However, routine physical examinations for all drivers, as attempted in Pennsylvania, are also inadequate. Since the present study is limited to drivers whose medical conditions were known to the Department of Motor Vehicles it is not possible in the absence of further studies to assume a similar degree of driving handicap in unreported drivers with the same conditions.

IU-60-D0334

PATHOLOGIST AND PATIENT. DRINKING AND DRIVING. PEP PILLS, TRANQUILIZERS OR COURAGE?, J. Lister, New England Journal of Medicine v262 n13 p668-670 (31 Mar 1960)

The author reports the findings of a special committee of the British Medical Association concerned with the relation of alcohol to road accidents. The Committee investigated the effect of alcohol on driving performance or skills resembling driving and examined the statistical evidence of the proportion of accidents in which it could be established that the persons involved had been drinking alcohol prior to the accident. It was concluded that the British police records showed that of all fatal road casualties in 1954, 2.1% were at least partly attributable to drink or drugs, but that smaller surveys have shown much higher figures.

IU-74-D0335

DETECTION OF DEPENDENCE-PRODUCING DRUGS IN BODY FLUIDS, World Health Organization Meeting of Investigators, WHO Technical Report Series, n556 (1974)

Expert committees and scientific, study, and working groups were convened by the World Health Organization Meeting of Investigators to consider a variety of matters related to the use of dependence-producing drugs outside appropriate

medical practice. Topics covered include the methodology of detecting dependence-producing drugs in body fluid, prospects for meaningful detection of particular drugs, the functions of national reference and other laboratories, quick diagnostic techniques applicable in acute intoxication, and international cooperation.

IU-72-D0336

NONHIGHWAY INJURY FATALITIES. 1. THE ROLES OF ALCOHOL AND PROBLEM DRINKING, DRUGS AND MEDICAL IMPAIRMENT, J. A. Waller, Journal of Chronic Disease v25 p33-45 (Jan 1972)

Presence of alcohol, alcoholism, drugs other than alcohol and medical impairment was studied among persons age 15 or older who died of nonhighway injury. Where relevant they were compared with persons who died after acute episodes of illness. Alcohol was present in 42% of injury fatalities and 18% of those who died of illness. Among persons who died of falls or fire respectively 70 and 64% had alcohol present, usually in very high concentration. Most persons with alcohol had an actual diagnosis or at least one indicator of problem drinking.

Impairment attributable to other drugs appeared to play only a minor role in death from injury. However, 10% of fatal injuries were initiated by episodes of altered consciousness and another 7% by other forms of medical impairment.

IU-73-D0337

CANNABIS AND DRIVING ABILITY. EXPERIMENTAL STUDY, P. Kielholz; L. Goldberg; V. Hobi; D. Ladewig; G. Reggiani; R. Richter, German Medicine v3 n1 p38-43 (Spring 1973)

In a double-blind study 54 volunteers were tested for their car driving ability before and after taking delta-9-tetrahydrocannabinol (THC) at doses of 350,400 or 450 ug/kg and a placebo. Medical examination of these in the THC group revealed injected conjunctival vessels, increased pain sensitivity, as well as a significant pulse rate increase and rise in diastotic blood pressure. There were three prominent effects in the self-assessment of the THC group: a definite inward turning of consciousness followed by an impairment of attention and concentration capacities; change in motor functions, co-ordination and associations; and a failing to come to terms with the environmental situation.

It was felt that THC, because of its inhibiting as well as stimulating effects, influences psychological and physiological functions important for driving in a manner different from alcohol. It changes and worsens adaptability, especially if there is simultaneous stress when rapid decisions and actions are required; prolongation of reaction time and an increased frequency of wrong and inadequate responses were observed. The degree of impairment, though, depended on the initial personality structure and individual effects of the drug on basic mood and attitude. The intensity of action of THC was still measurable five to six hours after intake.

IU-71-D0338

MARIJUANA AND HEALTH. REPORT TO THE CONGRESS, American Journal of Psychiatry v128 n2 p189-193 (Aug 1971)

This report summarizes present scientific knowledge concerning the connection between marijuana use and health. It describes the subjective and physiologic effects of short-term use, including changes in intellectual and motor performance and acute psychotic episodes. While few data exist to prove the harmful effect of long-term use, there is increasing evidence that frequent, heavy use is correlated with a loss of interest in conventional goals and with development of lethargy. The need for more research in both physiological and psychosocial areas is stressed.

IU-72-D0339

INVESTIGATION OF 400 PEOPLE KILLED IN ROAD ACCIDENTS WITH SPECIAL REFERENCE TO BLOOD ALCOHOL LEVELS, D. W. Hossack, Medical Journal of Australia v2 p255-258 (29 July 1972)

Experimental evidence shows that the risk of road accidents increases as the blood alcohol level of the driver exceeds 50 mg/100 ml. In this study, 50% of the drivers killed had blood alcohol levels above 100 mg/100 ml. Many drivers, particularly those under 25 years of age, had such high blood alcohol levels that it would appear they were problem drinkers. In this series, 94% of killed drivers were not wearing seat belts.

A study of drugs as a contributing factor was inconclusive because of the small size of the sample. High blood alcohol levels were also found in killed passengers and pedestrians, but this was not so in a small group of killed motor cyclists.

IU-72-D0340

ALCOHOL AND MARIJUANA. A COMPARISON OF EFFECTS ON A TEMPORALLY CONTROLLED OPERANT IN HUMANS, H. Cappell; C. D. Webster; B. S. Herring; R. Ginsberg, Journal of Pharmacology and Experimental Therapeutics v182 n2 p195-203 (1972)

The effects of smoked marihuana and ethanol on human schedule controlled behavior were compared. The behavioral task involved a differential reinforcement of low rate schedule in which subjects were required to space key-press responses at least 20 sec. apart in order to receive a small monetary reinforcement. Another feature of the schedule was that reinforcement was available for a limited period ranging from 0.5 to 4.0 sec. Subjects received immediate feedback indicating whether a response was premature, correct or late. 12 subjects performed after consuming marihuana cigarettes containing a total of 0, 4, 8 or 16 mg of Δ^9-tetrahydrocannabinol, and 12 additional subjects were tested following 0, 0.48, 0.72 or 0.96 g/kg of ethanol.

There was a dose-related decrement in reinforced responses after marihuana. Moreover a reliable shift toward errors of premature responding was observed with increasing doses. Ethanol had no reliable effects on the schedule controlled behavior at any dose. Marihuana also had a dose-related effect on pulse rate and subjective ratings of the degree of "high." The results indicate that marihuana, in contrast to alcohol, interferes with temporally controlled responding even when there is a maximum of feedback concerning response accuracy. A placebo effect on behavior was found with marihuana but not with ethanol.

IU-73-D0341

CANNABIS AND ALCOHOL: EFFECTS ON ESTIMATION OF TIME AND DISTANCE, P. Bech; L. Rafaelsen; O. J. Rafaelsen, Psychopharmacologia v32 n4 p373-381 (1973)

The effect of cannabis and alcohol on estimation of time and distance during simulated car driving was studied. Cannabis resin containing 4% Δ1-tetrahydrocannabinol (THC) was administered orally in 3 doses equivalent to 8, 12, and 16 mg THC. Alcohol was given orally in one dose of 70 g. The subjects were 8 men, 21 to 29 years old.

Cannabis showed much stronger effects than alcohol on the estimation of time and distance. The effect of cannabis was more marked on the "subjective" than on the "objective" estimation. A dose-response type of effect was seen on cannabis.

IU-72-D0342

EFFECT OF MARIJUANA ON DRIVING PERFORMANCE, F. B. Benjamin, Current Research in Marijuana, M. F. Lewis, ed., p205-214 (1972)

This article is a summary of the available data relating marijuana use to automobile driving. Although preliminary evidence indicates that marijuana impairs the ability to drive, it is not a significant factor in the statistical incidence of fatal and non-fatal accidents. The author concludes that either the marijuana smoker is conscious of the impairment and avoids driving, or that he manages to compensate for the deficiency, at least to some extent. He also warns that these are only tentative findings and that considerable work is required to establish more reliable data.

IU-72-D0343

EFFECTS OF THE CHRONIC USE OF MARIJUANA ON SLEEP AND PERCEPTUAL-MOTOR PERFORMANCE IN HUMANS, E. Barratt; W. Beaver; R. White; P. Blakeney; P. Adams, Current Research in Marijuana, M. F. Lewis, ed., p163-193 (1972)

In this paper the authors hypothesize that chronic use of marijuana at dose levels which produce a physiological as well as a psychological high leads to changes in the percentage of time spent in various sleep-wakefulness periods; these changes are in turn related to changes in mood and everyday life style. They conclude that the reported relationships of marijuana to brain amines and the resulting behavioral changes related to slow wave sleep are consistent with this hypothesis.

Marijuana experiments which involve measures of perceptual-motor performance, cognitive problem-solving, and psycho-physiological functioning as dependent variables are reviewed. The authors present a progress report on the UTMB human level laboratory and field marijuana research, and discuss selected findings to date which relate to the rationale for their hypothesis.

IU-72-D0344

COMPARISON OF THE EFFECTS OF MARIJUANA AND ALCOHOL ON VISUAL FUNCTIONS, H. Moskowitz; S. Sharma; M. Schapero, Current Research in Marijuana, M. F. Lewis, ed., p129-150 (1972)

This paper reports three sets of experiments designed to compare alcohol and marijuana effects on visual functions. The first set of experiments examined drug influences on the detection of peripheral lights under three levels of central visual information processing demands. The second set studied drug effects on autokinesis and the third set examined drug effects on visual acuity, dark adaptation, and ocular motor control.

The authors found that alcohol has no effect on the sensory transducing or transmitting mechanisms involved in peripheral vision, but instead impairs central processing of peripheral visual information when processing of the information conflicts with processing of information from other sources. Marijuana affects peripheral vision whether or not there is a requirement for processing information from other sources. The authors conclude that it is clear that marijuana does impair visual perceptual performance to a large degree, and potential users should be warned that it is likely to lead to accidents.

IU-71-D0345

NEW RESEARCH ON CANNABIS, British Medical Journal v2 n5757 p293-294 (8 May 1971)

This article comments on the present state of progress in cannabis research,

with emphasis on its effects on psychomotor functioning. The quantification of the amount of delta-9-tetrahydrocannabinol (THC) actually ingested by smoking in experimental subjects is felt to be a great leap forward in the direction of correlating psychomotor changes to exact dose levels. Better experimental design will also come from taking into account the person's previous experience with cannabis since naive and practiced smokers react differently.

IU-68-D0346

INTERACTION OF DRUGS AND ALCOHOL IN RELATION TO TRAFFIC SAFETY, W. M. Rosinga, Drug-Induced Diseases v3 p295-306 (1968)

Very little is known as yet about the interaction between drugs and alcohol, and pertinent investigations are urgently needed. However, case reports alone are sufficient to warrant the conclusion that the use of alcohol or drugs can unfavourably affect traffic safety; this applies even more to the combination of alcohol and drugs. In this context it is not only the "psychotropic" drugs that must be regarded with suspicion, but almost all drugs.

Few adequately controlled studies have been made of the effects of alcohol ingestion and/or medication on driving skill, and double-blind investigations deserve special encouragement. Medical practitioners, pharmacists and the pharmaceutical industry, in their own fields and also jointly, must ensure adequate information about the risks inherent in the use of alcohol and/or drugs by drivers. In countries with a government-controlled drug market, the controlling agency should be alert and contribute actively to acquisition of knowledge and dissemination of information about these questions.

IU-68-D0347

EXPERIMENTAL PSYCHOLOGICAL STUDY ON THE EFFECT OF HALOPERIDOL GIVEN ALONE OR IN COMBINATION WITH ALCOHOL, E. Wambsganss; J. Bredenkamp, Arzneimittel-Forschung v18 n2 p238-243 (Feb 1968)

A group of 88 male and female students, 20 to 26 years old, were tested in a double-blind-study before and after treatment with 4'-fluoro-[1, 4-hydroxy-4-(4'-chloro)-phenyl-piperidino]-butyrophenone (haloperidol; Serenace®), which was applied orally in a daily dosage of 2x2 tablets (1 mg), or with a placebo. Psychological performance tests and a self-rating test were carried out for the purpose of a control of changes of psychic and intellectual efficiency as well as of psychic state, caused by use of medicaments. The combined effects of alcohol and haloperidol, as well as the dependence of the changes on the level of neuroticism, were examined.

The results show that haloperidol is a substance with a slightly sedating effect in low dosage and that no noticeable side-effects occur when it is applied by itself, nor when applied combined with alcohol. In neurotic subjects side-effects were observed as a result of a combined application of haloperidol-alcohol, namely as a diminuation of efficiency with regard to the ability of "semantic classification".

IU-70-D0348

TRICHLOROETHYLENE IN COMBINATION WITH CNS DRUGS. EFFECTS ON VISUAL-MOTOR TESTS, R. K. Ferguson; R. J. Vernon, Archives of Environmental Health v20 n4 p462-467 (Apr 1970)

The purpose of the studies was to determine if three widely used drugs could significantly enhance the effects of trichloroethylene (Trilene®) on visual-motor performance. Thonzylamine hydrochloride (Anahist®), 50 mg; meprobamate (Equanil®), 800 mg; or a lactose placebo was given to each of eight subjects. In a second group, each of six subjects drank alcohol, 35 ml/70 kg of body weight, or a placebo over a 20-minute period starting just at the end of the first test

series. In both parts of the study, trichloroethylene was administered for two hours at concentrations of 0, 300, or 1,000 ppm.

Compared to trichloroethylene and placebo, the addition of thonzylamine or meprobamate did not significantly alter performance on any test. Low blood levels of alcohol (20 to 30 mg per 100 ml) markedly augmented the adverse effects of trichloroethylene on performance of three of the tests.

IU-69-D0349

PERCEPTION OF DANGER IN A SIMULATED DRIVING TASK, L. Currie, Ergonomics v12 n6 p841-849 (Nov 1969)

In this report a method of simulating danger is described, and the relation between simple reaction time and perception of danger in the task is examined. No connection was found between simple reaction time and the accident records of the subjects or the nature of the task performed, but relation was found between accident records and the perception of danger. Drivers who claimed to have accident-free records perceived danger in the tasks (as operationally defined in this study) more quickly than their accident counterparts, and there was no correlation between simple reaction time and the event perception time.

Simple reaction time appears to be a poor index of safe driving, and an individual's behavior in the presence of danger is likely to be based on his appraisal of the situation, how quickly he perceives the threat of danger, and the kind of action he consequently takes. The process is more sequential than simultaneous, and the driver's speed of reaction seems to be secondary to his appraisal of the situation. Whether or not his action prevents or aggravates the chance of injury depends on the appropriateness of his prior perception.

IU-69-D0350

EFFECTS OF TRICHLOROETHYLENE ON VISUAL-MOTOR PERFORMANCE, R. J. Vernon; R. G. Ferguson, Archives of Environmental Health v18 n6 p894-900 (June 1969)

Effects on visual-motor performance of breathing 0, 100, 300, and 1,000 ppm of trichloroethylene were evaluated by six standard tests. Each concentration was administered in random order to each of eight male subjects for two hours. During each period of exposure, all tests except one were given three times to each subject.

The results of each test were submitted to statistical analyses. Compared to control responses, 1,000 ppm of trichloroethylene had adverse effects on performance in the Howard-Dolman, steadiness, and pegboard tests. It had no effect on flicker fusion, form perception, or code substitution tests. The results show that trichloroethylene, under the experimental conditions, adversely affected three tests of visual perception and motor skill at the highest concentration, but had no significant effects at the lower concentrations.

IU-67-D0351

DRUGS AND DRIVING, J. Allan, British Medical Journal v3 n5567 p739-740 (16 Sep 1967)

In this letter the author expresses concern about doctors who fail to inform their patients that they should not drive while taking certain drugs; this represents a callous indifference to the safety of patients and others. Equally dangerous is the practice of some physicians who fail to warn patients whether certain drugs are safe when taken with alcohol.

IU-67-D0352

DRUGS AND DRIVING, J. C. Barker, British Medical Journal v2 n5557 p109 (8 July 1967)

The author of this letter expresses concern over the dilemma encountered by physicians prescribing psychotropic drugs for their patients. Although patients should be warned of the possible effects of the drugs on their driving ability, such warnings may cause considerable alarm and would vitiate the rapport existing between the doctor and the patient.

IU-73-D0353

EFFECTS OF CANNABIS AND ALCOHOL ON PSYCHOLOGICAL TESTS, L. Rafaelsen; H. Christrup; P. Bech; O. J. Rafaelsen, Nature v242 n5393 p117-118 (9 Mar 1973)

Persons given 200-400 mg cannabis showed poorer performance in cognitive tests than did persons given 70 g ethanol. Psychological tests showed that cannabis caused a greater degree of dreaminess, lassitude, and sleepiness in the subjects than did ethanol, and cannabis also had a greater effect on finger dexterity.

HS-801 144 IU-73-D0354

HUMAN FACTORS ANALYSIS OF MOST RESPONSIBLE DRIVERS IN FATAL ACCIDENTS, R. S. Sterling-Smith; J. C. Fell, Boston University; Office of Accident Investigation and Data Analysis, National Highway Traffic Safety Administration (1973)

A special study of the alcohol/drug problem associated with the "most responsible" drivers in fatal collisions occurring in the Greater Boston area was conducted. The study was designed to answer four questions in the human/psychological/alcohol/drug areas with regard to these drivers: (1) differences between most responsible drivers who kill themselves (Type I), most responsible drivers who kill another driver or passenger (Type II), and drivers who kill pedestrians (Type III); (2) differences between alcohol-involved and non-alcohol/involved drivers; (3) differences between alcohol-involved drivers and drivers arrested for DWI; and (4) differences between drivers involved in fatal collisions within the Boston ASAP geographic area and those occurring outside the ASAP area. This paper describes results pertaining to question #1.

Type II drivers were found to be quite different from Type I and Type III drivers. Significant findings for Type II drivers included suicide attempt histories, driving without a license, job loss due to alcohol abuse, smoking marijuana, and other drugs involved in the crash. Significant accident causal factors included unfamiliarity with the accident vehicle and passenger distraction for Type II drivers. Age may account for some of the factors, but not all.

IU-74-D0355

DRUG INVOLVEMENT IN AUTOMOBILE DRIVER AND PEDESTRIAN FATALITIES, R. F. Turk; A. J. McBay; P. Hudson, Journal of Forensic Sciences v19 n1 p90-97 (Jan 1974)

The cases presented were those of drivers and pedestrians fatally injured in auto crashes who did not receive emergency medical treatment in a hospital. Blood was analyzed for alcohol and other volatiles; urine and blood were analyzed for acids, neutrals, and organic bases; and the liver was analyzed for organic bases. The liver was also examined microscopically for fatty changes and cirrhosis.

61% of the single-vehicle operator victims had significant amounts of alcohol in their blood, and 5% had combinations of alcohol and a drug. In the multiple vehicle crashes 25% of the operator victims showed significant blood alcohol concentration and no other drugs were detected. Of the pedestrian victims 54%

had significant amounts of alcohol in their blood, 15% had detectable amounts of drugs other than alcohol, and 6% had both alcohol and another drug present. The microscopic examination of the livers indicated that over half of the drivers and pedestrians displayed changes indicative of a severe alcohol problem.

IU-74-D0356

NARCOTIC USE AND DRIVING BEHAVIOR, R. D. Blomberg; D. F. Preusser, Accident Analysis and Prevention v6 n1 p23-32 (Sep 1974)

Data on 1562 methadone maintenanee patients in New York State were gathered through face-to-face interviews. A control group of 1059 people was constructed by asking the experimentals to volunteer names of non-addicted friends. State driver records for 718 experimentals and 579 controls were obtained and analyzed.

In general, experimental subjects were no worse drivers than the controls, either as patients or while they were using heroin. This was so despite the fact that the experimentals estimated their mileage to be at or above the national average throughout their abuse of non-narcotic and narcotic drugs and during their methadone treatment. It was also found that drug abusers who drive are likely to drive immediately after using drugs. There was an indication that narcotic users are able to compensate for drug effects.

IU-71-D0357

MARIJUANA--A MEDICAL REVIEW, C. M. Lieberman; B. W. Lieberman, New England Journal of Medicine v284 n2 p88-91 (14 Jan 1971)

This report concerns what is known and unknown about marijuana. Areas reviewed are: physical properties, chemical analysis, animal pharmacologic studies, psychological and physiological effects of marijuana on humans, and the effects of marijuana on mental and motor performance, including driving.

IU-__-D0358

PROOF POSITIVE. THE FACTS ON DRINKING, DRUGS AND DRIVING, Pilot Club International [n.d.]

This pamphlet is one in a series of "Proof Positive" Programs which are citizen-information seminars sponsored by the Pilot Club International. Because of the rising tide of research showing that abuse of alcohol and drugs is the causative factor in a preponderance of traffic crashes, this pamphlet was prepared so that widespread understanding of the problem, combined with laws restraining drivers under the influence of alcohol or drugs, can reverse this trend. Various steps toward solution are presented, and a suggested program for a seminar is provided.

IU-68-D0359

DRUNK AND DRUGGED DRIVER VERSUS THE LAW, P. W. Braunstein; S. B. Weinberg; L. D. Cortivo, Journal of Trauma v8 n1 p83-90 (1968)

Statistically, the drugged driver constitutes a very small portion of the fatally injured drivers. The menace of the drunken driver, however, looms over everyone traveling the American highways. The laws punishing the convicted drunken driver who has not caused an accident are cumbersome, difficult to enforce, and lose their impact when tried in the courts. In order to rapidly and efficiently remove the drunken driver from the highway, a modification of the existing laws is suggested, making mandatory the loss of license of anyone found driving while intoxicated. The motor vehicle bureau should be granted greater authority to rapidly rescind the drinking driver's license while pre-

serving his constitutional rights in the court. Also, a fair maximum breath and blood alcohol level should be established, if possible at a national level.

The American Association for the Surgery of Trauma and the American College of Surgeons championed safety engineering a decade ago. These organizations should now actively recommend stricter and more workable laws concerning the control of the drunken driver.

IU-71-D0360

DRINKING, DRUGS AND DRIVING, C. R. Self, Jr., H. K. Simon Co. (1971)

This booklet explores the effects of alcohol and drugs on driving for the benefit of the beginning driver. Drugs discussed include: amphetamines, barbiturates, cocaine, codeine, heroin, LSD, marihuana, mepedrine, methadone, and morphine, as well as other factors such as glue-sniffing, coffee, and cigarettes. The booklet concludes with a warning to drivers to refrain from driving after drinking, and to avoid drugs except under a physician's direction.

IU-72-D0361

GAS CHROMATOGRAPH-MASS SPECTROMETER AS A NEW AND IMPORTANT TOOL IN FORENSIC TOXICOLOGY, R. F. Skinner; E. J. Gallaher; J. B. Knight; E. J. Bonelli, Journal of Forensic Sciences v17 n2 p189-198 (Apr 1972)

Methodology was presented for the practical application of combined gas chromatography-mass spectrometry to analytical toxicology. The technique provides the analyst with a reliable method for the sensitive and specific determination of many drugs. In addition, it complements simple gas chromatography, thin-layer chromatography, and other techniques already in use in many laboratories.

IU-64-D0362

MISUSE OF VALUABLE THERAPEUTIC AGENTS. BARBITURATES, TRANQUILIZERS, AND AMPHETAMINES. REPORT BY THE COMMITTEE ON PUBLIC HEALTH, NEW YORK ACADEMY OF MEDICINE, Bulletin of New York Academy of Medicine v40 n12 p972-979 (Dec 1964)

This report by The Committee on Public Health of the New York Academy of Medicine is concerned with the misuse of some valuable therapeutic agents, namely, barbiturates, tranquilizers and amphetamines. Use statistics for these agents are outlined, as is the history of legislation designed to control both their production and distribution.

The Committee restates its 1946 recommendations for specific regulations, and concludes with proposals it feels will serve as remedies to the present problems of misuse of these agents.

IU-74-D0363

EFFECTS OF CAFFEINE ON ALERTNESS IN SIMULATED AUTOMOBILE DRIVING, E. G. Regina; G. M. Smith; C. G. Keiper; R. M. McKelvey, Journal of Applied Psychology v59 n4 p483-489 (Aug 1974)

Thirty minutes after ingesting 200 mg of caffeine or a placebo, each of 24 male subjects drove an automobile simulator for 90 minutes. Immediately thereafter, the subject ingested a supplemental dose of the medication taken initially (200 mg. of caffeine or placebo), and then drove for another 90 minutes.

The simulator provided a comprehensive and coherent set of stimulus inputs which produced a degree of realism not usually found in laboratory studies. Both the initial and the supplemental doses of caffeine significantly enhanced performance beyond that found with placebo, on each of four measures of alertness.

IU-60-D0364

BEHAVIORAL TOXICITY OF EMYLCAMATE (STRIATRAN®), L. Uhr; J. G. Miller, American Journal of Medical Sciences v240 n2 p197-203 (Aug 1960)

The effects of single doses of 800 mg of emylcamate, 400 mg of emylcamate, 800 mg of meprobamate, and matching placebos were tested on a behavioral toxicity battery with 18 variables. Forty-nine normal male subjects were pretrained and tested under all of the 4 drug treatments, according to a double-blind and counterbalanced design, each subject acting as his own control.

As compared with placebo, 800 mg of emylcamate, well above the recommended single clinical dose, led to significantly slower reaction times, whereas 400 mg of emylcamate did not. Neither dose had any consistent effect upon accuracy, and 400 mg of emylcamate increased caution in trading off speed for accuracy. Meprobamate, in 800 mg doses (double the usual clinical dose and roughly equivalent in clinical effects to 400 mg of emylcamate) led to both a slowing of reaction time and a decrease in accuracy. The 800-mg dose of both drugs appeared to have some effect on components of psychomotor behavior related to driving: emylcamate chiefly on reaction time, meprobamate a less specific effect on both reactions and accuracy.

Explanations for apparent inconsistency of these findings about meprobamate with previous studies are given. No behavioral toxicity was found for dosages of meprobamate less than 800 mg, 400 mg being the usual single clinical dose.

IU-74-D0365

DETECTION OF SEDATIVE/HYPNOTIC DRUGS IN THE IMPAIRED DRIVER, J. M. White; M. H. Graves, Journal of Chromatographic Science v12 p219-224 (May 1974)

Forensic laboratories are facing an increasing demand for rapid routine procedures for the detection of the wider panel of sedative/hypnotic drugs available to much of the population on prescription, and to many others by diversion from legitimate sources. Many laboratories asked to "screen" a blood sample for drugs will perform an examination for barbiturates, but will neglect the large number of other impairment-producing drugs more recently introduced to the drug market (i.e., benzodiazepines, methaqualone, carbomates, etc.).

The authors, in an attempt to rectify this, outline the analytical procedure used by the Criminalistics Laboratory of the Orange County (California) Sheriff-Coroner's Department to screen all driving cases in which alcohol is absent, or present at a level less than 0.10%. This procedure results in the detection of a number of commonly used compounds from a limited sample size (approximately 5 ml) within a reasonable amount of analytical time. All positive findings are confirmed with a second aliquot of the original sample, preferably by a second analyst using an independent testing method. The drugs and drug classes screened for by this process include: barbiturates, benzodiazepines, carbomates, methaqualone, glutethimide, ethchlorvynol, and mixtures of these.

IU-67-D0366

VISION AT LEVELS OF NIGHT ROAD ILLUMINATION. 11. LITERATURE 1965, O. W. Richards, Highway Research Record n164 p21-28 (1967)

This paper presents a brief review of the 1965 literature on vision at levels of night road illumination, and is an update of a similar study of 1964 literature. The main topics discussed are: glare, flashes and flicker illumination, visual illusions of movement, visibility distances, drivers vision, vision defects, color night driving, and effects of alcohol and drugs.

IU-64-D0367

DRUGS AND FLYING PERSONNEL, J. R. Dille, GP v30 n5 p86-90 (Nov 1964)

Recent investigations have implicated numerous human factors in aviation accidents; human factors are causally involved in 50 to 80% of all major aircraft accidents, both military and civilian. One of the most important causes, and a potentially remediable one, is ingestion of a variety of drugs, both prescribed and proprietary. Since drugs may have more pronounced effects in the presence of hypoxia, underlying disease, or when taken simultaneously with other agents, their side effects must not be discounted.

Drugs mentioned in this context include: ethanol, tobacco (e.g., nicotine and carbon monoxide), analgesics, antihistamines, nasal decongestants, antimotion sickness agents, antidiarrheal agents, amphetamines, tranquilizers, sedatives, antibiotics, cardiac agents, and steroids. Physicians ministering to flight personnel must be familiar with these drugs and aware of these problems.

IU-73-D0368

PHYSICAL CONDITION OF COMMERCIAL DRIVERS INVOLVED IN ACCIDENTS FOR YEAR 1971. REPORT, Bureau of Motor Carrier Safety, Federal Highway Administration (1973)

The accident reports that provide the basis for this study were submitted by motor carriers involved in interstate commerce. Questionnaires were sent out in those instances which indicated that the driver's condition may have been a causative factor at the time of the accident. Information in this report relates to 351 accidents on which questionnaires were completed and returned.

Included in the report is information on driver heart attacks, blackouts, drinking drivers, sleeping drivers, and drivers and drugs. The data relate to casualties to carriers' drivers only, and resultant property damage to carriers' vehicles only.

IU-70-D0369

DRUGS AND DRIVING, J. D. J. Harvard, British Journal of Hospital Medicine v4 p455-458 (Oct 1970)

Whereas there is ample evidence that under experimental conditions a wide variety of medicines and drugs impair skills resembling driving, there is little evidence that they increase the risk of accident involvement on the road. There would appear to be a serious problem of communication in bringing the dangers to the attention of the driving population. More could be done to inform doctors of the drugs which are particularly likely to impair driving, and doctors should assume that patients over the age of 17 drive cars until proved otherwise. Patients should be warned that the main danger is during the initial stage of therapy, before the extent of the main effect and of any undesirable side effects is known.

Special warnings should be given about exceeding the stated dose and about taking other drugs, especially alcohol, in combination. Stimulants, particularly in the amphetamine range, would appear to be the most important of the drugs likely to increase risk of accident involvement. Other drug classes mentioned in this context included: barbiturates, major and minor tranquilizers, narcotics, analgesics, antihistamines, hormones, ganglionic-blockers, steroids, cardiac glycosides, vasodilators and thymoleptics.

IU-71-D0370

EVALUATION OF THE PSYCHOPHYSIOLOGICAL FUNCTIONS IN HUMANS EXPOSED TO TRICHLOROETHYLENE, M. Salvini; S. Binaschi; M. Riva, British Journal of Industrial Medicine v28 p293-295 (1971)

To provide data on the psychophysiological efficiency of human beings exposed to solvent vapor currently used in industry, the effects of trichloroethylene (TCE) were evaluated. Six male university students were exposed to an average vapor concentration of 110 ppm for two 4-hr exposures, separated by a 1 1/2 hr interval. Each subject was examined on two different days, on one day undertaking a set of tests in an atmosphere contaminated with TCE vapors, and on another day in a 'control' atmosphere which did not contain TCE. On each of the two days two sets of tests were performed.

In all the tests performed, a statistically significant decrease in performance ability was seen; the greatest decrease occurred during the more complex tests. The suggested allowable concentration of TCE (100 ppm) appears to be very close to the average concentration capable of interfering with psychophysiological efficiency, even in the absence of other undesirable subjective and objective manifestations.

IU-72-D0371

ÜBER FAHRVERSUCHE UNTER DEM EINFLUB VON HASCHISCH (ABOUT DRIVING TESTS UNDER THE INFLUENCE OF HASHISH), K. Luff; H. Heiser; P. Moyat; B. Möller, Zeitschrift Für Verkehrssicherheit v18 n3 p147-153 (1972)

Because abstract theories are insufficient to produce relevant evidence about driving ability for criminal and civil cases, the authors conducted studies of drivers under the influence of hashish. Six men and six women, between 21 and 29, were tested when sober and when under the influence of hashish in quantities between 2.5 and 7.0 g. (3.5 g. average). It was found that under the influence of hashish, the tendency to minimize risks outweighed the subjects' rationally controlled judgment, and vitality and preparedness of action were much reduced.

IU-74-D0372

UNTERSUCHUNG KRAFTFAHRWESENTLICHER LEISTUNGSMINDERUNGEN DURCH ARZNEIMITTEL (INVESTIGATION OF DRIVING PERFORMANCE DEGRADATION FROM MEDICINE), L. Moser, Blutalkohol v11 n5 p285-311 (Sep 1974)

This experiment involved 80 test persons, who were given normal dosages of a tranquilizer, Prazepam, for three days. For two days thereafter, the dosage was doubled. In group tests and/or by means of apparatus the test persons were repeatedly checked according to a strict time schedule. The validity rating of all methods, especially in respect to the specific psychophysical performance functions which were of interest in this case, was good. In one of the test series, subjects were given alcohol in addition to the medicine. The dosage was 0.75 gr of alcohol per kg of weight (roughly 0.08% of blood alcohol content).

The expected differential results from the experiment indicate that the method that was applied in this case is a good means to obtain meaningful and reliable information economically on the effects of medicine on the intellectual and psychomotoric functions which are essential for driving a vehicle.

IU-71-D0373

TEILSIMULATION ZUR PRÜFUNG DER BEEINTRÄCHTIGUNG DER FAHRTÜCHTIGKEIT UNTER ALKOHOL (PARTIAL SIMULATION IN THE TESTING OF IMPAIRMENT OF DRIVING PERFORMANCE UNDER THE INFLUENCE OF ALCOHOL), P. Kielholz; L. Goldberg; V. Hobi; G. Reggiani, Schweizerische Medizinische Wochenschrift v101 n48 p1725-1731 (1971)

In conditions of selective simulation the effect of alcohol on driving behavior was studied on the basis of the authors' previous field tests. Under the acute influence of a blood alcohol concentration of .08%, a significant decline in performance or an impairment of the adaptation process was observed in both the selective simulation and the field tests.

The results show that the field test can be replaced by partial simulation. This allows experimental observation of the reciprocal effect of disease, medication and alcohol on driving behavior. Attention is also drawn to the possibility of using this method in the psychiatric and forensic fields to determine driving capacity and the effect thereon of disease and/or medication.

IU-74-D0374

INFLUENCE DE LA CONSOMMATION DE MÉDICAMENTS SUR LA CONDUITE AUTOMOBILE (INFLUENCE OF MEDICINAL DRUG CONSUMPTION ON AUTOMOBILE DRIVING), J. Crespy, Organisme National de Sécurité Routière Bulletin n4 p1-17 (Jan 1974)

The author reviews the literature on drugs and driving and draws a number of conclusions. (1) Therapeutic agents, alone, or in combination with alcohol can have adverse effects on performance, and consequently may well be a causative factor in numerous motor vehicle accidents. (2) Laboratory testing for such drug effects often utilizes a select population of volunteers (young males, for example) who do not adequately represent the total population. (3) Various individual testing procedures used in the laboratory may be meaningless and bear no resemblance to actual driving skills. (4) Driving simulators or test batteries may be less than useful in determining drug effects on actual driving situations. (5) The problem must be approached by multidisciplinary, multiagency collaborative efforts.

IU-74-D0375

FAHRTAUGLICHKEIT UNTER DEM EINFLUB VERSCHIEDENER MEDIKAMENTE (DRIVING ABILITY AS INFLUENCED BY VARIOUS DRUGS), G. Hauck; W. Spann, Medizinische Klinik v69 p525-529 (Mar 1974)

The author notes that increases in traffic accidents have run parallel to increases in production and use of prescription drugs. He suggests that a variety of pharmacological classes may have adverse effects on motor vehicle operation, either directly (via altered responsivity, drowsiness, etc.) or indirectly (via behavioral or psychological alterations). The classes of drugs considered active includes: hypnotics, brominated urea derivatives, psychotherapeutic agents (phenothiazines and benzazepines), antihistamines, narcotics, analgesics, corticosteroids, antihypertensives, stimulants, anorexigenic agents, and opthalmologic agents (narcotics, local anesthetics, mydriatics). He recommends that physicians inform their patients of the hazards of such medication, especially in combination with alcohol.

IU-74-D0376

BEEINFLUSSUNG DER FAHRTUCHTIGKEIT DURCH PSYCHOPHARMAKA (INFLUENCE OF PSYCHOPHARMACA ON THE APTITUDE TO DRIVE), P. Kielholz; V. Hobi, Therapeutische Umschau/Revue Therapeutique v31 n9 p606-613 (Sep 1974)

Serial examinations on persons injured in accidents and hospitalized in 14 hospitals in Switzerland revealed that in more than 20% of these people, alco-

hol (.08% and above) played a part. Driving experiments with 200 volunteer policemen of the Basel police corps showed that, with a probability of more than .99, an alcohol concentration of .08% increases serious mistakes by more than 100%. From this fact it must be concluded that alcohol is the most frequently used and the most dangerous toxic substance which interferes with the driving aptitude.

The main danger of the psychopharmacologic agents lies less in their direct effect than in their enhancing the effect of alcohol. Hypnotics, sedatives and analgetics, especially because of their enhancing effect on alcohol, can seriously interfere with a person's driving aptitude. Hypnotics are also dangerous because of their after-effects during the day (fatigue, somnolence, stupor and, in case of overdosage, ataxia). Central stimulants, especially amphetamine and methamphetamine, are contraindicated when driving a vehicle since they may lead to circulatory collapse and unexpected sleepiness. In persons addicted to amphetamines, toxic psychosis with hallucinations and persecution mania occurring with the use of high doses can seriously reduce the driving aptitude.

Various psychopharmacologic agents, particularly those with centrally sedating spectra, such as neuroleptics, antidepressives and tranquilizers, as a rule have an adverse effect on the driving aptitude only at the start of the treatment. In outpatients, these drugs should be prescribed in initially low doses with the principal dose to be given at night.

IU-69-D0377

ARZNEIMITTEL UND FAHRTÜCHTIGKEIT. 1. MITTEILUNG: BARBITURATE (DRUGS AND DRIVING ABILITY. 1. BARBITURATES), R. Bonnichsen; A. Maehly; S. Åqvist, Blutalkohol v6 n3 p165-174 (May 1969)

The results of chemical and medical investigations of drivers who had taken barbiturates are presented. The physician could not detect any signs of medication in only eight of a total of 126 cases investigated.

A short discussion is included of the role of the physician's check-up of the drivers and of the lack of correlation between the barbiturate levels in the blood and the impairment of driving ability. The analytical methods used are briefly described.

IU-69-D0378

ARZNEIMITTEL UND FAHRTÜCHTIGKEIT. 2. MITTEILUNG: ZENTRALSTIMULIERENDE AMINE UND AROMATISCHE KOHLENWASSERSTOFFE (DRUGS AND DRIVING. 2. CENTRAL NERVOUS SYSTEM-STIMULATING AMINES AND AROMATIC HYDROCARBONS), R. Bonnichsen; A. C. Maehly; S. Åqvist, Blutalkohol v6 n4 p245-255 (July 1969)

This article reports the results of chemical analyses of urine samples from drivers who abused amphetamines and related drugs and of blood samples from drivers who had inhaled thinner vapors.

The current widespread abuse of amphetamine and its analogues in Sweden, mainly from i. v. injections, became apparent among drivers in 1966. Up to the end of 1968, positive results were obtained in 105 cases. The analytical methods used in this study for the assay of amphetamine, metamphetamine and phenmetrazine are described and discussed.

The greatest danger to driving ability occurs not during the excitation state of the amphetamine abuser, but during the "down" period where exhaustion and irritation sets in. Any relationship between the results of medical examination and the excretion of the drugs in the urine was obscured by the fact that the samples contained fluoride which made measurements of the pH meaningless. In one case amphetamine could be found in the blood of a driver, taken at least two hours after the injection of the drug.

IU-70-D0379

ARZNEIMITTEL UND FAHRTÜCHTIGKEIT. 3. MITTEILUNG: BENZODIAZEPINDERIVATE (DRUGS AND DRIVING ABILITY. 3. BENZODIAZEPINE DERIVATIVES), R. Bonnichsen; A. C. Maehly; S. Åqvist, Blutalkohol v7 n1 p1-12 (Jan 1970)

This paper reports some results of the physical examination by a police surgeon of over 100 drivers who were suspected to be under the influence of Librium® or Valium®. The blood and urine levels of these drugs are summarized in tables and diagrams. Thin-layer and gas chromatography were used as analytical tools.

The levels of benzodiazepine derivatives in body fluids were considerably lower in the group of drivers who had also consumed alcohol. It must be emphasized that the small amounts of samples sent to the laboratory usually made it impossible to carry out reliable screening procedures. The presence of other drugs can therefore not be excluded in all cases. The concentrations of benzodiazepines in the blood and urine of hospital patients and of autopsy cases are also reported and compared with the data obtained from the drivers.

IU-72-D0380

ARZNEIMITTEL UND FAHRTÜCHTIGKEIT. 4. MITTEILUNG: ÜBRIGE PHARMACA UND ZUSAMMENFASSUNG DER RESULTATE DER 1-4 MITTEILUNG (DRUGS AND DRIVING ABILITY. 4. OTHER DRUGS, AND SUMMARY OF THE RESULTS OF THE 1ST-4TH COMMUNICATIONS), R. Bonnichsen; A. C. Maehly; M. Möller; S. Åqvist, Blutalkohol v9 p8-24 (1972)

This paper contains reports on the chemical and medical examinations of 87 drivers suspected of having driven under the influence of drugs and in some cases, of alcohol as well. The results of chemical analyses alone are reported on an additional 32 drivers.

The drugs found include meprobamate (49 cases), salicylates (31), methaqualone (13), chlomethiazole (15), and tricyclic antidepressive amines (11 cases). Short descriptions of a screening method for drugs in blood and urine, and of techniques for the analysis for meprobamate, salicylic acid and chlomethiazole are given.

IU-61-D0381

UNTERSUCHUNGEN UBER DEN EINFLUB EINIGER VERKEHRSMEDIZINISCH WICHTIGER PHARMAKA AUF DIE MENSCHLICHE LEISTUNGSBEREITSCHAFT (INVESTIGATIONS ON THE INFLUENCE OF SOME DRUGS FREQUENTLY USED BY DRIVERS, ON HUMAN EFFICIENCY), H. Brüner, In Mitteilungen Der Deutschen Gesellschaft Für Verkehrsmedizin. 10. Referat Und Diskussion Anlässlich Der Arbeitstagung Der Sektion "Arzneimittel Und Verkehr", p23-32 (1961)

In a discussion of adverse effects on performance, psychomotor skills, and behavior of a variety of drugs the author emphasizes the need for knowing the effects of the drugs, especially with respect to both time- and dose- response characteristics, their interaction with alcohol, and their interactions with other drugs.

IU-66-D0382

DRIVING UNDER THE INFLUENCE OF ALCOHOL OR DRUGS, Traffic Institute, Northwestern University (1966)

This basic training manual for police contains detailed instructions on how to recognize operating-under-the-influence offenses, and provides guides for enforcement action. Topics covered include: unlawful condition of the driver, what is required for conviction, detecting the violation, defenses by drinking drivers, tests for intoxication, and recording observations.

IU-39-D0383

NACHWEIS DER COFFEINWIRKUNG AUF BLUTALKOHOLGEHALT UND TRUNKENHEIT (DEMONSTRATION OF EFFECTS OF CAFFEINE ON BLOOD ALCOHOL LEVEL AND DRUNKENNESS), H. Elbel, Beiträge zur Gerichtlichen Medizin v15 p14-25 (1939)

Large doses of caffeine (450 mg) acted on a variety of behavioral test systems as basically a stimulant drug. Subjective and objective tests of behavior were affected, as were reaction time measurements. Therapeutic doses of caffeine (100-200 mg) had no such effects, nor did they influence blood alcohol levels or time-decay curves.

IU-68-D0384

ALKOHOL UND MEDIKAMENTE, ARZT UND PATIENT (ALCOHOL AND DRUGS, DOCTOR AND PATIENT) PATIENT), R. Gugler, Medizinische Welt v19 n33-34 p1764-1768 (24 Aug 1968)

A large number of drugs, including sedatives, hypnotic agents, analgesics, psychotherapeutic agents, antihypertensives, stimulants, and anorexigenic agents, alone, or in combination with alcohol, have significant effects on motor vehicle operation. In a study of 3,782 cases, 416 showed combinations of alcohol plus other drugs sufficient to cause adverse effects. The author recommends that physicians advise their patients regarding such problems.

IU-67-D0385

UNFÄLLE UNTER DER EINWIRKUNG VON ARZNEIMITTELN UND ALKOHOL (ACCIDENTS UNDER THE INFLUENCE OF DRUGS AND ALCOHOL), J. Im Obersteg; J. Bäumler, Schweizerische Medizinische Wochenschrift v97 n32 p1039-1042 (1967)

This study concerns 328 patients transferred to the surgical department of a Cantonal Hospital following accidents. From each patient blood samples were taken for determination of blood alcohol, and urine samples for detection of possible drug intake.

Blood samples were alcohol positive in 19% (24% of traffic accidents and 15% of other occupational and non-occupational accidents). In approximately two-thirds of traffic accidents the blood alcohol concentration was over .08%, whereas drug intake before accidents was demonstrated in 4% of patients. In contrast to alcohol concentration, no specific relationship of drug intake to the three accident groups was apparent. Alcohol was a much more important factor than drugs in the various kinds of accident considered.

IU-39-D0386

ALKOHOL UND SEDATIVA (ALCOHOL AND SEDATIVES), H. Peter, Deutsche Zeitschrift für die Gesamte Gerichtliche Medizin v31 p113-154 (1939)

In a study with human volunteers, the author found that a variety of sedative drugs, including phenobarbital, Sedormid®, and diallylbarbituric acid and aminopyrine, all have the ability to potentiate the depressant action of alcohol on a variety of test systems, with no significant effects on the absorption or metabolism of the alcohol.

IU-64-D0387

WISSENSCHAFTLICHE GRUNDLAGEN UND ERFAHRUNGEN BEI GLEICHZEITIGER EINWIRKUNG VON MEDIKAMENTEN UND ALKOHOL (SCIENTIFIC PRINCIPLES AND EXPERIENCES IN THE SIMULTANEOUS EFFECTS OF DRUGS AND ALCOHOL), E. Osterhaus, Medizinische Sachverständige v60 n4 p83-89 (Apr 1964)

Recently, a new problem regarding the disposition of criminal cases has arisen, and this involves the combined effect of alcohol and drugs. A large number of

defendants were attempting to evade prosecution by claiming that certain drugs, either alone or in combination with alcohol, had made them commit offenses, so that they should not be guilty of the charges.

It is the author's belief that these problems have been greatly overestimated, although a drug-alcohol synergism may occur. All problems which arise in this connection should be considered within the framework of the customary judgment of the offender, because if only theoretical and abstract considerations are applied, it will no longer be possible to determine whether an offender is guilty or innocent.

IU-63-D0388

DOIT-ON PRESCRIRE LES TRANQUILLISANTS ET CERTAINS AUTRES MÉDICAMENTS AUX CONDUCTEURS D'AUTOMOBILE? (SHOULD ONE PRESCRIBE TRANQUILIZERS AND OTHER DRUGS FOR AUTOMOBILE DRIVERS?), J. Boyer, Revue du Praticien v13 n7 p795-796 (1 Mar 1963)

Tranquilizers, and certain other drugs, can clearly have adverse effects on motor vehicle operation. The possibility and nature of such effects should be communicated to the public and especially to those patients taking the drugs.

IU-64-D0389

PSYCHOPHARMAKA UND ALKOHOL UNTER BESONDERER BERÜCKSICHTIGUNG VERKEHRSMEDIZINISCHER PROBLEME (PSYCHOPHARMACOLOGICAL DRUGS AND ALCOHOL, WITH SPECIAL CONSIDERATION OF DRIVING PROBLEMS), W. Pöldinger, Praxis v53 n27 p926-934 (1964)

Hypnotics, and composite sedatives and pain-relievers containing them, affect road safety not only directly but also indirectly, in that they potentiate the effect of even small quantities of alcohol. Abuse of these drugs can produce progressive affective and intellectual personality-changes which are incompatible with safety as a driver and which may, moreover, lead to states of confusion when the drug is omitted.

Those of the tranquilizers that do not possess a strong inhibiting effect may, in the lower dosage-ranges, increase driving-skill by virtue of their effect on internal agitation, anxiety and tension. In the presence of mild depression the same may apply to low doses of antidepressants. However, high doses and the additional intake of alcohol may have the reverse effect. A warning is therefore necessary against taking these drugs without medical advice.

Stimulants may counteract the activity-components responsible for the prejudicial effect of these drugs, but in high doses they, too, are prejudicial because of the internal agitation, impairment of concentration, uncertainty, uncoordinated movements and even intoxicated states that they produce.

IU-69-D0390

AUSWIRKUNGEN DER GLEICHZEITIGEN EINNAHME VON ALKOHOL UND ANTIHISTAMINIKA AUF LEISTUNGEN IN VERKEHRSPSYCHOLOGISCHEN TESTS (EFFECTS OF SIMULTANEOUS INTAKE OF ALCOHOL AND ANTIHISTAMINES ON PSYCHOLOGICAL DRIVING PERFORMANCE TESTS), U. Seydel; B. Biehl, Alkohol Und Verkehrssicherheit. Konferenzbericht Der 5. Internationalen Konferenz Über Alkohol Und Verkehrssicherheit pl.85-1.91 (1969)

In two studies with a total of 52 subjects the influence of simultaneous administration of alcohol and antihistaminics in different dosage forms upon performance in tests of driving ability was investigated. Alcohol was administered in the form of vodka of 42%. The expected BAC was .046%, measured 90 minutes after administration. The BAC was measured by means of gas chromatography.

The antihistaminics were administered in two different dosage forms (liquid + candy). In the control test the same subjects were given placebo. The results obtained by analysis of variances are discussed.

IU-68-D0391

PHARMAKOLOGISCHE GRUNDLAGEN DER WIRKUNG VON ARZNEIMITTELN AUF DIE VERKEHRSTÜCHTIGKEIT (PHARMACOLOGICAL PRINCIPLES OF THE EFFECT OF DRUGS ON DRIVING ABILITY), K. Soehring; H. G. Wolters, Handbuch Der Verkehrsmedizin. Unter Berücksichtigung Aller Verkehrswissenschaften, p854-883 (1968)

The authors review the area of drugs and driving, comparing the status of the situation with alcohol with that of other drugs in terms of known pharmacology, analytical methodology, blood level/drug effect relationships and behavioral effects. They conclude that drugs other than alcohol represent a largely unknown situation, although logically, adverse effects on performance should be expected from intravenous anesthetics, sleeping pills, psychotherapeutic agents, antiepileptic drugs, antihistamines, antihypertensive agents, stimulants, insulin and oral hypoglycemic agents, tuberculostatic drugs, and opthalmic diagnostic and therapeutic agents.

IU-70-D0392

ARZNEIMITTELMIBBRAUCH IM STRABBENVERKEHR. DARGESTELLT AM BEISPIEL EINES PKW-FAHRERS MIT AKUTER SCHLAFMITTEL-INTOXIKATION (DRUG MISUSE IN ROAD TRAFFIC. SHOWN IN THE EXAMPLE OF A CAR DRIVER IN A STATE OF ACUTE HYPNOTIC DRUG POISONING), D. Tiess, W. Wolf, Verkehrsmedizin Und Ihre Grenzgebiete v17 n6 p249-259 (1970)

This is a report of a driver, arrested while trying to start his car, who was in a state of acute narcotic drug poisoning, with signs of strong alcoholic intoxication. The high overdoses of drugs, diethylbarbituric acid and isopropyl-lallylbarbituric acid (Dormalon®) and 2-Methyl-3-o-tolyl-4-oxochinazolin (Dormutil®), were taken in an attempt to commit suicide. Observations of the police, findings of the examining physician, and chemical-analytical examinations of blood (54 ppm barbiturate) and urine (250 ppm) samples are reported and discussed. The authors conclude with suggestions for improvement of similar investigations, including preservation of investigative materials.

IU-64-D0393

VERKEHRSGEFÄHRDUNG DURCH PHARMAKA (DRUGS AS A DANGER TO DRIVING), D. Wenckstern, Zeitschrift Fur Arztliche Fortbildung v58 n9 p517-521 (11 Sep 1964)

The author reviews the status of drugs and motor vehicle accidents and concludes that a number of problems exist with regard to the physician-patient relationship in terms of informing patients of adverse effects, as well as making sure of their awareness of drug-alcohol interactions. In addition, he recommends that pharmaceutical industries do more research on drug effects on performance, and disseminate such information. Finally, he defines the need for analytical methodology for measurement of drugs in body fluids and for correlation of drug levels with effects.

IU-64-D0394

KOMBINIERTE ALKOHOL-MEDIKAMENTEN-WIRKUNG UND IHRE BEDEUTUNG BEI VERKEHRSUNFALLEN, W. Pohl (1964)

In a doctoral thesis, the author discusses the possible implications of interactions of sedative and antidepressant drugs with alcohol for safe motor vehicle operation, and draws two conclusions. First, he finds that most of the drugs have additive or synergistic effects when combined with alcohol; these effects lead to impairment of safe motor vehicle operation. Second, he reports that

blood levels of alcohol normally considered below the limit for safe motor vehicle operation, may, in combination with other drugs, actually cause significant impairment of performance.

IU-67-D0395

STRABENVERKEHR, TRANQUILLIZER UND ALKOHOL (ROAD TRAFFIC, TRANQUILIZERS AND ALCOHOL), P. Kielholz; L. Goldberg; J. Im Obersteg; W. Poeldinger; A. Ramseyer; P. Schmid, Deutsche Medizinische Wochenschrift v92 n35 p1525-1531 (Sep 1967)

The authors examined the effects of the combination of doses of 400 mg of meprobamate, 10 mg of chlordiazepoxide, or placebo with alcohol, using 120 volunteers from the Basel police. Measurements were made of blood levels of alcohol and drugs, reaction time, and several subjective tests. The results statistically prove that the alcohol-drug combinations have adverse effects on performance.

IU-73-D0396

INVESTIGATION OF THE EFFECTS OF CARBON MONOXIDE ON HUMANS IN THE DRIVING TASK. FINAL REPORT, F. W. Weir; T. H. Rockwell, Ohio State University Research Foundation (1973)

This investigation of the effects of carboxyhemoglobin (COHb) on human performance involved the testing of 40 subjects on the highway with a battery of real driving situations and/or laboratory tasks related to driving skills. 24 tasks were developed and over 130,000 observations taken to study human performance at carboxyhemoglobin (COHb) levels of nominally 0, 7, 14, and 20%.

Overall the results suggest consistent patterns of performance changes with increased COHb levels. Differences observed with 20% COHb levels were directionally preserved with lower (7 and 14% COHb) levels but with smaller magnitude differences. The results, however, do not suggest a low COHb level where all performance measures are first affected. Rather, the magnitudes and directions of performance changes appear to be highly dependent on the particular task and protocols employed. As expected, laboratory dual tasks (where the subject is required to perform two tasks simultaneously) exhibited performance differences at lower COHb levels than more simple tasks. Since accidents are probably more prevalent when the attention and control demands on the driver are greatest, the dual task results may be more important than results in routine, over-learned driving situations. Strong correlations between performance on simple laboratory tasks and COHb levels were not observed.

Driving performance was categorized into three levels: visual, control, and dynamic response. The results of this research suggest that the largest magnitude effects with increased COHb levels occur at the early stages of information processing. Visual and psychomotor control measures, in general, were the first measures to be affected by COHb. These measures, however, are also the most variable due to large intra- and intersubject variability.

IU-68-D0397

ARZNEI- UND GENUBMITTEL-ABHÄNGIGKEIT BZW. -MIBBRAUCH IM STRABENVERKEHR (DRUG AND NON-MEDICINAL STIMULANT DEPENDENCE AND ABUSE IN ROAD TRAFFIC), H. J. Wagner, Handbuch Der Verkehrsmedizin. Unter Berücksichtigung Aller Verkehrswissenschaften, p884-895 (1968)

In considering the possible implications of drug dependence and drug abuse problems for the highway safety picture, the author limits his discussion and review of the literature to alcohol and the narcotic agents. In this regard, two aspects must be considered: the pharmacological actions of the drugs themselves, especially in terms of chronic usage, and, the effect that chronic usage may have on the personality/behavior of the user.

IU-67-D0398

I PERICOLI DELL'AUTOTERAPIA NEL PILOTA. FARMACI CHE POSSONO CONTROINDICARE L'ATTIVITA' DI VOLO E DI CUI E' PIU' FREQUENTE L'ASSUNZIONE SENZA CONSIGLIO MEDICO (DANGERS OF SELF-MEDICATION BY PILOTS. DRUGS THAT CAN COUNTERINDICATE FLYING ACTIVITY, AND WHICH ARE MOST FREQUENTLY TAKEN WITHOUT MEDICAL ADVICE), G. Valletta, Rivista di Medicina Aeronautica e Speziale v30 p54-88 (1967)

The author surveys some characteristics of the standard psycho-physiological profile of flying personnel as they relate to the phenomena of self-medication. He reports the possible causes of self-medication, defining this term to mean the self-administration of drugs without medical advice or control.

The drugs most prone to be used through self-medication are divided according to their pharmacologic action, and their potentially dangerous effects on flyer performance are mentioned. The drug classes considered included: analgesics/antipyretics, analeptics, local anesthics, antiarthritic agents, antihistamines, antibiotics, antifungal agents, antiprotozoal agents, antihelminitic agents, cardiovascular agents, hormones, parasympathomimetic agents, parasympatholytic agents, sympathomimetic agents, sympatholytic agents, hypnotics/sedatives, major and minor tranquilizers, antidepressants, serum vaccines and diagnostic agents.

Some cases of dangerous self-medication of flying personnel were reported. The author concludes by stressing the necessity of this field being controlled by doctors specializing in aviation medicine.

IU-71-D0399

ALKOHOLGENUB BEI LANGZEITBEHANDLUNG. TOXIKOLOGISCHE PROBLEME DES ÄRZTLICHEN ALLTAGS (ALCOHOL INGESTION DURING LONG-TERM TREATMENT. TOXICOLOGICAL PROBLEMS OF MEDICAL PRACTICE), R. Schüppel, Verkehrstüchtigkeit Und Langzeittherapie. Beiträge Aus Pharmakologischer, Gerichtsmedizinischer, Internistischer, Neurologischer, Dermatologischer Und Psychiatrischer Sicht, p39-60 (1971)

The authors caution physicians who are prescribing therapeutic agents such as neuroleptics, thymoleptics, hypnotics, sedatives, stimulants, appetite depressants, narcotics, antiepileptics, antihistamines, antiemetics, antiasthmatics, analgesics, antipyretics, muscle relaxants, antidiabetic agents, and anticoagulants, especially when used in long-term therapy, to warn their patients of the possible adverse effects of combination with alcohol. One source of information/identification of adverse effects is traffic accidents implicating the alcohol-drug interaction as a cause.

IU-67-D0400

KOMBINATIONSVIRKNINGEN AF ALKOHOL 06 PSYKOFARMAKA. EN GENNEMGANG AF 15 ÄRS SAGER FORELAGT RETSLAEGERÅDET (COMBINED EFFECT OF ALCOHOL AND PSYCHOPHARMACOLOGICAL DRUGS. A REVIEW OF CASES SUBMITTED TO THE MEDICO-LEGAL COUNCIL IN A 15-YEAR PERIOD), N. Reisby, Ugeskrift for Laeger v129 n4 p109-117 (26 Jan 1967)

Cases involving the combined effect of alcohol and psychopharmacological drugs submitted to a medico-legal council during a 15-year period are reviewed. The material comprises 182 cases involving 258 combinations of drugs with alcohol. 90% of the cases were traffic offenses, 13 involved offenses such as violence, theft, and indecency, and in 8 cases, the council had to express an opinion as to the cause of death.

In 37 cases the blood alcohol content was low enough to discount the possibility that alcohol alone was responsible, leading the council to conclude that a drug-alcohol synergistic effect was involved. Alcohol alone was believed to be responsible in 67 cases, and in 5 cases, the council could not discount the possibility that an abnormal condition was present. In all 8 cases where death occurred, the medico-legal council believed that death was due to combined drug-alcohol intoxication.

IU-68-D0401

DIE BEEINFLUSSUNG DER VERKEHRSTÜCHTIGKEIT DURCH PSYCHOTROPE PHARMAKA (INFLUENCE OF PSYCHOTROPIC DRUGS ON DRIVING ABILITY), W. Pöldinger; W. Sutter, Pharmakopsychiatrie Neuropsychopharmakologie v1 n3 p223-231 (1968)

In an extensive review of the literature, the authors conclude that there are three ways in which psychoactive drugs can have an adverse effect on motor vehicle operation, as indicated by a variety of behavioral and psychomotor test systems: (1) directly, by virtue of their endogenous pharmacological activity, (2) indirectly, by virtue of tolerance, withdrawal, or alteration of behavioral function, and (3) by interaction with alcohol.

IU-66-D0402

PHYSICIAN AND AUTOMOBILE SAFETY, A. J. Mirkin, GP v34 n3 p120-126 (Sep 1966)

Treatment and rehabilitation of the victims of automobile accidents constitute only part of the responsibility of the medical profession; physicians should also adopt a preventive approach to accidents. Limitations in driving an automobile may develop in abnormal physiological states, in chronic and acute illnesses and injuries, in emotional disturbances, and in the use of alcohol and drugs.

Certain drugs which are capable of altering the physiological or psychological characteristics of drivers are mentioned, and these include barbiturates, local anesthetics, stimulants, antihistamines, sulfonamides and antibiotics, hallucinogens, and carbon monoxide. The author recommends that physicians serve as consultants to automobile manufactureres, state motor vehicle administrators, and state and national legislative bodies.

IU-64-D0403

EFFECTS OF THE ABUSE OF NARCOTIC DRUGS ON ACCIDENTS IN GENERAL AND ON ROAD ACCIDENTS IN PARTICULAR, United Nations Economic and Social Council, Commission on Narcotic Drugs (1964)

At its eighteenth session, the Commission on Narcotic Drugs instructed the Secretariat to collect information on the effects of narcotic drugs on accidents, particularly traffic accidents. This report briefly describes the material which was found, and a list is included of specific information relevant to the problem.

IU-65-D0404

TABLETTENRÄUSCHE AM STEUER? (UNDER THE INFLUENCE OF PILLS AT THE WHEEL?), Auto v11 p601-602 (Nov 1965)

A paper was delivered by Prof. P. Kielholz, director of the Psychiatric Clinic at Friedmatl, Basel, during a symposium held by the Swiss Automobile Club in Luzern in October 1965. In it, he emphasized that side-effects of commonly used drugs may continue for as long as 30 hours. Pain killers and sleeping pills, he noted, should be used only early in the evening, if the person expects to drive the following day.

Prof. W. Hiigin, an anesthesiologist at Bürgerspital, Basel, mentioned that a similar impairment of driving may result from local anesthetics, such as those used by dentists, if they are used in conjunction with other drugs or alcohol. He observed that drugs used to lower blood pressure may also inhibit brain functions; the Rauwolfia alkaloid reserpine is one such drug.

IU-64-D0405

DRUGS, DRINK, AND DRIVING, British Medical Journal v2 p740 (19 Sep 1964)

In answer to a question whether a patient taking 300 mg of chlorpromazine and 3 mg of haloperidol daily should avoid alcohol and refrain from driving, the Journal responds in the affirmative. The effects of alcohol are additive with other drugs which depress the central nervous system, and therefore any patient who is taking a sedative or tranquilizer is well advised to take alcohol very sparingly or not at all. The same applies to driving after taking a drug which affects the central nervous system, since the patient may find himself liable to a charge of driving while under the influence of drugs.

IU-67-D0406

COMBINED EFFECT OF ETHANOL AND OTHER DRUGS, R. B. Forney, The Prevention of Highway Injury, M. L. Selzer, ed., p70-77 (1967)

Insufficient attention has been paid to the effects of combining alcohol with drugs, especially tranquilizers. While such drugs diminish anxiety, they also diminish performance. Tests on humans and animals to determine these effects are described. The difficulties of testing impairment of driving ability are discussed.

IU-68-D0407

OCCURRENCE OF SOME DRUGS AND TOXIC AGENTS ENCOUNTERED IN DRINKING DRIVER INVESTIGATIONS, B. S. Finkle; A. A. Biasotti; L. W. Bradford, Journal of Forensic Sciences v13 n2 p236-245 (Apr 1968)

A report of the frequency of occurrence of drugs in 3,409 routine drinking driver investigations in Santa Clara County, California, during 1966 is presented. 705 (21 percent) cases involved 713 drug occurrences as indicated by police investigation. These drugs have been tabulated in 20 groups according to their physiological action.

In the fraction of cases in which the blood alcohol concentrations were less than 0.15% w/v, and the subjects exhibited definite symptoms of intoxication, 21% of the cases, through screening tests, were found to have a significant concentration of other drugs in the blood sample submitted for alcohol analysis.

IU-66-D0408

TOXICOLOGICAL STATISTICS FOR BARBITURATES, OTHER SEDATIVES, AND TRANQUILLIZERS IN ONTARIO. A 10-YEAR SURVEY, R. C. Gupta; J. Kofoed, Canadian Medical Association Journal v94 n16 p863-865 (16 Apr 1966)

A steady increase in the number of cases of poisoning due to barbiturates, tranquilizers and non-barbiturate sedatives has been noted for Ontario by the Attorney-General's Laboratory, Toronto, during the period 1955-1964 on the basis of submitted material. Five cases of poisoning by barbiturates were recorded in 1955 and 193 in 1964.

Urine and blood samples from persons charged with driving motor vehicles while under the influence of drugs were also examined. In 1958 only one such case was reported to the Laboratory, whereas 25 cases were recorded in 1964; barbiturates were detected in 18 of these 25. Patients must be warned of the risks of ingesting alcohol while receiving barbiturate treatment.

IU-65-D0409

ALCOHOL, CNS-ACTIVE DRUGS AND DRIVING SKILL, L. Goldberg, Fourth International Congress of the International Federation for Hygiene and Preventive Medicine, May 26, 1965, Vienna, p369-371 (1965)

A preliminary report is given of a study made on the effect of alcohol, CNS-active agents, and combinations of alcohol and drugs on driving skill. Field and laboratory experiments were carried out. Tests included rating of subjective mood estimates, objective performance, and physiological functions. The drugs used had no influence on the blood alcohol curve. All tranquilizers tested, except chlordiazepoxide, brought about a synergistic effect with alcohol. Chlordiazepoxide had an antagonistic effect and decreased impairment, thus improving performance.

IU-69-D0410

DRUGS IN DRINKING DRIVERS. A STUDY OF 2,500 CASES, B. S. Finkle, Journal of Safety Research v1 n4 p179-183 (Dec 1969)

Of more than 10,000 routine drinking driver investigations conducted in Santa Clara County, California during 1966, 1967 and 1968, approximately 2,500 cases involving 2,700 drug occurrences were studied. Salient facts from a breakdown of the cases are presented including the tabulation of occurring drugs according to their physiological action and numeration of "dangerous drugs" encountered.

In addition to requests by police for alcohol and/or drugs analyses, analytical data was compiled from the fraction of the total cases in which the blood alcohol was less than 0.15% w/v, and the subjects exhibited definite symptoms of intoxication. This data is evaluated. A distribution by age and sex of those individuals in which drugs were detected is made, and the administrative usefulness and judicial outcome of the cases noted, to be possibly used as a guideline in selecting future cases for analysis.

IU-63-D0411

INFLUENCE OF TWO SELECTED TRANQUILIZERS ON DRIVING SKILLS, W. J. Huffman; A. E. Florio; J. L. Payne; F. E. Boys, American Journal of Psychiatry v119 p885-886 (Mar 1963)

This study was designed to test the behavioral effects of normal or double the normal dosage of a relatively new tranquilizer, hydroxyphenamate (Listica), on reaction time, visual acuity, and hand steadiness. Hydroxyphenamate was compared with both a placebo and meprobamate. The three materials were provided in tablets of identical appearance, and one contained 200 mg or 400 mg of hydroxyphenamate, the second 400 mg or 800 mg of meprobamate, and the third was the placebo tablet.

25 healthy young adults, 15 males (mean age 22.5 years) and 10 females (mean age 20.5), were selected from student volunteers. The tablets were administered according to a double-blind counterbalanced design so that each subject served as his own control. After the performance of psychomotor tests which measured 16 different variables, analysis of the results led the authors to conclude that under the conditions of this experiment, hydroxyphenamate had no significant effect on the performance of the subjects, either at normal or double the normal dosage.

IU-71-D0412

ALCOHOL, CARBON MONOXIDE AND DRUGS IN ROAD-FATALITIES, T. E. Naess-Schmidt, Blutalkohol v8 p318-336 (1971)

Results are presented of a study of the occurrence of alcohol, carbon monoxide and drugs in 301 autopsied victims of 288 road accidents in Denmark. Of the persons killed, 273 had been responsible for their deaths. These subjects, together with 18 drivers of passengers who were killed, and 231 other parties involved were subjected to blood testing for alcohol. The tests were positive in 36.2% of the accidents. Blood alcohol concentrations of 0.1% or over were found in subjects involved in 21% of the accidents, while concentrations of 0.05% or over were seen in subjects involved in 30% of the accidents.

The distribution of blood alcohol concentrations according to age, sex and type of road user is presented in tabular form, and the distribution of blood alcohol concentrations over the 12-month period, the average week and the average 24-hour period is shown in diagrams. The rate of positive blood alcohol concentrations was twice as high in the subjects killed as in the other parties involved. At least 93% of the subjects killed who showed blood alcohol concentrations of 0.05% or over had caused their own deaths, as compared with 63% of the subjects who had no alcohol in their blood. Presence of carbon monoxide and barbiturates was found in only a few of the subjects. Meprobamate, in small quantities, was seen in a few subjects but no other drugs were detected.

IU-67-D0413

DRUGS AND ROAD ACCIDENTS, A. A. Larsen; P. M. Ransford, British Columbia Medical Journal v9 n6 p204-206 (June 1967)

In order to escape legal action, patients may claim that their impaired driving ability was caused by drugs prescribed by their physicians, and this problem is explored in this article. Those drugs which can affect the central nervous system and therefore impair driving ability are listed, and the dangers of taking alcohol in combination with various medications is described. The importance of physicians' warning their patients that drugs may decrease their driving skill and that certain side effects of drugs can affect driving are stressed.

IU-71-D0414

STUDY ON ARRESTS AND DISPOSITION OF ALCOHOL-DRUGS AND DRIVING CASES IN NEW YORK STATE, B. Newman; A. Dihrberg; J. Rivo, Police v16 p47-52 (Nov 1971)

The New York State Traffic Safety Council and the New York and Suffolk County Police Departments undertook an intensive evaluation of arrests and dispositions of drunken driving and drug cases in New York for 1968 and 1969. The survey was undertaken to evaluate the police, district attorneys' and magistrates' roles in dealing with motorists who were arrested for driving while intoxicated or driving while ability was impaired by alcohol or drugs.

From an examination of the data it became apparent that the problem of the drunken and drugged driver in New York is far from being solved or even attacked. Various recommendations are offered by the authors, including: statewide conferences to determine the most effective method of dealing with these offenders, more vigorous prosecution, amendment of the implied consent law, obligatory determination of blood alcohol levels of persons involved in fatal automobile accidents, more reliable research on drugs and driving, and greater exposure of the public to the dangers of drugs and driving.

IU-58-D0415

EXPLORATORY STUDY OF THE BEHAVIORAL EFFECTS OF SUAVITIL® (BENACTYZINE HYDROCHLORIDE), G. W. J. Smith; L. Uhr; J. C. Pollard; J. G. Miller, University of Michigan Medical Bulletin v24 n10 p402-407 (Oct 1958)

Four groups of subjects -- six normal, six anxious, six depressed, and six obsessive-compulsive neurotic -- were tested for the effects of a single 2.5 mg dose of Suavitil® (benactyzine hydrochloride), an antianxiety agent, on 59 behavioral and cognitive or personality variables. Eighteen tapping scores and at least three independent cognitive factors were analyzed. Further testing allowed comparisons on 41 variables, evaluating driving proficiency, reaction times, visual acuity, steadiness, tempos, figural after-effects, anxiety, and perception.

Because of the small number of subjects tested in each group, the results were not subjected to any tests for statistical significance, but merely treated as indicative of hypotheses for future testing. There may have been some tendency for improvement in performance under Suavitil® throughout the groups, with the obsessive-compulsive neurotic subjects showing the greatest gains.

IU-64-D0416

DRUGS-THE DEADLY HIGHWAY MENACE, B. Swart, Fleet Owner v59 n5 p75-90 (May 1964)

The purpose of this article is to spotlight the problem of amphetamine misuse by truck drivers, and to bring about vital legislative and enforcement changes, as well as internal improvements in fleet administration. The psychological and physiological effects of amphetamines are described, and their ready availability to truck drivers and others is described. It is pointed out that 90% of illegal amphetamine distribution goes to or through truck drivers, and large quantities are sold by truck drivers themselves.

Weak federal drug laws provide insufficient control over illegal amphetamine distribution, and the only federal body with any jurisdiction over illegal sales, the Food and Drug Administration, admits its efforts have been largely ineffectual so far. Before the problem is solved, many changes will be necessary in federal and state laws to provide stronger enforcement, and these include changes in drug marketing, and improvements in fleet hiring, supervision, and driver education. Fleets must encourage by word and deed active cooperation with federal and state authorities. Full participation in state and regional trucking groups can bring about effective laws to cut off the supply of amphetamines, and bring about an enlightened industry-wide program of education.

IU-67-D0417

DRUGS AND OUR AUTOMOTIVE AGE, Food and Drug Administration, Dept. of Health, Education, and Welfare, F.B.I. Law Enforcement Bulletin, v36 p16-18 (Apr 1967)

The Food and Drug Administration is concerned over the increasing threat to highway safety from drivers under the influence of drugs. Drugs involved include narcotics, stimulants, tranquilizers, barbiturates, sedatives, and antihistamines. Uncontrolled use of these drugs is a danger to the health and welfare of the user and the safety of others.

IU-54-D0418

EFFECTS OF CERTAIN DRUGS USED IN SELF-MEDICATION IN RELATION TO DRIVING PERFORMANCE AND TRAFFIC HAZARDS, G. R. Wendt, Health, Medical and Drug Factors in Highway Safety. Proceedings of Second Highway Safety Research Correlation Conference, Washington, p2.26-2.31 (April 1954)

The author describes his research with barbiturates, antihistamines, and analeptics, including studies on self-medication of his staff. It is his opinion

that seconal in small doses would be good for anxious drivers, but extremely bad for reckless drivers and those with dangerous driving habits. Antihistamines are probably dangerous only for certain kinds of drivers, and then only for occasional lapses. Some of the opium derivatives have an initial effect on motor incoordination and bad judgment which may later cause occasional lapses due to drifting attention. Pyrahexyl compound, which has effects similar to marijuana, should never be given to a person unless he can be kept under complete surveillance indoors since it has a very marked effect on reducing flexibility of mental set.

IU-66-D0419

TRANSPORT DRIVERS AND "PEP PILLS", B. E. Christophers, Medical Journal of Australia v2 n6 p287-288 (1966)

The author of this letter disputes the contention that the use of amphetamines by truck drivers may be a serious problem due to the impairment of driving ability; instead, they may have actually prevented road accidents. If it is indeed determined that a problem exists, then regulations should be established which specify blood or other levels of the drug, as is done with alcohol.

IU-63-D0420

DRIVING WHILE UNDER THE INFLUENCE OF DRINK OR A DRUG, Republic of Ireland, Commission on "Driving Under the Influence of Drink or a Drug", Republic of Ireland Govt. Stationary Office, Dublin (1963)

This Commission was appointed to investigate and to report on the feasibility of fixing a standard by reference to the blood alcohol level or any other test, to constitute drunkenness for the purpose of the drunk driving offense. The legislative measures which might be taken to deal with the offense of driving, attempting to drive, or being in charge of a vehicle in a public place while under the influence of drink or a drug, were also investigated, and these included objective tests of drunkenness, graded offenses according to the degree of intoxication, penalties, and method of trial and court procedure.

Topics covered in the report include: the present law; the dimensions of the problem of drink and driving; effects of alcohol and the assessment of those effects; effects of drugs and fatigue; effectiveness of present measures; use of blood-alcohol level as evidence of impairment of driving capacity; determination of blood-alcohol level and its presentation as evidence; and conclusions and recommendations on major issues.

IU-68-D0421

DOSE RESPONSE STUDY OF DIAZEPAM (VALIUM®) AND 4306 CB (TRANXILEN®) DURING PROLONGED SIMULATED CAR DRIVING, I. Dureman; P. A. Björkstrand; G. Stening; K. Westholm (1968)

The aim of this study was to compare the effects of two sedative drugs, Diazepam (Valium®) and 4306 CB (Tranxilen®), during prolonged simulated car driving, on performance (speed, steering errors and reaction time); physiological activation level (respiratory frequency, skin conductance level, heart rate); and subjective experience. The subjects drove the simulator for three hours two days in succession. The doses for both Diazepam and 4306 CB were varied from the first day to the second.

The results show that there is a tendency for the Diazepam groups to have better performance (no less steering errors in spite of lower speed for the 4306 CB groups). In general the 4306 CB drug had a tendency to lower the physiological activation level compared to the corresponding Diazepam dose levels. On the scale of objective experience the 4306 CB group in general estimated themselves more on the negative dimension of the scale than the corresponding Diazepam groups.

IU-69-D0422

DRUGS AND DRIVING, T. B. Sirnes, Alkohol Und Verkehrssicherheit. Konferenzbericht Der 5. Internationalen Konferenz Über Alkohol Und Verkehrssicherheit p3.39-3.43 (1969)

Legal action resulting from driving a motor vehicle while intoxicated by a drug or by a combination of a drug and alcohol was taken against 21 individuals in Norwegian courts during the period of 1963-1966. In 20 cases a collision or peculiar driving behavior was the reason for stopping the driver. The remaining case was related to dangerous parking. This report is concerned with the degree of drug involvement in these cases, and in each of the 21 instances, the author diagramatically outlines the nature of the infraction, the type and degree of drug involvement, the presence or absence of alcohol, the proof of involvement, and the subsequent legal action taken against the offenders.

In some cases there was evidence of multiple drug indulgence, and of these, a few had also partaken of alcohol. Drugs found to be involved, either alone or in combination, included: barbiturates (e.g., apobarbital, cyclobarbital, amobarbital, phenobarbital), meprobamate, chlordiazepoxide (Librium®), diazepam (Valium®), amitriptyline, methadone, disulfram, a chloral hydrate preparation (Bonadorm®), and an unspecified type of sleeping pill.

IU-54-D0423

ANTIHISTAMINES AND ALCOHOL, British Medical Journal, v1 p403 (13 Feb 1954)

This anecdotal report of a driver arrested for driving under the influence of drugs or alcohol stresses the importance of physicians' warning their patients about the effects of drugs prescribed. Defendant suffered disorientation as a result of drinking alcohol after taking antihistamines which his physician prescribed with no warnings or qualifications except the number and rate the pills were to be taken.

IU-68-D0424

RESEARCH ON THE EFFECTS OF ALCOHOL AND DRUGS ON DRIVING BEHAVIOUR AND THEIR IMPORTANCE AS A CAUSE OF ROAD ACCIDENTS, L. Goldberg; J. D. J. Harvard, Organization for Economic Co-Operation and Development (1968)

This report, prepared by the O.E.C.D. Research Group on the Effects of Alcohol and Drugs on Driver Behaviour, deals mainly with the relation of alcohol to road accidents, and includes a discussion of methods used for determination of alcohol in the body. The relation of drugs to road accidents is also discussed, and a section is included on the effects of combining drugs and alcohol. Various recommendations for a research program are offered, including projects for coordinated joint research.

IU-68-D0425

ALCOHOL, DRUGS AND PSYCHOLOGICAL FACTORS INFLUENCING DRIVING ABILITY, M. Tyndel, Ontario Medical Review v35 n9 p458-461 (Sep 1968)

In this article on impaired driving, the author first discusses the notion of driving ability, and its relation to both alcohol and drug usage. Not only the confirmed alcoholic, or person with an alcoholic problem, but everyone else should be warned that drinking and driving do not mix, regardless of the type and amount of alcoholic beverage. Drugs of any type and description, not only those specifically known to interfere with the user's driving ability, should be used only under strict medical supervision, with the doctor and patient closely cooperating to prevent any adverse drug effect with respect to driving ability. The same close cooperation is needed to prevent emotional factors from interfering with a person's driving ability.

IU-69-D0426

PSYCHOACTIVE DRUGS AND TRAFFIC ACCIDENTS. A STUDY OF PERSONS DEPENDENT ON STIMULANTS, DEPRESSANTS, TRANQUILLIZERS AND ALCOHOL, R. G. Smart; W. Schmidt; K. Bateman, Alkohol Und Verkehrssicherheit. Konferenzbereicht Der 5. Internationalen Konferenz Über Alkohol Und Verkehrssicherheit p3.45-3.51 (1969)

This study examined the accident rates of 30 psychoactive drug abusers seen at a clinic in Toronto. The group included persons addicted to or dependent on barbiturates, tranquilizers and stimulants; half were also dependent on alcohol. All 30 were interviewed as to their driving accidents and driving exposure (miles driven per year); accidents were checked with official records and good agreement was achieved. Expected accident rates per mile driven were computed for age and sex groups separately and the observed rates were compared with them.

The psychoactive drug abusers had accident rates about twice as high as expected for their age, sex, and driving exposure. Most of the excess was contributed by those addicted to amphetamines (alone or in combination), whereas those addicted to alcohol and barbiturates, barbiturates only or tranquilizers only had lower rates than expected.

IU-63-D0427

EFFETS OF DIAZEPAM (VALIUM®) AND ALCOHOL ON PSYCHOMOTOR PERFORMANCE, M. P. Lawton; B. Cahn, Journal of Nervous and Mental Disease v136 n6 p550-554 (June 1963)

In this study twenty male subjects were given a battery of four psychological and psychomotor tests on the fourth day of medication with each of four treatment conditions: 1) placebo pill - placebo drink, 2) placebo pill - alcohol (three ounces of 100-proof vodka in fruit juice), 3) Valium® - placebo drink and 4) Valium® - alcohol. Tests consisting of a cancellation test, digit symbol test, addition test and a pegboard placement test were administered.

The results demonstrated a small but statistically significant tendency for psychomotor performance to be influenced by the Valium® medication, whether with alcohol or placebo drink. There was, however, no evidence to suggest a potentiating decrement of performance with a combined dosage of Valium and alcohol.

IU-64-D0428

DEXTRO-AMPHETAMINE, ETHANOL AND DEXTRO-AMPHETAMINE-ETHANOL COMBINATIONS ON PERFORMANCE OF HUMAN SUBJECTS STRESSED WITH DELAYED AUDITORY FEEDBACK (DAF), F. W. Hughes; R. B. Forney, Psychopharmacologia v6 n3 p234-238 (1964)

Mental tests were given to eight human subjects in a delayed audiofeedback stress situation, and their performance quantified under the influence of d-amphetamine (20 mg) and/or ethanol (45 ml/150 lb). Ethanol impaired performance; D-amphetamine had relatively no effect. When given in combination with ethanol, no clear evidence of antagonism by d-amphetamine was found; in fact, in the simple addition test, a synergistic effect was noted.

IU-72-D0429

SPECIAL ACCIDENT INVESTIGATION STUDIES. THE ROLE OF ALCOHOL/DRUG INVOLVEMENT, R. S. Sterling-Smith; J. C. Fell, National Highway Traffic Safety Administration (1972)

The NHTSA sponsored special accident investigation studies on the alcohol/drug involvement problem in the cities of Albuquerque, Baltimore, and Boston. These studies were in coordination with ongoing ASAP projects in each of the three cities. The first year's effort at Boston is described.

A total of 50 accidents involving a fatality during an 8-month period in the Boston ASAP area were investigated. A Human Factors Index (HFI) was determined via interviews, records, and questionnaires on each driver designated to be "at-fault" in the accident. A hypothetical "modal" operator is described based upon the entire sample.

42% of the focal operators were under the influence of alcohol at the time of the crash; and 60% of the focal operators indicated chronic risk taking behaviors. 62% of the alcohol involved operators were considered to be "problem drinkers." Implications pointed to new areas of possible identification criteria for the Boston ASAP. A proposed two-year continuation of the study is described.

IU-73-D0430

COLLECTION OF BASELINE DATA ON EFFECT OF ALCOHOL CONSUMPTION ON TRAFFIC ACCIDENTS. DISCUSSION, J. A. L. Gilbert, Conference on Medical, Human and Related Factors Causing Traffic Accidents, Including Alcohol and Other Drugs. May 30-31, 1972, Montreal, Canada. Proceedings, p49-54 (1973)

This paper is a discussion of two studies based on data gathered at the emergency room of the Royal Alexandra Hospital in Alberta, Canada. The first study involved the use of the breathalyzer and was concerned only with alcohol use, and the second employed blood examinations in an attempt to determine alcohol level, as well as the presence of various drugs including bromides, salicylates, Valium®, Librium®, barbiturates, and phenothiazines.

It was found that 20-25% of the population had been drinking, 11% had been taking various drugs, and 8% were using salicylates or aspirin. The author feels that the dangers of mood-altering drugs and alcohol call for society, the government, and its supporting agencies to come to grips with this crucial problem and to propose countermeasures for it.

IU-73-D0431

INTERACTION OF ALCOHOL AND DRUGS AND TRAFFIC SAFETY, L. Goldberg, Conference on Medical, Human and Related Factors Causing Traffic Accidents, Including Alcohol and Other Drugs. May 30-31, 1972, Montreal, Canada. Proceedings (1973).

The study of the involvement of alcohol and drugs in traffic safety and traffic injuries from an epidemiological point of view not only shows the importance of alcohol intake, alcoholism, and the rising role of the interaction between alcohol and drugs, but also serves to disclose some of the underlying mechanisms in the intricate pattern of different social events and their interaction with other social phenomena and with the direct interplay between drugs and the individual.

IU-73-D0432

INTERACTION BETWEEN ALCOHOL AND DRUGS, AND THEIR RELATIONSHIP TO DRIVING. DISCUSSION, G. M. Ling, Conference on Medical, Human and Related Factors Causing Traffic Accidents, Including Alcohol and Other Drugs p131-135 (1973)

Various studies on the interactions between alcohol, barbiturates, antidepressants, and tranquilizers on cognitive performance and psychomotor behavior are described. The author's study of the effects of cannabis, alone or in combination with alcohol, on certain perceptual-motor skills related to driving is also discussed. Preliminary results indicate that alcohol alone, at the blood level of 50 mg/100 ml, has little effect on performance, but there was a marked inter-subject variation in performance after smoking the low cannabis dose. The high dose of cannabis induced an increase in reaction time, acquisition time, and settling time. The combination of alcohol and either dose of cannabis resulted in much worse performance times than those observed with either agent alone.

The author concludes that cannabis and alcohol can enhance the effects of the other drug, and the combined use of these agents can result in decreased psychomotor performance. However, more research is needed to characterize the interactive effects of cannabis and alcohol, and to draw firm correlations between the study of drug effects on psychomotor skills in an experimental laboratory setting and actual driving behavior under authentic conditions.

IU-73-D0433

PANEL DISCUSSION ON RESEARCH PRIORITIES IN CONTROLLING EFFECT OF ALCOHOL AND DRUGS ON DRIVER BEHAVIOR, A. F. W. Peart; L. Goldberg; J. D. J. Harvard; J. L'Hoste; R. B. Voas; C. M. Stroh; P. J. Farmer, Conference on Medical, Human and Related Factors Causing Traffic Accidents, Including Alcohol and Other Drugs, May 30-31, 1972, p151-161 (1972)

This panel discussion touches upon such topics as the effects of carbon monoxide on driving performance, the "Spare Capacity Model" of traffic accidents, the synergistic effects of Valium® and Librium® with alcohol, the relative importance of drugs as causes of traffic accidents, the question of controlled data on exposure, drinking patterns of the French, and the difficulty of detection and measurement of drugs.

IU-72-D0434

SYNERGISTIC EFFECTS OF ALCOHOL, METHAPYRILENE, AND CHLORDIAZEPOXIDE ON DRIVERS' EYE MOVEMENTS AND TRACKING ERRORS IN SIMULATED DANGEROUS SITUATIONS, S. R. Schroeder; J. A. Ewing; B. A. Rouse; P. Ball; J. A. Allen, Highway Safety Research Center (1972)

Thirty male college undergraduate volunteers repeatedly tracked a segment of the Aetna Training Film Traffic Strategy with the Aetna Drivo-Trainer Station. Simultaneously, their eye movements were recorded. Single low doses of antihistamine (methapyrilene, .7 mg/kg) and tranquilizer (chlordiazepoxide, i.e., Librium®, .2 mg/kg) were administered on different days in combination with placebo or ethyl alcohol (70 mg%).

While there were no significant effects of these low doses on steering, accelerating, decelerating, or braking errors, there were significant effects of drugs on eye movements and blink rate. Chlordiazepoxide increased eye movements, alcohol suppressed eye movements, while synergistic combinations of alcohol with antihistamine and chlordiazepoxide had intermediate effects.

The main effects of alcohol were to suppress large amplitude eye movements correlated with stimuli occurring in the periphery. There was a significant negative correlation between driving errors and the ratio of the frequency of long to short discursive eye movements. This suggests that a maladaptive effect of low alcohol concentrations may be to decrease detection of peripheral dangerous events when visual load is high, as in congested traffic. The antagonistic effects of alcohol combined with antihistamine or chlordiazepoxide suggests that a more thorough examination of the synergistic effects of these drugs should be made in terms of critical dose level, rate dependency, and tolerance effects.

IU-74-D0435

COMBINED EFFECTS OF ALCOHOL AND COMMON PSYCHOACTIVE DRUGS. FIELD STUDIES WITH AN INSTRUMENTED AUTOMOBILE, A. M. Smiley, National Research Council, National Aeronautical Establishment (1974)

This study was undertaken to determine the effects of alcohol (at .06% BAC) alone and in combination with 50 mg diphenhydramine (an antihistamine), 5 mg diazepam (a sedative), and 1.5 g marihuana on both high- and low-speed driving in an instrumented car. Driving was also performed under a placebo condition. 8 subjects, 6 male and 2 female, ranging in age from 19-27, participated in the

experiments. All subjects were experienced drivers and acquainted with the use of both alcohol and marihuana. The design of the experiment was a Latin square so that practice effects would be balanced over all the drug conditions.

The drug conditions in order of decreasing mean driving speed were: placebo; alcohol; alcohol with diphenhydramine; alcohol with diazepam; and alcohol with marihuana. The drug conditions in order of decreasing mean steering movements were: alcohol with marihuana; alcohol and diphenhydramine; alcohol; placebo and alcohol; and diazepam. Another measured index, peak frequency, shifted to higher frequencies with increasing task difficulty or increasing effort at the task. The means in order of increasing peak frequency were alcohol and diazepam; alcohol; alcohol and diphenhydramine; alcohol and marihuana; and placebo. Responses to a secondary task light, driving maneuverability, and stopping accuracy were also recorded.

The authors concluded that the results of this experiment show that alcohol alone and in combination with other drugs affects driving performance in different ways. The measures which most clearly differentiated between drug conditions were steering movement and average velocity.

IU-65-D0436

ACCIDENT PATTERNS ASSOCIATED WITH DRINKING, AND VIOLATION PATTERNS, AMONG DRIVERS WITH ALCOHOLISM, OTHER MEDICAL CONDITION, AND NO MEDICAL CONDITION, J. A. Waller, Evaluation of Reports to the California Department of Motor Vehicles on People with Medical Conditions. Report No. 1. (1965)

This study is a continuation of two earlier studies comparing the accident experience of people with alcoholism and other chronic medical conditions who were known to the California Department of Motor Vehicles, and of a group of drivers now known to have a medical condition. The accident rate of the medical groups and the comparison group was reviewed to determine if any differences exist in the types of accidents incurred. The present report deals with the accident and violation rates of the alcoholism sample and with different levels of sobriety, both among those with alcoholism and among drivers with other medical conditions or with no known condition.

More drivers with alcoholism had accidents and violations than did those with other medical conditions, while drivers with no medical condition were least likely to have accidents and violations. The overwhelming weight of evidence is that alcoholism rather than social drinking plays the major role in the occurrence of traffic accidents involving the use of alcohol, so the problem then becomes one of identifying the person with the drinking problem and removing him from the road.

IU-73-D0437

VEHICULAR ACCIDENTS AND RELATED PROBLEMS. THEIR FORENSIC ASPECTS, International Reference Organization in Forensic Medicine and Sciences, Wichita, Kansas, Inform v5 n3 (July 1973)

Problems related to traffic safety may call upon the entire spectrum of forensic practice, from psychiatrists, immunologists and serologists, to odontologists and anthropologists. The scope of the pathologist's responsibilities in investigating problems related to deaths and injury caused by vehicles is outlined, and special problems related to vehicles, such as natural deaths, accidental deaths, suicides, and homicides, are discussed.

General criminalistic aspects are explored, and a section is devoted to the topic of drinking, drugs, and driving. Driving under the influence of drugs or alcohol is considered a major problem, and the difficulties involved with the drugged driver are discussed.

IU-72-D0438

STUDY OF THE EFFECTS OF CERTAIN TRANQUILLIZERS AND SMALL AMOUNTS OF ALCOHOL ON DRIVING PERFORMANCE, A. B. Clayton; T. A. Betts; G. M. Mackay, Journal Européen De Toxicologie v4 p254-256 (1972)

A double-blind study of the effects of chronic administration of four tranquilizers upon performance of low-speed vehicle-handling tests was carried out. Three of the drugs (chlordiazepoxide, amylobarbitone sodium, and trifluoperazine) produced significant changes in performance but there was little potentiation of the effect with alcohol (50 mg%).

It is recommended that physicians should advise patients of the potential dangers involved in driving while under the influence of such drugs, particularly during the early stages of medication.

IU-65-D0439

BEWARE THE FATAL FORMULA, Parke Davis Review, p26-27 (Dec 1965)

The dangers of taking drugs before driving, and of taking barbiturates in combination with alcohol, are discussed. The effects of narcotics, barbiturates, tranquilizers, and antihistamines are described, and the article concludes with the warning: "Drugs + Drinking + Driving = Death".

IU-__-D0440

DRUGS AND THE MOTORIST, Abbott Laboratories [n.d.]

A new act which requires the automatic suspension for one year of a driver's license who is found driving while under the influence of drink or drugs make it doubly necessary for physicians to warn their patients against driving while taking certain drugs. A list of Abbott products which may have effects or side effects which could render a person liable to prosecution is included, and these drugs are: Calcidrine® syrup, Desbutal®, Di-paralene®, enduronyl® and enduronyl forte®, Ephedrine® and Nembutal®, Harmonyl®, Nembudeine® and Nembu-Donnal®, Nembutal®, Norisodrine®, Serenesil®, Tecal-drine®, and anticonvulsants.

IU-70-D0441

DETERMINATION AND IDENTIFICATION OF SYMPATHOMIMETIC AMINES IN BLOOD SAMPLES FROM DRIVERS BY A COMBINATION OF GAS CHROMATOGRAPHY AND MASS SPECTROMETRY, R. Bonnichsen; A. C. Maehly; Y. Mårde; R. Ryhage; B. Schubert, Zeitschrift Für Rechtsmedizin v67 p19-26 (1970)

Gas chromatographic and mass spectrometric data concerning the analysis for certain sympathomimetic amines in blood samples from drivers are presented. In all cases where gas chromatography gave peaks at the correct retention times for amphetamine or phenmetrazine respectively, mass-spectrometry confirmed the presence of the corresponding drugs in the extracts from blood. Drug-free blood samples gave neither gas chromatographic nor mass spectrometric responses at the retention times characteristic for amphetamine or phenmetrazine.

Computer-drawn mass spectra of phenmetrazine are shown, and analytical data obtained from twelve drivers and one hospital patient are collected.

IU-73-D0442

FACTORS AFFECTING VIGILANCE. BIOMEDICAL ASPECTS, C. W. Erwin, National Conference on Highway Traffic Optimization for the 1980's. Proceedings, T. C. Helvey, ed., p72-78 (1973)

The topic of this paper is intrusive sleep or narcolepsy in vehicular operation.

The effects of drugs, including narcotics, hallucinogens, marijuana, amphetamines, tranquilizers, and antihistamines, on the reticular activating system and arousal levels are discussed. The author describes some of his laboratory studies relating to intrusive sleep, and concludes that sleeping behind the wheel occurs far more commonly than has generally been assumed.

IU-74-D0443

INTERNATIONAL RECOMMENDATIONS ON ALCOHOL, DRUGS AND TRAFFIC SAFETY. A SURVEY, Journal of Traffic Medicine v2 n3 p42-43 (Aug 1974)

This document is a survey of international recommendations on alcohol, drugs, and traffic safety. Organizations represented include the World Health Organization, the Economic Commission for Europe (United Nations), the Council of Europe, and the European Council of Ministers of Transport.

IU-74-D0444

ALCOHOL AND DRUG CONSUMPTION AS CAUSAL FACTORS IN ROAD TRAFFIC ACCIDENTS IN NORWAY, J. F. W. Haffner; O. Bø; P. K. M. Lunde, Journal of Traffic Medicine v2 n4 p52-56 (Dec 1974)

The number of road traffic accidents with personal injury in Norway has doubled during the last decade. The number of accidents in Oslo has also increased, but not to the same extent. However, since there has been an even greater increase in registered motor vehicles the accident rates per 1000 vehicles and per million kilometers have decreased.

Both alcohol and diazepam sales have risen during the last decade, and the influence of alcohol and diazepam appears to be increasingly common as a causal factor in road traffic accidents. Alcohol is by far the most common causal factor; it has been found in 2.8% of non-accident drivers, in 10% of all drivers involved in accidents with personal injury, and in as many as 52.6% hospitalized accident-involved drivers. Diazepam has been found in 2% of non-accident drivers, and in 20.2% of hospitalized accident-involved drivers.

Both intoxicants were found more commonly in those drivers who were involved in accidents at night, and they were less frequently found in the age group 16-20 than among drivers above 20. It is concluded that both alcohol and diazepam are surprisingly common causal factors in road traffic accidents. The information on these and other potential intoxicants is too scanty, however; it needs updating, and supplementary studies on a nation-wide scale are required.

IU-73-D0445

PROBLEMS OF THE AGING DRIVER, W. A. Mann, North Carolina Symposium on Highway Safety v7 p39-50 (1973)

Various problems of the aging driver are explored, such as his physical condition, emotional condition, mental awareness, and lack of knowledge of proper driving habits. Drugs are also considered, and the author warns about the use of some drugs while driving, either alone or with alcohol. The need for classes in traffic safety for aging drivers is stressed, and the requirements for such schools are laid out.

IU-73-D0446

DRUGS AND DRIVING, Autosafe v2 n5 p9-10 (May 1973)

In theory any drug can increase the hazards of driving under certain circumstances, but there are some drugs which have more potential for deteriorating the skills and judgment needed for driving. Examples of these drugs include non-prescription drugs like alcohol, caffeine, nicotine, and aspirin; drugs supplied either on prescription or illegally for therapeutic use, such as seda-

tives, tranquilizers, stimulants, and antihistamines; hallucinogens like marijuana and LSD; and narcotics like morphine and heroin. It is the latter two classes which are dealt with in greatest detail in this article.

IU-66-D0447

DRINKING DRIVING DRUGS, American Insurance Association (1966)

This pamphlet is devoted mainly to the dangers of drinking while driving, but does include a discussion of the effects of various drugs on skills necessary for safe driving. It is pointed out that a physician should be consulted about the side effects of any drugs prescribed, including antihistamines, cold tablets, sedatives, stimulants, tranquilizers, and barbiturates.

IU-71-D0448

DRIVING, DRINKING, AND DRUGS, South Carolina State Highway Department, Columbia, S. C., (1971)

The dangers of taking such commonly used drugs as antihistamines, sedatives, cold tablets, stimulants, and tranquilizers before driving, are stressed, as are the exaggerated effects these drugs may produce when taken in combination with alcohol. The penalties for operating a motor vehicle while under the influence of intoxicants are described, and the effects of alcohol alone on driving performance are discussed.

IU-71-D0449

DRINK, DRUGS AND DRIVING. SOME PROBLEMS IN THE DEVELOPMENT AND APPLICATION OF LEGISLATIVE COUNTERMEASURES, K. Beaumont (1971)

The history of British legislation designed to discourage people from combining drinking and driving is traced from the Licensing Act of 1872, the Criminal Justice Act of 1925, and the Road Traffic Acts of 1930, 1960, and 1962, to the Road Safety Act of 1967. The results of the 1967 Act are discussed in terms of accident figures, coroners' reports, prosecutions, and breath tests, and problems, such as the definition of "driving or attempting to drive", procedures for taking the breath test, and drivers who drink after stopping driving, are described. Because it was believed that drugs are a factor in only a tiny minority of traffic accidents, the 1967 Act dealt solely with impairment with alcohol.

IU-71-D0450

RECENT TRENDS IN DRUNKEN DRIVING IN FINLAND, A. Alha (1971)

In Finland, tests for blood alcohol and drugs in cases of suspected drunken driving are performed at the Division of Forensic Chemistry. Submission to the taking of the blood sample was decreed obligatory in 1959, but there is no statutory limit of blood alcohol, so that the court is at liberty to consider each case on its own merits. In this paper statistics and data from tests are reported, several factors contributing to the incidence of drunken driving are mentioned, the underlying causes discussed, and preventive measures considered.

IU-72-D0451

STUDY OF THE EFFECTS OF CERTAIN TRANQUILLIZERS AND SMALL AMOUNTS OF ALCOHOL UPON DRIVING PERFORMANCE, A. B. Clayton; T. A. Betts; G. M. Mackay, Report On The Road Accident Research Project To The Science Research Council, v2 pIV-iii--IV-95 (1972)

The incidence of people driving while under the influence of psychotropic drugs is thought to be increasing, although exact figures are virtually im-

possible to obtain. This study sought to isolate the effects of four commonly prescribed drugs given in approximately equivalent clinical dosages; trifluoperazine 10 mg, haloperidol 2.5 mg, chlordiazepoxide 50 mg, and amylobarbitone sodium 150 mg. The subjects were divided into five groups; each group received a drug and placebo in random order on a double-blind basis, or a double placebo. The subjects were tested both sober and with alcohol (55-65 mg%) under each drug condition. Three driving tests were used together with measurement of kinetic visual acuity and an objective and subjective assessment scale.

The results of the driving tests were consistent neither between drugs nor between sexes. All the drugs produced at least one significant result, and the ratio of significant to non-significant results far exceeded the 1 in 20 expected by chance alone. The subjects were unable to distinguish between the effect of the drug or placebo. Objective assessment of the subjects showed significant differences in terms of mood between the drug and placebo condition (particularly with haloperidol and amylobarbitone sodium), but there was little interaction with alcohol.

IU-71-D0452

SELECTIVE ATTENTION IN ACCIDENT PREVENTION. PT. 2. AN EXPERIMENTAL APPROACH TO DRIVER EVALUATION USING ALCOHOL DRINKERS AND MARIHUANA SMOKERS. FINAL REPORT, A. Binder, System Development Corporation (1971)

An experimental procedure was used to evaluate the effects of marihuana smoking and various levels of blood alcohol upon several components of the driving task. To gain certain advantages of the epidemiological method in the experimental setting, subjects were recruited from bars and parties where they had been drinking alcoholic beverages or smoking marihuana in a manner and amount that was customary in the context.

It was found that performance decrement increased with blood alcohol content, that differences in performance found under alcohol were in evidence among the same subjects in non-alcohol trials, that marihuana produced performance decrement but apparently to a much lesser degree than alcohol, and that experimenters could predict the motor performance of the drinking subjects by observation of their behavior just prior to the experimental run.

IU-61-D0453

STUDY OF PERFORMANCE DECREMENT IN SIMULATED COMPLEX TASK SITUATIONS AND SIMULATED ENVIRONMENTS, Public Service Research (1961)

This study attempted to establish that research on performance decrement could be accomplished with human subjects in a simulated complex task situation and a simulated environment. Tasks utilized included a continuous tracking task and secondary visual and aural tasks. Twenty-four subjects were exposed to tranquilizers, antihistamines, alcohol, fatigue, heavy meals, and sleep deprivation. Placebo controls were utilized on drug and alcohol experiments.

The results indicated that studies of this nature are feasible, and that meaningful comparisons of performance can be made on simulator equipment. A continuous tracking task of the type utilized proved highly sensitive to decrements in psychomotor performance under induced mild stress effects, and this technique appears to hold promise for measuring relative changes in performance under varying degrees of treatment effects. The results on the tracking task indicate the mild treatment effects occurred primarily in subject variance in performance, and not in group mean performance. The intermittent secondary tasks proved to be useful indicators of visual and aural response decrements.

Performance decrement on the complex task was most pronounced in the sleep deprivation portion of the experiment. The fatigue, fatigue plus alcohol, fatigue plus alcohol placebo treatments, also indicated significant performance decrements on the tracking task. The drug treatments showed no marked effect on tracking, but there was a significant performance deterioration on the visual task for both the tranquilizer and antihistamine treatments.

IU-74-D0454

SERUM CHLORDIAZEPOXIDE, DIAZEPAM AND THIORIDAZINE CONCENTRATIONS AFTER THE SIMULTANEOUS INGESTION OF ALCOHOL OR PLACEBO DRINK, M. Linnoila; S. Otterstrom; M. Anttila, Annals of Clinical Research v6 p4-6 (1974)

The effect of 0.8 g/kg of alcohol on serum diazepam, chlordiazepoxide and thioridazine levels was examined in a double blind cross over trial with five volunteers. The drugs were administered in gelatin capsules simultaneously with alcoholic or placebo bitter drinks of equal volume. Blood samples were taken 30, 60, 90, 120, 150 and 240 min. later.

Serum chlordiazepoxide levels only were significantly increased at 120 and 150 min. after alcohol, as compared to those after placebo drink. The availability of any drug was not, however, significantly modified after alcohol. Taken with previous findings in behavioral studies, the present results suggest that the interaction of diazepam, chlordiazepoxide or thioridazine with alcohol takes place centrally.

IU-64-D0455

COMPLICATIONS FROM PSYCHOTHERAPEUTIC DRUGS--1964, L. E. Hollister, Clinical Pharmacology and Therapeutics v5 n3 p322-333 (May-June 1964)

After a decade of use, the indications and abuses of psychotherapeutic drugs have become evident. The antipsychotic drugs, chiefly the phenothiazine derivatives but also Rauwolfia alkaloids, have had a profound impact on the management of severe mental illnesses. Tranquilizing or antianxiety drugs, some of new chemical structure, others old, offer the physician a wider choice of agents for managing the difficult patients with minor emotional disorders, but have not enhanced the total therapeutic results a great deal. Antidepressant drugs still have questionable value, though very likely some are helpful for selected patients.

As is the case with all therapeutic agents with pharmacodynamic actions, side reactions and complications can develop from each of these classes of drugs. They occur often enough so that none should be used for trivial reasons. On the other hand, when clearly indicated, these drugs may be used with an acceptable amount of risk.

Until more is known about the interactions between different psychotherapeutic drugs, the trend toward polypharmacy is to be deplored. Drug combinations often produce new and unexpected complications. Fortunately, most important side reactions and complications of these drugs appear early in treatment, there being little evidence of chronic toxicity. A few complications are presentable and most are treatable.

IU-68-D0456

BLOOD ALCOHOL: A UNIQUE COURT CASE, P. K. van Gent, Journal of Forensic Medicine v15 n4 p157-160 (Oct-Dec 1968)

This article reports on a blood alcohol court case in Cape Town, South Africa, in which the accused (an anesthetist) claimed that the diethyl ether inhaled by him in the course of his daily duties, was the cause of the 0.31% w/v alcohol content of his blood. The authors review the literature that deals with this proposed phenomenon of the in vivo formation of alcohol from ether. One researcher in 1936 found a maximum blood alcohol level of 0.15% among 51 post-operative patients who had been under ether narcosis. Others in 1955, however, found no alcohol in 26 blood samples taken from surgeons and operating theater personnel who had been present during operations in which ether was administered by the open method. The authors subsequently evaluated this literature, noting that no mention was made of the purity of the ether used for narcosis in these

studies and that no tests were done for statistical significance because the total number of subjects was not recorded.

The authors therefore conducted a study to determine the ethyl alcohol content of blood samples from patients post-operatively and from operating theater personnel. From the analytical results, it appears that alcohol is not found in the blood of post-operative patients who have been under ether anesthesia; neither is it found in the blood of anesthetists who have administered ether.

The court found the accused guilty of consuming at least enough alcohol to produce a .16% blood alcohol level, which is in excess of the .15% maximum allowable by law. He was therefore fined, and had his driver's license suspended for 6 months.

IU-71-D0457

MARIHUANA AND AUTOMOBILE CRASHES, A. W. Klein; J. H. Davis; B. D. Blackbourne, Journal of Drug Issues v1 n1 p18-26 (Jan 1971)

The authors in this study surveyed a college-level population to determine marihuana usage and reported effects. Approximately 2000 survey forms were distributed; of 571 replies, 225 indicated the present or past use of marihuana. Based on the data collected the authors concluded that there is little doubt that marihuana is analagous to alcohol in the potential for detrimental effects upon driving. However, exact comparisons of psychological and physiological effects are difficult as the two drugs probably alter the nervous system differently. The lack of tissue, urine, or blood analytical methods for marihuana constituents prevents the determination of its causation in traffic crashes.

The authors believe that unless adequate research is extended in this area, it may be assumed that marihuana-related traffic accidents or abnormal driving behavior will remain unreported. The preliminary findings of two case reports of subjects observed while driving under the influence of marihuana were also reported. Both were interpreted as demonstrating that marihuana does have detrimental effects on driving skill and behavior.

IU-66-D0458

ANFALLSLEIDEN UND FAHRTAUGLICHKEIT (EPILEPSY AND FITNESS TO DRIVE), J. Hirschmann, Deutsche Zeitschrift fur die Gesamte Gerichtliche Medizin v57 n1-2 p366-381 (1966)

Because the accident frequency as a result of epileptic seizures is considerable, the majority of epileptics should not be allowed to obtain drivers licenses In judging the results of the fitness test, the physician should not only consider that seizures could occur; he must also consider the extent of change in the person's personality, and the alteration in reaction time caused by drugs.

Only in exceptional cases should the physician support an epileptic's request for a drivers license, and the criteria which should be met are laid out. The physician is obligated to be silent about his patient's illness, and to try to appeal to the patient's sense of responsibility to persuade him to abstain from driving. Only those patients who cannot be considered responsible should be reported to the authorities.

IU-71-D0459

SIMULATION PARTIELLE, SERVANT A VÉRIFIER LA DIMUNITION DE LA VIGILANCE AU VOLANT, SOUS L'INFLUENCE D'ALCOOL (DETERIORATION OF SIMULATED AUTOMOBILE DRIVING SKILLS UNDER THE INFLUENCE OF ALCOHOL AND DRUGS), P. Kielholz; L. Goldberg; V. Hobi; G. Reggiani, Hygiene Mentale v60 n2 p25-41 (July 1971)

In a selective simulation, the effect of alcohol on driving behavior was studied on the basis of previous field tests. Under the acute influence of a blood alcohol concentration of 0.8% a significant decline in performance or

an impairment of the adaptation process was observed in both the selective simulation and in the field tests.

The results show that the field test can be replaced by partial simulation. This allows experimental observation of the reciprocal effect of disease, medication and alcohol on driving behavior. An indication is also made of the possibility of using this method in the psychiatric and forensic fields to determine driving capacity, and the effect upon it of disease and/or medication.

IU-67-D0460

GEFÄHRDUNG DER FAHRSICHERHEIT DURCH BEWUBTSEINSSTÖRUNGEN INFOLGE INNERER KRANKHEITEN (IMPAIRMENT OF DRIVING ABILITY BY DISTURBANCES OF CONSCIOUSNESS DUE TO INTERNAL DISEASE), F. Hoff, Medizinische Welt v31 n5 p1761-1767 (Aug 1967)

Several types of disease states can cause persons to lose consciousness without warning; if this should occur while operating a motor vehicle, the results may be disastrous. The most common medical problems likely to cause sudden, temporary unconsciousness are diabetes (hypoglycemic blackout), myocardial infarcts, hypertensive syndromes, and coronary insufficiency.

IU-67-D0461

ARZNEIMITTEL, ALKOHOL UND VERKEHRSTÜCHTIGKEIT (MEDICAMENTS, ALCOHOL AND DRIVING EFFICIENCY), A. Doenicke; H. Kleinert, Medizinische Klinik v62 n21 p835-840 (1967)

The European literature on the topic since 1923 is reviewed. The case material, experiments, and forensic experiences discussed in this paper reveal that drugs are capable of impairing concentration and performance, and that a synergism (additive or potentiative) between barbiturates, psychoactive drugs, or tranquilizers and alcohol is demonstrable by means of psycho-diagnostic tests and the electroencephalogram.

IU-71-D0462

AUSWIRKUNGEN DES DROGENMIBBRAUCHS IM STRABENVERKEHR (EFFECTS OF DRUG MISUSE IN ROAD TRAFFIC), G. Hauck; W. Spann, Offentliche Gesundheitswesen v33 p555-558 (1971)

At present, hallucinogenic drugs play only a small role as the cause of traffic accidents. Nevertheless, it must be noted that with a greater increase in the abuse of narcotics, the implications of hallucinogenic drugs become more serious. An even greater danger is found in morphine and amphetamine derivatives, and this danger will be diminished only if narcotic abuse is drastically reduced.

IU-68-D0463

A STUDY. ROLES OF ALCOHOL, DRUGS AND ORGANIC FACTORS IN FATAL SINGLE VEHICLE ACCIDENTS, H. W. Sullivan, Police Chief v35 n3 p16, 18, 20, 22 (Mar 1968)

In this study conducted by the California Highway Patrol, 1474 single vehicle accidents in which the driver died within 15 minutes of the accident were investigated. It was found that well over one-third of all men drivers had a blood alcohol content of 0.20% or higher and were considered "excessively impaired". An additional 33% of men and 16% of women fell in the group with between 0.10 and 0.19% blood alcohol content and were considered drunk.

Of the 772 drivers in the test group, 84 men and 18 women had been taking drugs, and the percentage of drivers using drugs steadily increased with age for both men and women. Deaths by natural causes occurred in greater numbers

than expected; in the original study group of 1474, 155 deaths were by natural causes.

The non-drinking driver had fewer accidents, convictions, and police contacts, and the drinking driver was more often single. Drivers dying from natural causes had fewer traffic accidents, convictions, and police contacts than the drivers dying in accidents.

IU-67-D0464

ARZNEIMITTEL UND VERKEHRSSICHERHEIT (DRUGS AND TRAFFIC SAFETY), K. Händel, Landarzt v43 n5 p193-202 (20 Feb 1967)

In reviewing the literature related to drugs and motor vehicle operation, the authors note that a variety of pharmacological agents have been found to have adverse effects on driving. These effects may be due to direct actions of the drugs themselves, or to actions remaining after the drugs have had their desired effects (sedative hangover), or to interactions of the drugs with alcohol. They recommend that physicians be made aware of these problems, and that they, in turn, make their patients aware of the hazards. Examples are given of cases where either prescription or over-the-counter drugs interacted adversely with alcohol.

IU-71-D0465

CANNABIS OG ALKOHOL. VIRKNING PÅ SIMULERET BILKØRSEL (CANNABIS AND ALCOHOL. INFLUENCE ON SIMULATED CAR DRIVING), P. Bech; L. Rafaelsen; J. Christiansen; H. Christrup; J. Nyboe; O. J. Rafaelsen, Nordisk Psychiatrisk Tidsskrift v25 p350-356 (1971)

The effects of cannabis and alcohol on simulated car driving were studied. Eight healthy men, ages 21-27, who did not abuse cannabis or alcohol were taken as volunteers. Cannabis was given orally in the form of a cake in doses of 200, 300 and 400 mg. Alcohol was given 70 g in 500 ml juice. The procedure was as follows: at 0 hr the volunteer underwent psychological tests and simulated driving, which took approximately 1 hr. The volunteer was then given cake and juice to be consumed during 1/2 hr. At 2 1/2 hr a blood sample was taken and again tests and driving were performed. Each volunteer took part in the experiment 9 times in one week intervals.

The results indicated that 300 mg cannabis delayed the braking time by 16 to 23%, but only in one case was this signficant at the 5% level. With 400 mg cannabis, the braking time was delayed by 66% and the starting time by 50%. In both cases these values were statistically significant. With 70 g alcohol the braking time was delayed by 44% and gear changes were increased by 10%. Both values were statistically significant at the 5% level.

IU-68-D0466

ARZNEIMITTEL UND VERKEHR--DIE MEDIKAMENTÖSE BEEINFLUSSUNG DER LEISTUNGSFÄHIGKEIT UND IHRE BEDEUTUNG FÜR DIE VERKEHRSSICHERHEIT 1. TEIL (DRUGS AND DRIVING--THE INFLUENCE OF MEDICATION ON PERFORMANCE, AND ITS SIGNIFICANCE FOR TRAFFIC SAFETY. 1), B. Dokert, Zeitschrift für Ärztliche Fortbildung v62 n21 p1165-1171 (1 Nov 1968)

The author reviews the literature regarding drugs and traffic safety in the light of widespread use of alcohol and a variety of drugs. Based on urinary assays, the most commonly found drugs were: analgesics (29-67%), sedatives/hypnotics (7-19%), narcotics (1-7%), stimulants (2-3%), and psychoactive agents (1-2%). These were in drivers who admitted taking a drug in the 24-hour period prior to driving. The author discusses the various ways in which such drugs can adversely influence a variety of performance systems involved in motor vehicle operation. In particular, he cites the following drugs as likely to be problems: sedatives/hypnotics, intravenous barbiturates, tranquilizers, neuroleptics, antidepressants, psychostimulants, and hallucinogens.

IU-68-D0467

ARZNEIMITTEL UND VERKEHR-DIE MEDIKAMENTÖSE BEINFLUSSUNG DER LEISTUNGSFÄHIGKEIT UND IHRE BEDEUTUNG FÜR VERKEHRSSICHERHEIT. 2 TEIL (DRUGS AND DRIVING--THE INFLUENCE OF MEDICATION ON PERFORMANCE, AND ITS SIGNIFICANCE FOR TRAFFIC SAFETY. 2), B. Dókert, Zeitschrift für Ärztliche Fortbildung v62 n22 p1205-1211 (15 Nov 1968)

The author discusses the classes of drugs that may have adverse effects on motor vehicle operation: antiepileptics, analgesics, antihistaminics, antiallergenic agents, antiemetics, insulin, oral antidiabetic agents, muscle relaxants, and anticoagulants. He suggests the need for a standardized approach to defining the problem and developing adequate countermeasures.

IU-69-D0468

FAHRVERSUCHE ZUR FRAGE DER BEEINTRÄCHTIGUNG DER VERKEHRSTÜCHTIGKEIT DURCH ALKOHOL, TRANQUILIZER UND HYPNOTIKA (ROAD TESTS ON THE QUESTION OF THE INFLUENCE OF ALCOHOL, TRANQUILIZERS, AND HYPNOTICS ON DRIVING ABILITY), P. Kielholz; L. Goldberg; J. Im Obersteg; W. Pöldinger; A. Ramseyer; P. Schmid, Deutsche Medizinische Wochenschrift v94 n7 p301-306 (Feb 1969)

Driving ability and reaction time were tested in 200 persons of different ages before and after intake of a placebo, 20 mg chlordiazepoxide, 800 mg meprobamate, 200 mg phenobarbital or 200 mg methyprylone and on additional alcohol intake, alcohol and drug contents of blood being measured in each case. It was found that after a single dose of 20 mg chlordiazepoxide or 800 mg meprobamate (double the mean therapeutic single dose), there was a small increase in the number of errors, but this was not statistically significant. But after intake of 200 mg phenobarbitol or 200 mg methyprylone there was an increase in the rate of errors in the driving tests which was significantly greater statistically than that on placebo or tranquillizer.

On combined intake of alcohol plus either 20 mg chlordiazepoxide or 800 mg meprobamate or 200 mg phenobarbitol or 200 mg methyprylone the alcohol effect was markedly increased. A blood-alcohol level of 0.08% increased the errors in the driving test to a highly significant degree.

IU-73-D0469

PRÜFUNG DES EINFLUSSES EINES HYPNOTIKUMS AUF DIE FAHRTAUGLICHKEIT MIT UND OHNE ALKOHOLBELASTUNG (INVESTIGATION OF THE INFLUENCE OF A HYPNOTIC ON DRIVING FITNESS, WITH AND WITHOUT THE ADDITION OF ALCOHOL), C. Osterwalder; P. Schmid, Blutalkohol v10 n2 p80-95 (1973)

The possible influence of a hypnotic drug, a Dibenzthiepin derivate (Geigy GP 41 299), was investigated under the two conditions of the presence and absence of alcohol with the help of a driving simulator and single run tests. No effect of the hypnotic drug on driving ability could be found, but a very significant effect of concentration of alcohol in the blood (0.9%) was found both in the driving simulator and the single run tests. However, no significant effect of alcohol taken the previous day (equivalent to a concentration of 0.8%) could be found.

IU-65-D0470

BLUTDRUKSENKENDE MEDIKAMENTE BEI KRAFTFAHRERN (USE BY DRIVERS OF DRUGS WHICH LOWER BLOOD PRESSURE), H. Franke, Medizinische Klinik v60 n35 p1428 (1965)

A number of antihypertensive medications have the potential for adverse effects on motor vehicle operation through psychosedative effects or production of orthostatic hypotension.

IU-53-D0471

ALCOHOL AND BARBITURATES, British Medical Journal v1 p1269-1270 (1953)

The literature on the effects of the combined use of alcohol and barbiturates is reviewed. Observations on humans and experimental animals suggest that synergism, if not potentiation, may occur. At present, vast quantities of alcohol are consumed, and, in the U.S. in 1948, 300 tons of barbiturates were administered. Fatalities from the combined effect are very rare in relation to the size of the population exposed to the risk. Patients receiving large doses of barbiturates should certainly be warned about taking alcohol, and the possible impairment of driving ability by small doses of each in combination should be stressed.

IU-67-D0472

CIRCULATION ROUTIÈRE, TRANQUILLISANTS ET ALCOOL (ROAD TRAFFIC, TRANQUILIZERS AND ALCOHOL), P. Kielholz; L. Goldberg; J. Im Obersteg; W. Pöldinger; A. Ramseyer; P. Schmid, Hygiene Mentale v56 n2 p39-60 (1967)

The question whether impaired driving may be due, directly or indirectly, to tranquilizers was investigated within the framework of a possible interaction with alcohol. 120 policemen were given placebo, 400 mg meprobamate, or 10 mg chlordiazepoxide, under double-blind conditions, with and without the addition of alcohol (sufficient white wine to produce a blood alcohol level of .08-.10%), to test their driving ability under natural conditions at a trial area. At the same time, determinations were made on the blood alcohol level, drug levels in the blood, reaction time, and subjective self-evaluation.

The statistical evaluation of the results showed no direct effect of the applied drugs in the given dose on the blood alcohol level or on the alcohol effects; conversely, impaired driving at an average blood alcohol value of .08% was established with high statistical significance.

IU-66-D0473

BEEINTRACHTIGEN PSYCHOPHARMAKA DIE FAHRTUCK TIGKEIT DES KRAFTFAHRERS? ERGEBNIS EINER UNTERSUCHUNG DES VERKEHRSPSYCHOLOGISCHEN INSTITUTES DES KURATORIUMS FÜR VERKEHRSSICHER HEIT, WIEN (DO PSYCHOPHARMACOLOGICAL AGENTS IMPAIR THE DRIVING ABILITY OF DRIVERS? FINDINGS OF A STUDY OF THE TRAFFIC PSYCHOLOGY INSTITUTE OF THE COMMITTEE FOR TRAFFIC SAFETY, VIENNA), B. Biehl; D. Klebelsberg; U. Seydel, Medizinische Welt v17 n32 p1654-1657 (6 Aug 1966)

Impairment of a variety of behavioral/performance tasks could be shown following administration of UCB-1402, UCB-1486, UCB-6215, or meprobamate to human volunteers.

IU-64-D0474

KLINISCHE UND EXPERIMENTELLE ÜBERPRÜFUNG DES LEISTUNGSVERHALTENS NACH BEHANDLUNG MIT 10-METHOXYDESERPIDIN (CLINICAL AND EXPERIMENTAL INVESTIGATION OF PERFORMANCE CHARACTERISTICS AFTER ADMINISTRATION OF 10-METHOXYDESERPIDINE), A. van der Emden; B. Knick; H. J. Wagner, Arzneimittel-Forschung v14 n8 p905-907 (Aug 1964)

Clinical and experimental checks on 17 males subjected to daily administration of 15-20 mg 10-methoxydeserpidine (Methoserpidine; Decaserpil®) disclosed, in about half the test subjects, initially marked sedative side effects. The authors concluded that in the interest of traffic safety, patients given this therapy should abstain from driving a motor vehicle for at least 4-5 days after the commencement of medication. Only after repeated negative control tests should permission to resume control of a motor vehicle be considered.

IU-71-D0475

VERGLEICHENDE UNTERSUCHUNGEN ZUR VERKEHRSTAUGLICHKEIT NACH HASCHISCH-KONSUM UND NACH EINER KURZNARKOSE (COMPARATIVE STUDIES ON DRIVING FITNESS FOLLOWING HASHISH CONSUMPTION AND FOLLOWING BRIEF ANESTHESIA), J. G. Gostomzyk; G. Gewecke; G. Eisele, Medizinische Welt v22 n45 p1785-1789 (1971)

Studies with human subjects indicate impairment of reaction time, tapping performance, and attentiveness after recovery from short anesthesia with halothane-methoxyfluorane or thiobarbiturate-methoxyfluorane. The effects were similar to those of alcohol.

IU-67-D0476

UTJECAJ PSIHOFARMAKA NA PONAŠANJE U SAOBRAĆAJU (EFFECTS OF PSYCHOPHARMACOLOGICAL AGENTS ON BEHAVIOR IN TRAFFIC), N. Katičić, Neurosihijatrija v15 p201-206 (1967)

The increased use of both automobiles and psychotropic drugs can lead to a significant increase in traffic accidents. Because literature on the problem is scarce, the information in this paper is based mainly on theoretical hypothesis. This information involves a discussion of the major psychopharmacologic drug classes and their most common side effects.

Phenothiazines (fluphenazine, chlorpromazine, levopromazine, promazine) are mainly targeted drugs with a specific effect upon anxiety and the paranoid and hallucinatory syndrome. The hypnotic effect is small, but the extrapyramidal side effects, such as rigor, tremor, and akathisia are quite marked. The antidepressives include both the tricyclic compounds (imipramine, amitriptyline and its derivatives) and the monoamine oxidase inhibitors (nialamide, tranylcypromine). Their side effects are predominantly vegetative; MAO inhibitors cause marked hypotonia, and disturbances of accommodation are most often due to tricyclic compounds.

Tranquilizers (meprobamate, diazepam, chlordiazepoxide) reduce tension and anxiety. These compounds greatly differ in their chemical composition, and unlike many other psychotropic drugs, may be habit-forming. Psychostimulants (amphetamine compounds, oxazolidine) may play a role in traffic accidents because of their effects, such as affective elation, psychomotor release and excitation, artificially sustained wakefulness, exaggerated self-confidence, and wandering attention.

IU-69-D0477

VERSCHREIBUNG ALKOHOLUNVERTÄGLICHER MEDIKAMENTE (PRESCRIPTION OF DRUGS INCOMPATIBLE WITH ALCOHOL), K. Handel, Blutalkhol v6 p201-210 (1969)

The relative legal and ethical positions of physician and patient, with respect to the prescription and use of drugs which can have a dangerous effect in combination with alcohol, and the legal consequences of such combinations are discussed. Some drivers are convicted for impaired driving on the basis of actio libera in causa, while others are acquitted on the grounds that they could not have foreseen the consequences of combined use of alcohol with drugs.

The author stresses the necessity for and responsibility of the physician to inform his patient of potential hazards and side effects, and recommends that a note to this effect be made in the patient's file. In civil legal proceedings, the physician is not bound by medical ethics or secrecy in protecting himself by revealing the medical file and the warning note contained therein. Two cases of impaired driving, one of which resulted in conviction, due to interactions of alcohol with amytal in one case and Librium in the other, are mentioned.

It is concluded that, if a proper warning is given regarding the possible incompatibility of a drug with alcohol, only the patient can be held responsible for the consequences if this warning is ignored, and no claims can reasonably be made against the physician.

IU-72-D0478

EFFECT OF ALCOHOL AND DRUGS ON DRIVER PERFORMANCE, J. M. Clark, Jr., Institute of Traffic Engineers Proceedings p214-216 (Sep 1972).

Studies conducted to date indicate that between 50 and 70% of all highway accidents are caused by 70% of drivers who can be classified as alcoholics or alcohol abusers. When and if legislation is passed by all states to require blood-alcohol determinations on all accident-involved drivers, the resulting statistics may well show that the true figure is closer to 70%.

Driving performance deterioration was determined for 5 professional race drivers at the 0.10 and 0.15% blood-alcohol levels. These highly-skilled drivers would have been a menace on the highway even at the 0.10% blood-alcohol level, the presumptive limit for intoxication in the majority of the states.

The true effects of drugs on highway accidents is not established at the present time because of the legal and analytical problems associated with establishing that the accident-involved driver is "under the influence" of drugs. There can be a serious deterioration in driver performance as a result of the use of prescription medications when used singly or in combination with other medications or with alcohol. Marijuana appears to have the greatest possibility of having a significant effect on accident statistics. However, meaningful data on marijuana is not available because of the difficulty of establishing that the accident-involved driver is intoxicated on marijuana. Various side effects of marijuana can seriously impair the cognitive process and render the marijuana smoker a danger on the highway.

IU-73-D0479

DER "ABARTIGE" RAUSCH ("ABNORMAL" INTOXICATION), M. In der Beeck; H. Wutzke, Blutalkohol v10 n1 p50-54 (1973)

Upon conviction of a driver of negligent drunkenness by the district court of Monschau, and his subsequent acquittal by the provincial court of Aachen, the authors were prompted to explore the synergistic effects of the drug Nervogastrol® with alcohol. They found that the drug caused only insignificant damping effects, which led them to conclude that in only a few cases can a decrease in driving ability be attributed to Nervogastrol® alone.

IU-68-D0480

ARZT UND SICHERHEIT IM STRABENVERKEHR (PHYSICIAN AND ROAD TRAFFIC SAFETY), T. Kleinknecht, Medizinische Klinik v63 n46 p1870-1871 (1968)

In considering the problems caused by the interactions of medicine and highway safety, the author concludes that adverse situations in motor vehicle operation may occur because of disease states, therapeutic agents, or the combination of the latter with alcohol. He feels that better communication is needed to inform physicians of the problems so that they, in turn, can warn their patients.

IU-69-D0481

FAHRVERSUCHE ZUR FRAGE DER BEEINTRÄCHTIGUNG DER VERKEHRSTÜCHTIGKEIT DURCH ALKOHOL, TRANQUILIZER UND HYPNOTIKA (STUDIES ON THE QUESTION OF IMPAIRMENT OF DRIVING ABILITY BY ALCOHOL, TRANQUILIZERS, AND HYPNOTICS), P. Kielholz, Alkohol Und Verkehrssicherheit, p3.53-3.54 (1969)

An experiment is reported as an introduction to a film presentation. The effects on driving ability of frequently-prescribed tranquilizers and hypnotics, alone and in combination with alcohol, were investigated in 320 volunteers from the Basel police force. The subjects received orally, under double blind conditions, a placebo, 10 or 20 mg chlordiazepoxide, 400 or 800 mg meprobamate, 200

mg phenobarbital, or 200 mg methyprylone. In addition, half of the subjects also received sufficient alcohol to achieve a blood alcohol concentration of .08% 1 hr after ingestion.

Statistical evaluation of the results showed that lower doses of the tranquilizers did not significantly influence driving ability or the effects of alcohol; larger doses, while not affecting driving ability, did significantly enhance the effects of alcohol. Both hypnotics led to a decline in driving performance, and both enhanced the effect of alcohol.

IU-67-D0482

PHARMAKA, DROGENABHÄNGIGKEIT UND VERKEHR (DRUGS, DRUG DEPENDENCE, AND TRAFFIC), P. Kielholz; W. Pöldinger, Schweizerische Medizinische Wochenschrift v97 n1-2 p1-8, 49-54 (1967)

Different drug groups, i.e., short-acting narcotics, hypnotics, sedatives, narcotics in general, analgesics, CNS-active drugs, antihistamines, antiepileptics, muscle relaxants and antihypertensives can, due to their effect on mental function, impair fitness to drive. Drug side effects may also have this action. Because various drugs, chiefly those with a sedative action such as hypnotics, sedatives, neuroleptics, tranquilizers, antidepressives and antihistamines may lower tolerance to alcohol, they may indirectly affect the subject's safety as a road user.

The effect on driving skill is particularly marked in the initial stages of medication when large doses are given, and risks are therefore decreased by long-term therapy under medical supervision. The danger remains, however, where these drugs are taken without supervision, and particularly where taken on a single occasion. Reduction of fitness to drive can also result from addictive use of drugs, particularly hypnotics, analgesics and stimulants, which may cause psychotoxic effects, withdrawal symptoms or personality changes. Such patients should undergo preventive treatment to create awareness of the effects which these drugs can produce, and should be requested not to drive until individual reaction and optimum dosage are known and they have adapted to the symptoms of fatigue which these drugs may induce.

IU-73-D0483

EFFECTS OF CARBON MONOXIDE ON DRIVING PERFORMANCE, Eye, Ear, Nose, and Throat Monthly v52 n4 p141 (Apr 1973)

This article reports on research being carried out at Ohio State University with high levels of carboxyhemoglobin. Carbon monomixide blood levels of 7 to 14% produced mild variations in eye movement patterns, car following spacing, steering wheel reversals, and gas pedal usage, and the effects did not necessarily become more pronounced at these high levels. The subtle performance variations observed in the study did not create safety hazards during test runs conducted at speeds of 30 and 50 mph.

IU-69-D0484

REDUCING HIGHWAY SLAUGHTER, Medical World News v10 n35 p22-26, 28-29 (29 Aug 1969)

Because there is disagreement among medical experts on whether a significant percentage of highway accidents involve prescribed drugs, more research is needed. Drugs known to be capable of impairing driving performance include barbiturates, amphetamines, antihistamines, tranquilizers, antidepressants, analgesics, anti-convulsants, ganglion-blocking agents, muscle relaxants, antibiotics, and narcotics.

Medical factors other than drugs which contribute to highway accidents in-

clude: heart disease, diabetes mellitus, neurologic disease, visual deterioration, and other medical conditions; cardiovascular and other chronic conditions; suicide; sudden natural death; and alcoholism.

IU-65-D0485

COURT ERRS IN USING ADDICTION TEST, DRUG USER MOTORIST GIVEN NEW TRIAL, Medical Tribune v6 p31 (1965)

The California Supreme Court ruled that in the prosecution of a driver on a charge of driving while addicted to a narcotic drug, the trial court erred in applying the "habitual use" test for the purpose of determining whether the defendant was addicted. Therefore, his conviction was reversed and a new trial ordered.

IU-66-D0486

CALIFORNIA'S SINGLE VEHICLE FATALITY STUDY. ALCOHOL, DRUG AND ORGANIC FACTORS, G. L. Nielsen (1966)

This study involved single vehicle fatal accidents in which the driver died, his death occurring instantaneously or within 15 minutes. During the study period 871 such cases were investigated, and an additional 155 natural death cases were also examined. These were cases which were not officially charged to traffic because the death precipitated the accident, not the accident the death.

Of the 871 cases charged to traffic, 74.3% had been drinking, and their average blood alcohol level was .19% by weight; 68% of the drivers had blood alcohol levels of .10% by weight or more. Drugs were present in 12.9% of the cases, and alcohol in combination with drugs were found in 8.9%. Drugs tested for included: secobarbital, pentobarbital, amobarbital, butabarbital, phenobarbital, meprobamate, Doriden® (glutethimide), Dilantin® (diphenylhydantoin), chlorpromazine, caffeine, Librium® (chlordiazepoxide), and nicotine. Caffeine and nicotine, or both, were found in 75% of the cases, and nearly 50% of the drugs found were barbiturates.

IU-73-D0487

PSYCHOLOGICAL TESTS AND DRUGS, H. Moskowitz, Pharmakopsychiatrie Neuropsychopharmakologie v6 n2 p114-126 (Mar 1973)

Automobile accident probability rises with any measurable blood alcohol; yet neither compensatory tracking nor visual search-and-recognition, the major component of the driving task, is impaired by moderate levels of alcohol. This paper presents evidence that the ability to time-share and process information from two or more sources is impaired by alcohol. This ability, essential to the dual component driving task, is suggested as the site of alcohol-induced decrements.

Studies in both visual and auditory modalities were reviewed which indicate that performance under concentrated attention sustains negligible deficits under alcohol. Perceptual performance under divided attention suffered a large decrement. Studies from a driving simulator offered additional evidence that decrements in the ability to divide attention are a prime source of alcohol-degraded driving skill.

Similar analyses of marihuana effects have been performed. In contrast to alcohol effects, performance decrements occurred for perceptual tasks under concentrated attention as well as under divided attention. Marihuana-induced perceptual deficits appear not to be dependent upon division of attention. However, it does not appear that marihuana affects sensory processes directly. A series of tests of simple visual functions failed to reveal any differences between the effects of marihuana and alcohol. It is hypothesized that marihuana may produce brief drop-outs of attention.

IU-66-D0488

ROLE OF PHYSICIAN IN ACCIDENT PREVENTION, A. J. Mirkin, Archives of Environmental Health, v13 p519-524 (Oct 1966)

All physicians should know that driving skill may be impaired by abnormal, physiological states, pathological conditions, emotional disturbances, and the use of alcohol and drugs. Physicians must be made to feel responsible for admonishing their patients about driving whenever drugs which may impair driving ability are prescribed. Attention by all physicians to these medical factors and to new ones as they are uncovered should, through persuasion, admonition, and direction, lessen opportunities for accidental trauma in their own patients.

IU-73-D0489

INTERNATIONAL SEMINAR, RESEARCH ON ALCOHOL, DRUGS AND DRIVING, 25TH-27TH OCTOBER, 1972, HELD AT THE UNIVERSITY PSYCHIATRIC CLINIC, BASLE, SWITZERLAND, Pharmakopsychiatrie Neuro-Psychopharmakologie v6 n2 p65-136 (Mar 1973)

This document contains the complete proceedings of the International Seminar on Research on Alcohol, Drugs and Driving, held October 25-27, 1972, at the University Psychiatric Clinic in Basle, Switzerland. Participants in the seminar include: P. Kielholz, J. D. J. Havard, O. J. Rafaelesen, P. Bech, L. Rafaelsen, D. Klebelsberg, R. Forney, H. Moskowitz, M. Linnoila, M. J. Mattila. Their papers are also cross-listed in this index under their individual names.

IU-73-D0490

RISK TAKING BEHAVIOUR, D. Klebelsberg, Pharmakopsychiatrie Neuropsychopharmakologie v6 n2 p83-90 (Mar 1973)

Before entering into discussion of relationship between risk taking behavior and drug effects the author attempted to clarify the basic concept. Risk taking behavior in the sense of danger risks is only one kind of risk taking behavior. Experiments on risk taking behavior can be carried out by the method of the "miniature situation experiment". Risk taking behavior can be understood as the individual pattern of achievement and safety tendencies, and depends on superimposed cognitive restructuring processes.

Several studies demonstrate similar effects of alcohol on risk taking behavior in the area of driving: lower capacity for cognitive restructuring, changes in personality measures (higher sensitivity and individualism, lower conscientiousness) with the consequence of a situation-independent preponderance of achievement tendency at the cost of safety tendency. Effects of drugs other than alcohol could be demonstrated only on risk-attitude, and not on risk taking behavior.

IU-66-D0491

DRUGS AND AUTO ACCIDENTS, Medical Letter on Drugs and Therapeutics, v8 n14 p53-54 (15 July 1966)

The wide range of drugs that can impair driving ability is sometimes overlooked by physicians, as is the fact that there are hazards to drivers in some of the most frequently prescribed drugs. Drugs which act on the central nervous system and can adversely affect alertness, motor coordination, skills, judgment and other faculties essential for safe driving are listed, and the importance of warning patients about drug effects is stressed. However, since warnings against driving are not often heeded, the potential adverse effects of drugs on drivers provide an important reason for the physician to avoid unnecessary prescription of drugs, especially sedatives, tranquilizers, and stimulants.

IU-67-D0492

DRUGS, DRINKING, AND DRIVING, British Medical Journal, v2 p776 (17 June 1967)

The duty of physicians to warn their patients about the possible effects of drugs prescribed is described. If a patient's driving were so badly affected by drugs prescribed for him without warning that he injured himself, the patient would have a good cause of action against the physician if he could show that the physician ought reasonably to have anticipated that there would be a risk of injury if no warning were given. Others injured by the patient also might be able to make a claim against the doctor; thus, the duty to give such warnings where necessary is a very high one.

IU-69-D0493

EFFECTS OF MARIHUANA AND ALCOHOL ON SIMULATED DRIVING PERFORMANCE, Medical Journal of Australia v2 n15 p732 (11 Oct 1969)

This article evaluates the findings of a number of studies by researchers investigating the basic physiological and behavioral effects of marihuana, especially those that relate to simulated driving. The results of these studies suggest that impairment of simulated driving performance is not a function of increased marihuana dosage or inexperience with the drug. Simulated driving performance is significantly impaired by a moderate degree of alcoholic intoxication, but not, under these conditions, by marihuana intoxication.

IU-69-D0494

AMPHETAMINES AND DRIVING, Bulletin on Narcotics v21 n1 p46 (1969)

According to the Food and Drug Administration, amphetamines may be dangerous while driving because the normal protective symptom of exhaustion is short-circuited, thus causing a driver to use up reserves of body energy, until a total and sudden collapse occurs. Other effects of amphetamines include headache, dizziness, agitation, irritability, decreased ability to concentrate, marked fatigue, and hallucinations, any of which could impair driving ability.

IU-69-D0495

NEW LEGISLATION IN SPAIN. DRIVING UNDER THE INFLUENCE OF NARCOTICS, Bulletin on Narcotics v21 n1 p20 (1969)

New legislation was introduced in Spain which makes driving under the influence of narcotics a crime punishable by a fine and suspension of drivers license. A second offense leads to permanent withdrawal of the drivers license. The Act was later amended to include the hallucinogenic substances LSD, mescaline, and psilocybine.

IU-61-D0496

DRAMATIC SIDE EFFECT OF A NEW DRUG, "LIBRIUM", A. A. Bartholomew, Medical Journal of Australia v2 n11 p436-438 (1961)

The cases of two patients treated with Librium® who demonstrated the side effect of drowsiness are reported. Both suffered a period of dizziness followed by a sudden falling asleep. The author warns that due attention should be given to the prescribing of a drug that is still of uncertain worth, but that has at least one alarming side effect when given to an out-patient who may be particularly susceptible.

IU-69-D0497

DRUGS AND DRIVING, T. H. Bewley, Criminologist v4 n12 p7-16 (May 1969)

There is very little objective evidence at present of the direct effects of many drugs on driving, mainly because there are, as yet, no simple quantitative tests such as those for alcohol. The use of drugs which act on the central nervous system is increasing, in both the area of medical prescriptions and illegal drug abuse.

The effects of various drugs are discussed, including stimulants, hypnotics, psychotomimetic drugs, cannabis, opiates, and tranquilizers. The need for future research is stressed in such areas as methods of determinations of presence of drugs, determination of the fate of drugs, experimental studies into the action of drugs, studies on the relationship of drugs to traffic accidents, and epidemiological studies on drug use among drivers.

IU-69-D0498

DETECTION OF DRUGS AT THERAPEUTIC CONCENTRATIONS AS APPLIED TO AVIATION ACCIDENT TOXICOLOGY, D. J. Blackmore, Journal of Forensic Sciences v14 n4 p545-554 (Oct 1969)

Experiences with the use of gas chromatography for the detection of some compounds liable to be encountered in aviation toxicology are described. Methods for the detection of barbiturates, decongestants and stimulants in therapeutic quantities are suggested. The determination and significance of alcohol and carbon monoxide found in post mortem tissue are discussed and techniques to minimize error recommended.

IU-67-D0499

DRUGS IN DRINKING DRIVER CASES, (State of) California, County of Santa Clara, Office of the District Attorney (1967)

During 1966, drinking driver cases from all agencies in Santa Clara County, California, were studied to ascertain the extent of drug involvement. 21% of drivers indicated some kind of drug use upon questioning, and 683 different drugs were named as being used.

180 cases with blood alcohol levels less than and including 0.15% were screened for drugs (barbiturates, meprobamate, glutethimide and chlordiazepoxide), and 19.4% yielded positive results. In 11 of these cases in which blood alcohol level was negative, gross symptoms of intoxication were present, and one of the screened drugs was present in a significant amount.

IU-68-D0500

DRUGS, F. E. Camps; D. R. Laurence, Medical Aspects of Fitness to Drive Vehicles. A Guide for Medical Practitioners, L. G. Norman, ed., Medical Commission on Accident Prevention, p29-31 (1968)

Drugs which may present a problem to drivers are listed, and a guide is provided for physicians to use in deciding whether any particular drug is likely to affect a patient's ability and safety as a driver. The drugs are broken into two classes: drugs which are taken without therapeutic indications, such as narcotics and stimulants, and drugs taken for therapeutic indications, such as barbiturates, hypnotics, tranquilizers, and antihistamines.

IU-66-D0501

DADE COUNTY, FLORIDA, STUDY ON CARBON MONOXIDE, ALCOHOL AND DRUGS IN FATAL SINGLE VEHICLE AUTOMOBILE ACCIDENTS, J. H. Davis; A. J. Fisk (1966)

The authors, by using simple toxicological laboratory procedures as a routine adjunct to the investigation of driver fatalities, found that alcohol was the most common intoxicant. When compared to alcohol, carbon monoxide was relatively insignificant as a major cause of fatalities. There remains, however, a definite need to investigate the frequency of occurrence of low levels of carbon monoxide as well as the physiological effects of such low levels when coupled with alcohol, drugs, and natural disease.

Drugs were found infrequently, insofar as routine ultraviolet spectrographic analysis was concerned. With the widespread utilization of "tranquilizers" and other drugs, there is a need for application of additional chemical procedures as routine testing purposes. There is an even greater need for more intensive background and scene investigation to determine the probable presence and type of drugs in order to direct laboratory investigation into more profitable channels.

IU-65-D0502

STREET FITNESS AFTER ANAESTHESIA IN OUTPATIENTS, A. Doenicke, Acta Anaesthesiologia Scandinavica suppl7 p95-97 (1965)

Any postanesthetic patient must be viewed as a possible traffic hazard; the author, therefore, calls on physicians to be very cautious with regard to releasing patients. He feels it is extremely difficult to test the traffic ability or street fitness after anesthesia, because patients as well as volunteers are able to concentrate sufficiently and seem to be alert for a certain time, especially in tests of short duration.

These results may lead to misinterpretations because even many hours after a short anesthesia, the patient gets tired easily if he has to concentrate for a long period of time. This was found true in a study by the author involving the administration of thiobarbiturates. On the other hand, his tests with propanidid in the same volunteers showed that the patients were alert and capable 30 min. after the administration of the anesthesia and did not show any sleepiness later, as they had with the thiobarbiturates.

IU-67-D0503

USE OF A RACING CAR SIMULATOR FOR MEDICAL RESEARCH. EFFECTS OF MARZINE AND ALCOHOL ON DRIVING PERFORMANCE, D. T. D. Hughes; F. Cramer; G. J. Knight, Medicine, Science and the Law v7 p200-204 (Oct 1967)

The objects of this study were twofold. First, a racing car simulator, developed and produced by Grovewood Race-A-Car Limited, was evaluated as to its usefulness in giving meaningful results with test subjects under the influence of drugs. Secondly, the effects of Marzine® (Cyclizine), an anti-motion sickness agent, and alcohol on driving performance were tested.

The results both demonstrated the usefulness of the racing car simulator, and indicated that with all subjects tested, no significant difference exists between their driving performance when taking the placebo or Marzine®. However, the results obtained after a combined ingestion of alcohol (100 ml) and Marzine® (50 mg), were not stated, and were difficult to analyze based on the experimental design.

IU-70-D0504

DAGGA AND DRIVING, T. James, South African Medical Journal v44 n20 p580-581 (16 May 1970)

The author attempted to draw attention to the use of marihuana among the youths of South Africa, and its possible debilitating effects on motor vehicle operation. He proposed no solution to this problem, feeling that an awareness of the situation would in itself contribute to its mitigation.

IU-64-D0505

COMPARATIVE EFFECT OF THREE ANTIHISTAMINICS AND ETHANOL ON MENTAL AND MOTOR PERFORMANCE, F. W. Hughes; R. B. Forney, Clinical Pharmacology and Therapeutics v5 n4 p414-421 (1964)

Three antihistaminics, clemizole, diphenhydramine, and tripelennamine were studied, alone and with alcohol, to determine their effects on motor and mental performance. Alcohol consistently and significantly impaired both mental and motor performance. No significant mental impairment was observed when the antihistaminic drugs were given alone, nor was the effect of alcohol potentiated by them significantly.

When motor performance was measured, some of the antihistaminics alone produced significant effects. In the presence of alcohol, the action of diphenhydramines was potentiated in two tests. The depressant property of the antihistaminics studied was much more apparent to the subjects than that of alcohol, and, yet, significant impairment was observed only with alcohol.

IU-69-D0506

EFFECTS RESULTING FROM COMBINING METHYPRYLON (NOLUDAR®) OR PHENOBARBITONE (FENEMAL®) WITH ALCOHOL IN MAN, S. G. Servais; A. Neri, Stockholm University, Sweden (1969)

Nine healthy male subjects were given 200 mg of phenobarbitone, 200 mg methyprylon, or a lactose placebo, in combination with alcohol (0.72 gm of pure alcohol per kg body weight). The effects were studied over five-hour periods using a test battery consisting of various physiological recordings, performance tests and self-ratings. The main results showed that both of the hypnotic agents acted synergistically with alcohol.

IU-57-D0507

NOTE ON THE PSYCHOMOTOR EFFECTS OF DIPHENHYDRAMINE HYDROCHLORIDE AND DIMENHYDRINATE, R. G. Pearson, Journal of American Pharmacologists Association, Scientific Edition v46 p702-703 (Nov 1957)

This study was designed to determine the effects of two of the more popular motion-sickness preventives on perceptual motor skills. 48 volunteer basic Air Force trainees served as subjects. Motor skill was tested by means of a tracking task, and the drug preparations consisted of diphenhydramine HCL (50 mg Benadryl®), dimenhydrinate (100 mg Dramamine®), and placebo (lactose), administered orally in capsules.

The results revealed that both diphenhydramine hydrochloride and dimenhydrinate decreased psychomotor performance as compared to placebo. The author concludes that the effects of both of these drugs are such that they are not recommended for motion-sickness prophylaxsis in situations where perceptual-motor skill is required of the individual.

IU-66-D0508

ASSOCIATION BETWEEN SMOKING AND ACCIDENTS. OVERDEPENDENCY AS AN INFLUENCING VARIABLE, J. R. Adams; E. B. Williams, Traffic Quarterly v20 n4 p583-588 (Oct 1966)

To test the hypothesis that smoking is associated with higher traffic accident rates, data were obtained from a group of insurance companies on the driving accident and violation records of 1,025 male insurance applicants between 18 and 25. A higher accident-violation rate was found for smokers, and the authors feel that the association between smoking and traffic accidents may be best explained by recognizing that both are manifestations of overdependency in the personality makeup of the accident repeater.

IU-57-D0509

TRANQUILIZERS AND TRAFFIC, R. Meyer, Traffic Safety v51 n3 p10-14 (Sep 1957)

Hundreds of research projects are being conducted throughout the nation in an attempt to learn more about the effects of tranquilizers on human behavior, but the drugs are being used in growing quantities now. This article explores four main areas: whether tranquilzers impair muscular coordination and reaction time, whether they reduce alertness and reaction to stimuli, whether they alter social attitudes or obedience to law and convention, and whether they react unfavorably when in combination with alcohol or other drugs.

The author concludes that not all tranquilizers are alike, and that the two most common types available are chlorpromazine and meprobamate. Physicians should advise patients of the possible effects of tranquilizers on driving, and public officials should be aware of these dangers.

IU-67-D0510

ALCOHOL + DRUGS, R. B. Forney; F. W. Hughes, Traffic Safety, v67 n6 p22-24, 34-36 (June 1967)

As the use of alcohol and drugs grows, it is becoming increasingly important to find out how the combination of alcohol and drugs affects driving skill. The impact of drugs other than alcohol on accident rates or their severity is difficult to assess, so there is little good evidence available.

The authors' research on the effects of barbiturates, tranquilizers, narcotics, caffeine, amphetamines, and monamine oxidase inhibitors on skills related to driving is described.

IU-61-D0511

THIORIDAZINMEDIKATION UND FAHRTÜCHTIGKEIT (THIORIDAZINE MEDICATION AND DRIVING ABILITY), K. Mayer, Medicina Experimentalis v5 p186-195 (1961)

The psychodynamic effects of small doses of thioridazine (20 mg and 3 x 20 mg) were tested in two series of subjects with the objective of discovering any effect on the ability and safety of the subject to drive a car. Two groups of randomly selected subjects served as controls. All the tests used yielded data capable of quantitative interpretation.

With a single dose, no statistically significant differences were observed between the active preparation and the placebo; with repeated doses, a certain cumulative effect was discernible. There was no actual reduction of performance, but a modification which was specific to the personality of the subject and dependent on the initial state of mind; this result is similar to that seen with higher doses of thioridazine.

IU-62-D0512

AU NOM DES COMMISSION DES ACCIDENTS DE LA ROUTE ET DE LA THÉRAPEUTIQUE. SUR L'USAGE ABUSIF DES TRANQUILLISANTS ET LEURS DANGERS POUR LES CONDUCTEURS (ON THE ABUSIVE USE OF TRANQUILIZING AGENTS AND THEIR DANGERS FOR DRIVERS), R. Monod, Académie Nationale de Medécine v146 p254-257 (3 Apr 1962)

Tranquilizers, especially when used improperly or in an abusive manner, may represent a serious problem for highway safety, since they can influence driver performance in a variety of ways.

IU-66-D0513

CARBON MONOXIDE LEVELS IN CITY DRIVING, A. J. Haagen-Smitt, Archives of Environmental Health v12 p548-551 (May 1966)

The purpose of this study was to determine the concentration of carbon monoxide which a Los Angeles rush hour commuter breathes while driving on the freeway. This was done by placing a carbon monoxide measuring instrument and recorder in the passenger seat of a car and then driving along the freeway during rush hour.

In the best trips made, the overall average level of carbon monoxide measured was 37 ppm of air. In heavy traffic moving at less than 20 mph, the level rose to an average of 54 ppm, with peaks up to 120 ppm. A short distance from the freeways and at heavily traveled streets, levels dropped rapidly, except at stop signals where traffic again accumulated.

A commuter spending two hours at the higher exposure levels found in this study would have a carbon monoxide level in his blood which would be approximately that cited by the Health Department of the State of California as the "serious" level. A concentration of 30 ppm gas will inactivate 5% of a person's hemoglobin and 60 ppm will inactivate 10% of it. If a person is smoking, another 5% of his hemoglobin is inactivated. Of special concern is the four- to five-fold increase in exhaust products other than carbon monoxide to which the commuter is exposed.

IU-72-D0514

MARIHUANA AND ALCOHOL. TIME PRODUCTION AND MEMORY FUNCTIONS, J. R. Tinklenberg; B. S. Kopell; F. T. Melges; L. E. Hollister, Archives of General Psychiatry v27 n6 p812-815 (Dec 1972)

In a double-blind study, time production tasks and clinical tests of memory function were performed by 15 normal subjects given placebo and "social" doses of alcohol (ethyl alcohol) and marihuana, calibrated to (-)-Δ^1-tetrahydrocannabinol. Using the subjects as their own controls, it was found that, compared to alcohol and placebo, marihuana induced a significant underproduction of time intervals, suggesting an acceleration of the internal clock. At these dose levels, there were no significant changes in memory function, but during marihuana intoxication, some consistent trends toward greater impairment of tracking information over time were noted.

IU-57-D0515

DRIVERS, DRINKS AND DRUGS, W. J. R. Camp. Postgraduate Medicine v22 n1 pA-38, A-40 (July 1957)

Driving a car is a complex of habit, thought, reflexes, muscular action, attitude, and emotional control, and alteration of any of these factors alone or in combination will effect a change from the norm with concomitant decrease in driving efficiency. Although the problem of alcohol has received considerable attention and warrants more intense study, insufficient thought has been given to the effect of drugs. Drugs which may have a definite effect on the central nervous system, and therefore impair driving ability, include marijuana, morphine, heroin, cocaine, barbiturates, antihistamines, stimulants, and tranquilizers.

IU-65-D0516

SMOKING AND NIGHT DRIVING, G. Johansson, G. Jansson, Scandinavian Journal of Psychology v6 n2 p124-128 (1965)

Two experiments were performed with an apparatus simulating night driving conditions in order to study the effect of smoking on detection time and re-detection time after glare. In the experimental sessions the subjects smoked two standard cigarettes for 15 min. There were no significant differences in results between these sessions and the control sessions without smoking. The conclusion is that the effect of tobacco smoking on the ability to detect objects on the road is from a practical point of view negligible.

IU-67-D0517

EINSCHRÄNKUNG DER FAHRTÜCHTIGKEIT DURCH ALKOHOL UND ARZNEIMITTEL (IMPAIRMENT OF DRIVING ABILITY BY ALCOHOL AND DRUGS), K. Soehring, Pharmazie v22 n4 p222 (Apr 1967)

The steadily growing consumption of alcohol and drugs, and the increasing use of motor vehicles are discussed. While the determination of the blood alcohol level is a matter of routine, the detection of drugs in the body is still difficult. Hundreds of different drugs with different chemical compositions influence driving ability, and each one has a different metabolic fate in the body. Many of the drugs have synergistic effects if ingested simultaneously with alcohol, but no drug is known as yet which has a significant effect on the blood alcohol level.

IU-63-D0518

VERGLEICHENDE UNTERSUCHUNGEN ÜBER DIE ZAHLENMÄBIGE BEZIEHUNG ZWISCHEN MEDIKAMENT-- BZW. ALKOHOLBEEINFLUBTEN VERKEHRSTEINEHMERN (COMPARATIVE STUDIES OF THE QUANTITATIVE RELATIONSHIP BETWEEN DRIVERS UNDER THE INFLUENCE OF DRUGS AND/OR ALCOHOL), H. J. Wagner, Zentralblatt fuer Verkehrs-Medizin-Psychologie Luft-und Raumfahrt-Medizin v9 n3 p132-135 (1963)

The roles of alcohol and drugs in traffic accidents, and the incidence of use in males and females and in various age groups, are reported for two German cities. Evaluation of 10,000 case histories of drivers involved in accidents while under the influence of alcohol showed that 10.3%-14.5% had also taken drugs during the preceding 24 hr. Sedatives and hypnotics were found to influence driving ability most. Surveys of the frequency of traffic accidents connected with drug and alcohol ingestion are analyzed.

IU-67-D0519

USAREUR FATAL MOTOR VEHICLE ACCIDENT STUDY, Department of the Army, Public Health Division, Department of Epidemiology, Army Medical Laboratory (1967)

Drivers involved in 540 fatal motor vehicle accidents occurring during a two-year period were compared to matched control subjects, the characteristics of the accidents were studied, and blood specimens from 90 deceased drivers were obtained at autopsy and chemically analyzed. Subject drivers were found to have uncorrected defective vision and histories suggestive of behavior or personality disorder, in significantly greater numbers than did the controls.

Two-thirds of the blood specimens contained ethyl alcohol, and in one-third the concentration was 150 mg% or greater. Carbon monoxide was present in one-third of the specimens. The majority of fatal accidents occurred on two-lane, undivided highways, under good climatic and road surface conditions, and without utilization of seat belts.

It is suggested that human factors play a major role in fatal motor vehicle ac-

cidents. Drivers with uncorrected poor vision, those who drink alcoholic beverages before driving, and those who have a history of undesirable conduct, contribute disproportionately to the high vehicle fatality rates among personnel of the United States Army in Europe.

IU-66-D0520

PHARMACOLOGY OF ALCOHOL AND ALCOHOL-DRUG COMBINATIONS, H. W. Smith, Alcohol and Traffic Safety. Proceedings of the Fourth International Conference on Alcohol and Traffic Safety, December 6-10, 1965, p26-34 (1966)

Literature on the topic, including a brief mention of alcohol-drug interactions, is reviewed. The present inadequacy of statistical documentation on the problem of drugs and driving is stressed. More research is needed on topics like driving behavior, alcohol and drug effects, drug combinations as they affect driving, and the types of people who are driving after alcohol and drug ingestion, in order to reappraise our approaches in education, enforcement, and treatment.

IU-66-D0521

INTERACTION BETWEEN ALCOHOL AND TRANQUILIZING AGENTS, L. Goldberg, Alcohol and Traffic Safety. Proceedings of the Fourth International Conference on Alcohol and Traffic Safety, December 6-10, 1965, p235-244 (1965)

A total of 542 experiments were carried out on 160 healthy humans to assess some behavioral and physiological effects of alcohol ingestion. The combinations of alcohol (in the form of whiskey, 0.33-0.66 g alkohol/kg) and the following 11 CNS-active drugs were studied: amphetamine (10 mg), buclizine (50 mg), chlorcyclizine (50 or 100 mg), chlordiazepoxide (20 mg), chlorpromazine (10 mg), hydroxyzine (25 mg), meclizine (25 or 50 mg), meprobamate (400, 500, or 800 mg), phenaglycodole (300 mg), promethazine (25 mg), and tripelennamine (50 mg).

None of the drugs changed the course of the blood alcohol curve in any essential way, the effect of the interaction varying with the type of drugs and the phase of alcohol metabolism studied. Meprobamate acted synergistically in the acute alcohol phase and reduced some of the after-effects in the post-alcohol phase; chlordiazepoxide acted antagonistically in all phases.

IU-66-D0522

OPTOKINETIC NYSTAGMUS UNDER THE INFLUENCE OF D'AMPHETAMINE AND ALCOHOL, M. E. Bernstein; A. B. Richards; F. W. Hughes; R. B. Forney, Alcohol and Traffic Safety, Proceedings of the Fourth International Conference on Alcohol and Traffic Safety, December 6-10, 1965, p208-210 (1966)

The effect of amphetamine-alcohol combinations on horizontal optokinetic nystagmus was studied in 8 healthy humans. The mean blood alcohol concentrations of the subjects were similar, being 46 mg% in the placebo-alcohol combination and 51 mg% in the amphetamine-alcohol combination. Amphetamine markedly overcame the nystagmatic effects resulting from the ingestion of a moderate amount of alcohol.

IU-66-D0523

DEXTRO-AMPHETAMINE, ALCOHOL, AND DEXTRO-AMPHETAMINE-ALCOHOL COMBINATION AND MENTAL PERFORMANCE, H. L. Kaplan; R. B. Forney; A. B. Richards; F. W. Hughes, Alcohol and Traffic Safety. Proceedings of the Fourth International Conference on Alcohol and Traffic Safety, December 6-10, 1965, p211-214 (1966)

In a double-blind study, four groups, each containing 10 subjects, were treated with one of the following: 1) placebo drug, 2) d-amphetamine (5 mg) 3) placebo drug plus alcohol, and 4) d-amphetamine (5 mg) plus alcohol. D-amphetamine improved the mental performance over placebo throughout the four-hour experiment.

The effect of the d-amphetamine-alcohol combination did not differ much from that of placebo plus alcohol. In initial tests, performance with alcohol-d-amphetamine was significantly better than with alcohol-placebo, but was significantly impaired when compared with d-amphetamine alone. Alcohol, therefore, suppressed the performaned-enhancing action of the drug.

IU-66-D0524

EFFECT OF D-AMPHETAMINE AND ALCOHOL ON ATTENTIVE MOTOR PERFORMANCE IN HUMAN SUBJECTS, D. J. Brown; F. W. Hughes; R. B. Forney; A. B. Richards, Alcohol and Traffic Safety. Proceedings of the Fourth International Conference on Alcohol and Traffic Safety, December 6-10, 1965, p215-219 (1966)

In double-blind experiments on 40 subjects, attentive motor performance was measured while subjects experienced the depression of alcohol (45 ml/150 lb), the stimulation of amphetamine (5 mg), and the effect of both drugs combined. During stress d-amphetamine failed to affect the alcohol-depressed subjects, and did not improve driving skills.

IU-64-D0525

OPENING SPEECH, L. G. Norman, Forensic Immunology, Medicine, Pathology and Toxicology. Report of Third International Meeting, Excerpta Medica Foundation p21-22 (1964)

Driving, drinking alcohol, and using drugs are three very common practices which are socially acceptable up to a point, and because they are each so widespread, they often occur in combination. The use of drugs by drivers is almost universal, and driving performance may be adversely affected by many drugs in common use. According to the author, 25-50% of road traffic accidents are associated with the consumption of alcohol.

A call is made for more laboratory studies on the effects of drugs on behavior. The author believes that it is especially critical to know the extent to which potentiation may occur. He emphasizes the prescriber's responsibility in the use of drugs by drivers, mentioning that the Lord Chief Justice had clearly established that within the meaning of the Road Traffic Act of 1930, insulin is a drug. A diabetic driving under the influence of insulin to such an extent as to be incapable of having proper control of his vehicle would be judged as driving under the influence of a drug and treated accordingly.

IU-64-D0526

HIGHWAY 66 PROJECT. ARIZONA HIGHWAY PATROL. STUDY OF VEHICULAR TRAFFIC ON A MAJOR HIGHWAY, M. Tuchler, Forensic Immunology, Medicine, Pathology and Toxicology. Report of Third International Meeting, p27-28 (1964)

In this preliminary report on his project, the author reports that alcohol played a very little part in accidents on Highway 66; the important factor was fatigue. Drugs, including alcohol, were responsible for 9.9% of the accidents, inattention accounted for 33.7%, fatigue for 15.4%, and the combination of admitted inattention with fatigue for 45%. The author suggests that accident research has been far too specialized in the study of alcohol, drugs, and traffic accidents, and that instead, the individual's personality must be considered. A group discussion of his findings and conclusions follows.

IU-72-D0527

DRUGS AND DRIVING. PRESCRIPTION FOR DEATH, Journal of American Insurance v48 n2 p25-27 (Mar-Apr 1972).

There is increasing evidence that prescription drugs, such as tranquilizers, barbiturates, amphetamines, and antihistamines account for a large portion of

highway deaths and injuries. Many states are beginning to focus attention on the drugged driver. The Pennsylvania Action Committee for Highway Safety recently proposed amendments to the Pennsylvania Vehicle Code broadening use of chemical tests for intoxication to include drugs and narcotics in addition to alcohol. The PACHS reports also pointed out that drug abuse connected with auto accidents is up 10-fold in the past decade.

The Federal government is also becoming increasingly concerned with the effects of mood drugs. The Justice Department proposed reclassifying amphetamines and methamphetamines to require non-refillable prescriptions. The U.S. Senate is also taking a close look at over-the-counter mood drugs. The result of Senate hearings on drugs was an announcement by the FDA in January of 1972 marking the beginning of an over-all review of the safety and the effectiveness of more than 100,000 non-prescription drugs now on the market.

IU-64-D0528

PERFORMANCE DATA OBTAINED BY ADDITION OF TRANQUILLIZERS WITH ALCOHOL IN HUMAN SUBJECTS, R. B. Forney; F. W. Hughes, Forensic Immunology, Medicine, Pathology, and Toxicology. Report of Third International Meeting, p23-24 (1964)

The effects of alcohol and tranquilizers, and their combination on human performance were studied. Delayed auditory feedback was used in connection with 9 reading, arithmetical, and color tests. Caffeine (500 g) did not alter the behavioral spectrum, and was ineffective in antagonizing alcohol. In some of the tests, alcohol and caffeine combinations caused greater impairment than can be calculated from the individual actions of the drugs. A more definitive alcohol antagonism was evident with the use of a true anti-depressant, such as nortriptyline.

IU-64-D0529

STUDIES IN ANIMALS OF PHARMACOLOGIC ACTIONS RESULTING FROM COMBINATIONS OF ALCOHOL WITH OTHER CENTRALLING ACTING DRUGS, F. W. Hughes; R. B. Forney, Forensic Immunology, Medicine, Pathology, and Toxicology. Report of the Third International Meeting, p24-25 (1964)

The experimental techniques developed in studying the potentiation of alcohol by other CNS depressants, and the calculation of a comparative tranquilizer index of psychotherapeutic drugs, are described. The over-all results of observations on rats and dogs, with respect to combinations of alcohol with the series of centrally-acting drugs, showed that potentiation occurred in the following (diminishing) order: reserpine, chlorpromazine, meprobamate, chlordiazepoxide, hydroxyzine, phenaglycodol, morphine sulphate, d-propoxyphene, codeine, pentobarbital.

IU-73-D0530

DRUGS IN AVIATION AND TRAFFIC SAFETY. EXPERIMENTAL ASSESSMENT OF SINGLE DOSE EFFECTS, J. Šulc; G. Brožek; J. Cmiral, Adverse Effects of Environmental Chemicals and Psychotropic Drugs, Quantitative Interpretation of Functional Tests. Vol. 1, p235-241 (1973)

This report, based on the authors' experiences in epidemiological investigations, points to an increase in the uncontrolled use of some drugs within the population. It is generally presumed that the growing intake of several freely accessible drugs may endanger traffic safety. Of special importance in this respect are analgesics and psychotropic drugs.

The problem is studied in situations modelling some elements of the pilot's skill with the objective of determining the effect of a single application of small doses of selected drugs, particularly analgesics, hypnotics, caffeine and psychostimulants, on psychomotor and some other central functions in

humans. The test battery consisted of [illegible] electrical brain activity, including autocorrelation analyses and estimation of power spectra, flicker fusion threshold, several variants of pursuit tests, and a complex discrimination task.

The results show that some bioelectrical changes occurring after the application of drugs may indicate a tendency of the organism to reestablish its equilibrium at a new level, that is, an adaptive rather than pathogenic reaction.

IU-73-D0531

DISTURBANCES OF VIGILANCE AND VISUAL-MOTOR PERFORMANCE RESULTING FROM AIR POLLUTANTS AND DRUGS, G. Winnere; J. Kastka; G. G. Polor, Adverse Effects of Environmental Chemicals and Psychotropic Drugs. Quantitative Interpretation of Functional Tests. Vol. 1, p193-202 (1973)

The effects of d-amphetamine sulphate (15 mg) and dichloromethane (0.03 and 0.08% by volume) inhalation were studied in three experiments on 42 subjects. Dichloromethane, in concentrations of 0.03 and 0.08% by volume, impaired vigilance and critical flicker frequency (CFF), while 15 mg d-amphetamine sulphate caused a significant improvement of behavioral vigilance and a slight increase in CFF. The inhalation of 0.08% dichloromethane resulted in a pattern of generalized impairment of psychomotor performance. Motor speed of gross hand and arm movements was reduced, reaction times for simple and complex responses were lengthened, coordination and precision of complex movement patterns, as well as the ability to react quickly to changing stimulus configurations were impaired, and steadiness and control precision of static as well as dynamic positioning movements was disturbed.

Amphetamine administration resulted in a fairly consistent pattern of generalized psychomotor activation. Speed of simple wrist and finger movements (tapping) was increased, steadiness of static and dynamic positioning movements was improved, as was coordination and precision of complex movements. Reaction times were not significantly shortened.

The tests used seem to be suitable for studies on the relative toxicity of neurotropic chemical agents in man. Performance decrements in psychophysiological functions are to be considered as symptoms of a reduced CNS activation, implying increased accident proneness and, therefore, an indirect health hazard.

IU-73-D0532

MENTAL PERFORMANCE AND EXPOSURE TO CHEMICAL AGENTS, J. H. Ettema; R. L. Zielhuis, Adverse Effects of Environmental Chemicals and Psychotropic Drugs, Quantitative Interpretation of Functional Tests. Vol. 1, p203-204 (1973)

The authors designed this study to test the following hypothesis: Exposure to chemical agents with a potential effect on the central nervous system will induce (1) a decrease of mental performance; (2) no decrease of mental performance, but an increase in physiological effort; or (3) no decrease of mental performance and no increase of physiological effort.

The results indicate that exposure to carbon monoxide (175 ppm) for 3 hours, producing a carboxyhemoglobin level of 10% or to trichloroethylene (175 or 300 ppm) for 3 hours, does not decrease mental performance, but alcohol > .035% in blood does. The investigators suggested that exposure to carbon monoxide (175 ppm) or trichloroethylene (300 ppm) for 3 hours may induce increased physiological effort in order to maintain mental performance.

IU-73-D0533

CONTINUOUS ATTENTION UNDER A LOW CARBON MONOXIDE CONCENTRATION, M. Haider; H. Wagner; E. Groll-Knap, Adverse Effects of Environmental Chemicals and Psychotropic Drugs, Quantitative Interpretation of Functional Tests. Vol. I., p205-206 (1973)

In this report the authors emphasize the potential deleterious effects of low doses of carbon monoxide (50, 100, 150 ppm) on human psychomotor functioning. 14 subjects were exposed to regulated levels of carbon monoxide within an enclosed environment, and certain behavioral and electrophysiological criteria were examined throughout the experiment. In a test of time estimation the subjects had to estimate the duration of repeatedly presented tones. In a vigilance test lasting 1.5 hours, pairs of tones were presented in which the second tone of the pair was randomly muted, and the subject had to respond to this signal tone. Thus the number of ignored signals in individual test periods could be determined.

The results indicate that at 50 ppm carbon monoxide the number of ignored signals is greater than in normal air. At 150 ppm carbon monoxide the number of ignored signals is almost twice as high as at normal air. Similarly, the decline of vigilance in the course of the experiment is more rapid at higher concentrations of carbon monoxide. The evaluation of the electrophysiological variables was still under way at the time of this publication; the results were to be reported at a later date.

IU-73-D0534

TRAFFIC POLLUTION AND MENTAL EFFICIENCY, J. Lewis, Adverse Effects of Environmental Chemicals and Psychotropic Drugs, Quantitative Interpretation of Functional Tests. Vol. 1, p207-213 (1973)

A substantial reduction in mental performance has been measured in 16 subjects breathing traffic-polluted air, compared to their performance when breathing British Oxygen Co. medically clean air. The effect was not progressive, but set in rapidly and then remained substantially constant. The carbon monoxide concentration in the traffic-polluted air averaged less than 30 ppm: too little for it to have been solely responsible for the effect produced. The air inside cars in traffic and the air breathed by the subjects in this study was substantially the same.

A factor Z is proposed equal to $\frac{\text{intoxication rate}}{\text{detoxication rate}}$, for a toxic gas or aerosal. This factor can be used to determine the characteristics necessary in a pollution monitoring instrument, if it is to be used to indicate possible toxic effects. All laboratory experiments known to the author, in which single gases are used at concentrations thought to simulate traffic-polluted air, have not produced measurable changes because the concentrations may have been too low. Also, it is possible that the toxic effects of individual pollutants may not be colligative, but synergetic. A program to indicate the presence of such synergism was proposed.

IU-67-D0535

DRUGS AND DRIVING, D. V. Foster, British Medical Journal v2 n5555 p836 (24 June 1967)

The author of this letter expresses concern over the increase in the number of cases of drivers who are arrested and charged with driving while impaired by drugs. The effects of chloridazepoxide and chlorpromazine on driving ability are discussed, and the author suggests that labels be affixed to drug containers which would warn that the user may not be able to drive an automobile properly while taking that drug.

IU-72-D0536

DRIVING INCOMPATIBLE WITH MARIJUANA, Journal of American Medical Association v220 n1 p139 (3 Apr 1972)

This comment is a brief report on a West German study in which six men and six women drove on a special experimental runway after smoking 3.5 mg of marijuana. It was concluded that marijuana is as much of a menace on the road as acute alcohol intoxication.

IU-62-D0537

VERKEHRSMEDIZINISCHE BEDEUTUNG PSYCHOTROPER PHARMAKA (IMPORTANCE OF PSYCHOTROPIC DRUGS FOR TRAFFIC MEDICINE), B. Knick, Hefte zur Unfallheilkunde v71 p140-153 (1962)

The author specifically discusses how a variety of psychotropic drugs (Rauwrolfia alkaloids, phenothiazine derivatives, iminodibenzyl derivatives, monoamine oxidase inhibitors, propanediol derivatives, benzodiazepines phenyl-oxazolidines) may have adverse effects on motor vehicle operation. In addition to specific actions such as inducing drowsiness or ataxia, altering vision or response time, or affecting psychomotor skills, he feels that significant actions on personality or mood may result in deviant driving behavior.

IU-60-D0538

CONTRE-INDICATIONS DE CERTAINS MÉDICAMENTS POUR LES PILOTES D'AVIONS ET LES CONDUCTEURS DE VÉHICLES AUTOMOBILES (CONTRAINDICATIONS FOR CERTAIN DRUGS FOR AVIATORS AND DRIVERS OF AUTOMOBILES), E. Evrard, Bruxelles-Médical v40 p215-221 (14 Feb 1960)

Some drugs provoke changes in the neuro-psychomotor field which may be a source of danger for pilots while flying. And because the psychic condition of an automobile driver is not essentially different from that of an aircraft pilot under the effect of drugs, driving safety may be impaired. Various drugs which may be dangerous to drivers and pilots are discussed, and special attention is given to tranquilizers.

IU-68-D0539

PSYCHOMOTOR EFFECTS OF LOW DOSES OF ACETAZOLAMIDE TO AID ACCOMMODATION OF MEN TO ALTITUDE, B. O. Hartman; P. P. Crump, USAF School of Aerospace Medicine, Aerospace Medical Division (1968)

Studies were conducted to evaluate the usefulness of acetazolamide in aiding accommodation to altitude. Three experimental conditions were included in the studies: 5 men decompressed to a pressure altitude of 14,000 ft for 6 hrs 6 men decompressed to 16,000 ft for 4 hrs and 3 men decompressed to 14,000 ft for 5 days. Each subject participated in two runs, one with administration of the drug and the other on placebo, using the double blind procedure. Despite a scattering of significant psychomotor changes, no substantial evidence was obtained to support the use of this drug for accommodation to altitude.

IU-60-D0540

METHAMINODIAZEPOXIDE, N. Murray, Journal of American Medical Association v173 n15 p1760-1761 (13 Aug 1960)

The author of this article disagrees with an earlier letter in which it was stated that methaminodiazepoxide (Librium) has a greater margin of safety than meprobamate, particularly in relation to driving ability. An increase in traffic accidents, falls, disorientation, and ataxia are reported, and it is recommended that more research be done before general and non-specific administration of Librium is begun.

IU-66-L0001

LIMITATIONS IN EXPERIMENTAL RESEARCH ON HUMAN BEINGS, L. Alexander, Lex et Scientia v3 n1 p8-24 (Jan-Mar 1966)

Experimentation on humans has been an important and essential instrument in the development of medical skill since the dawn of scientific medicine. The chief protection of the subject has been the ethical code of the physician and the scientist, reinforced by their dependence upon the continued regard and respect of their fellows.

The origin and application of the Nuremberg Code are discussed, and the author feels the greatest advantage of the Code is its ability to supply the working scientist with a standard against which he can measure his own proposed experimentation. This enables researchers to proceed without the uncertainty that might be present if such a standard had not been available.

IU-67-L0002

PROTECTION OF PRIVACY IN BEHAVIORAL RESEARCH, L. Alexander, Lex et Scientia, v4 n1 p34-47 (Jan-Mar 1967)

The necessity of providing legal protection of privacy in behavioral research is stressed in this article, and various devices for ensuring such privacy are suggested. These include the safeguards of informed consent, responsible researchers, anonymity of respondents, destruction of data, coding of participant identity, avoidance of artifice, and limiting as narrowly as possible the invasion of privacy. The application of these principles will enable behavioral research to proceed without violating the rights and dignity of the individual.

IU-64-L0003

PATIENT CONSENT IN EXPERIMENTAL DRUG THERAPY, R. W. Ballard, Lex et Scientia v1 n1 p216-221 (Jan-Mar 1964)

The author recommends that when obtaining a patient's consent to undergo experimental drug therapy, certain points should be kept in mind. These include the full disclosure to the subject of all possibilities; the importance of obtaining written, signed, and witnessed consent from one legally capable of giving it; the necessity that the trialist not exceed the usage or regime proposed in the initial consent; and the requirement that the patient benefit from use of the investigational material. The capable investigator who secures informed consent and who follows his moral and ethical code has little to fear of the law.

IU-72-L0004

PUBLIC HEALTH SERVICE GUIDELINES GOVERNING RESEARCH INVOLVING HUMAN SUBJECTS. AN ANALYSIS OF THE POLICY-MAKING PROCESS, M. S. Frankel, Program of Policy Studies in Science and Technology, George Washington University (1972)

This study is concerned with the Public Health Service Guidelines regarding the protection of the individual as a research subject. Part I of the study examines the evolution of the first issuance of the PHS Guidelines and subsequent revisions through the promulgation of the Protection of the Individual As A Research Subject in 1969. Part II of the study analyzes the process by which these Guidelines were developed and examines the values, motivations, and other underlying factors which led to their formulation. This analysis is constructed in the context of various theoretical and conceptual frameworks of decision-making and attempts to explain why the policy evolved as it did.

IU-70-L0005

RESEARCH AND THE INDIVIDUAL, 1ST ED., H. K. Beecher, Little, Brown and Co., Boston (1970)

Because of the rapid increases in the progress of science and advances in moral and ethical standards, there is a great need today for constant re-examination of ethical aspects of experimentation. The general topic of research and the individual is first explored in this book, and the role of the subject and the investigator is each explained in depth. Questionable ethics in experimentation are presented, as are ethical problems in transplantation. The law and human experimentation section goes into the background of legal constraints on human experimentation, and various standards are presented. In the final chapter, the author discusses science in relation to moral, ethical, and religious issues. Various codes are reprinted in the appendix, ranging from the Hippocratic Oath to the AMA Guidelines for Organ Transplantation.

IU-67-L0006

WHAT PRICE PRIVACY?, C. C. Bennett, American Psychologist v22 n5 p371-376 (May 1967)

The values involved in the issue of privacy can best be understood in terms of the management of communication rather than the sanctity of privacy. The contemporary concern over privacy parallels a pervasive need to communicate; the individual's right to secrecy is counterbalanced by the public's right to knowledge. The explicit defense of privacy as a moral issue is a contemporary phenomenon, and the author demonstrates how the right of privacy has evolved.

It is the author's contention that the moral imperative is not to protect privacy, but to foster communication and to treat personal confidences with respect. Privacy is "a graceful amenity, generally to be fostered, but with discriminating restraint and with due recognition of obligations as well as privilege."

IU-75-L0007

MAN OR GUINEA PIG?, R. Berendt, George Washington Times v4 n2 p6-7, (Mar-Apr 1975)

The formulation of governmental guidelines for medical research involving human subjects is traced from 1963 to the present. The effect of the new regulations on medical research at George Washington University is discussed, and the author believes that the Medical Center's Committee on Human Research and Experimentation will serve to upgrade the quality of both research and medical care at that facility.

IU-74-L0008

ETHICS OF GIVING PLACEBOS, S. Bok, Scientific American v231 n5 p17-24 (Nov 1974)

Ethical issues are raised when a treatment is prescribed that, unknown to the patient, cannot have any specific effect on his condition. Although experiments involving humans are now subjected to increasingly careful safeguards for the people at risk, it will be a long time before the practice of deceiving experimental subjects with respect to placebos is eradicated.

Even those who recognize that placebos are deceptive often dispel any misgivings with the thought that they involve no serious deception. The author, however, believes that placebos are not trivial because they cost millions of dollars, patients incur greater risks of discomfort than is generally understood, and their use may combine to form practices on the part of patients which can

lead to serious harm. He therefore recommends that their use be restricted, and explains what considerations must be balanced in individual cases in order to decide if the use of a placebo should be avoided altogether.

IU-69-L0009

CIVIL LIABILITY FOR INVESTIGATIONAL DRUGS, PT. 1, J. E. Campbell, Temple Law Quarterly v42 n2 p99-155 (Winter 1969)

The author first reviews the sources of law governing the investigational use of drugs, including federal statutes, federal regulations, state and local laws, and codes of ethics and other regulations and directives. These standards are discussed in the context of phases of investigational drug studies, duties of the sponsor and investigator, and consent.

Some of the problems of drug testing and evaluation are presented as a general background to the discussions on liability which follow. Contract liability between the sponsor and investigator, the investigator and the subject, and the investigator and the insurer, is explained. Intentional torts for which liability may be imposed include assault and battery, defamation, fraud, deceit, and misrepresentation (by either the sponsor or investigator), and violation of confidence and privilege.

IU-69-L0010

CIVIL LIABILITY FOR INVESTIGATIONAL DRUGS. PT. 2, J. E. Campbell, Temple Law Quarterly v42 n4 p289-354 (Summer 1969)

In Part II, the author concentrates upon theories of negligence and strict liability which apply to the investigational use of drugs. The liability of the drug manufacturer for negligence is discussed in relation to such areas as defective products, selection of investigator, and failure to warn, while the physician's negligence is seen in terms of informed consent and the duty to warn, malpractice, clinical investigation as a medical specialty, and negligence in administration of drugs. Such concepts as respondeat superior, charitable immunity, and the omission of a positive duty are discussed in reference to the liability of the hospital and research institution. Finally, a section on the government's liability for negligence deals with the Federal Tort Claims Act and the FDA.

Strict liability is viewed in three different contexts: from the position of various legal writers, the Restatement of Torts, and court decisions. Defenses to liability in all actions involving investigational drugs are then discussed, and the author concludes with an analysis of remedies and compensation schemes.

IU-60-L0011

LEGAL IMPLICATIONS OF PSYCHOLOGICAL RESEARCH WITH HUMAN SUBJECTS, Comment, Duke Law Journal v1960 n2 p265-274 (Spring 1960)

Recent concern over the legal implications o psychological research with human subjects is understandable since legal boundries in this area have not been delineated by judicial or legislative pronouncements. The possibility of subjects seeking judicial redress for any injuries is not so remote that consideration of related legal problems is unwarranted.

The determination of legal liability will depend mainly upon whether a privilege exists for the experimenter and upon the efficacy of the subject's consent. Recovery for damages will be affected both by the elements of loss which are compensable, and by the measurement of these elements of loss.

IU-74-L0012

PATIENTS' RIGHTS. HARVARD IS SITE OF BATTLE OVER X AND Y CHROMOSOMES, B. J. Culliton, Science v186 n4163 p715-717 (22 Nov 1974)

A chromosome screening study conducted by the Harvard Medical School has led to a controversy over the rights of subjects to be fully informed before consenting to an experiment. The opposition to the study claims that the classification of a baby as XYY will lead to behavioral problems as part of a self-fulfilling prophecy. The only way to avoid such a result is to not inform the parents of the results of the screening, which in turn would involve serious charges of unethical conduct. Feelings about the ethics of the study are strong, ranging from charges of fraud and deceit to rationalizations that labeling children is just a risk that must be taken in order to conduct the investigation.

IU-66-L0013

LEGAL CODES IN SCIENTIFIC RESEARCH INVOLVING HUMAN SUBJECTS, W. J. Curran, Lex et Scientia v3 n1 p65-73 (Jan-Mar 1966)

International law in the area of research with human beings is outlined, and various interpretations of specific provisions in the growing number of codes are given. Among these, the Nuremberg Code and the Helsinki Declaration are in the author's judgment the two most influential sets of principles on human experimentation in the Western World.

In the field of American law, little control over experimentation has been exercised, but there is a great deal of interest on the part of the American medical, educational, and scientific communities in the possibility of increasing legal control. The antagonistic drives of concern for human rights and the curing of the ills of man through research ensure that the topic of human experimentation will continue to be a controversial one.

IU-63-L0014

LEGAL IMPLICATIONS OF PSYCHOLOGICAL RESEARCH WITH HUMAN SUBJECTS, D. P. Dietrich, In CLINICAL INVESTIGATION IN MEDICINE, 1ST ED., I. Ladimer; R. W. Newman, eds., Law-Medicine Research Institute, Boston, p246-256 (1963)

The environment in which human experimentation is pursued may be termed extralegal in that legal bounds have not been delineated by judicial or legislative pronouncements. This is because until recently, psychological research had seldom involved potential harm to the subject. The possibility of a subject seeking judicial redress for injuries is no longer so remote that speculative consideration of related legal problems is unwarranted.

The issues of liability and damages are explored, and the author concludes that the resolution of the dilemma of society's needing research while at the same time requiring due legal protection for both experimenter and subject, can be premised upon the recognition that society is more than the ultimate beneficiary of research.

IU-71-L0015

THE ASSAULT ON PRIVACY, A. R. Miller, Ch. 4, Sect. 4, The Federal Government and the Public--The Freedom of Information Act, p152-161 (1971)

The Freedom of Information Act may have a profound effect upon an individual's capacity to prevent the circulation of information that he has divulged to the government. The author believes that the disclosure of information gathered by the federal government to private individuals and organizations creates a series of threats to personal privacy. These threats are particularly troublesome because in many cases the information held by the government has been extracted

from individuals under a statutory mandate or through the use of subtle (and occasionally blatant) forms of coercion.

Some of the difficulties and open issues raised by the Act are discussed, such as how the cost of information disclosure is to be computed and who is to bear the expense. The author concludes that the conflict between the general public's right to know what its government is doing and the individual's right to have some control over the dissemination of personal information held by the government is an extremely difficult one to resolve.

IU-67-L0016

HUMAN EXPERIMENTATION: ETHICS IN THE CONSENT SITUATION, J. Fletcher, Law and Contemporary Problems v32 n4 p620-649 (Autumn 1967)

There is a spectrum of ethical issues associated with research in man; these include broad social policy goals, underlying which are fundamental images of man and society; the scientific values, timing, and design of the experiment; the informed consent of the subject; and the conditions surrounding publication and application of the findings to wider groups. It is the consent situation which will be the focal point of the most serious legal difficulties and moral dilemmas. The author explores the conditions of consent-giving in the light of ethics, and formulates some untested but promising hypotheses for the improvement of the consent situation itself.

The debates over rules for human experimentation swing between two extremes, between threats of external controls on the one hand and claims of the scientist for autonomy on the other. The two values which come into conflict, the general welfare and the welfare of the individual, must be balanced and harmonized in the consent situation itself. The author argues that the principle of mutuality between persons is the relevant ethical principle for the consent situation.

IU-67-L0017

IS THE LAW READY FOR HUMAN EXPERIMENTATION?, P. A. Freund, American Psychologist v22 n5 p394-399 (May 1967)

The author of this article feels that the law cannot be expected at this time to yield precise answers to the ethical problems of medical experimentation. Because the law is conservative and deeply protective of human integrity and life, certain safeguards should be adopted by researchers using human subjects. These precautions include the inner check, disclosure and consent, the external check of another echelon of medical advice, and the requirement that all results of an experiment be submitted for publication.

The law on the subject of experimentation will be worked out in close reliance on the moral sensibilities of the community. Therefore, it behooves the medical profession to take the public into its confidence and to educate the public rather than risk the shock and revulsion which are likely to be felt in a melodramatic case involving human research subjects.

IU-69-L0018

LEGAL FRAMEWORKS FOR HUMAN EXPERIMENTATION, P. A. Freund, Daedalus v98 n2 p219-527 (Spring 1969)

A consideration of possible legal frameworks for human experimentation ought to rest on an appreciation of certain characteristics of the legal order, such as the law's solicitude for physical integrity. A convenient framework for considering the role of law in human experimentation is afforded by two models of order--the voluntary association or community, and the imposition of extrinsic standards and sanctions for their breach.

The legal requisites for legitimate, liability-free experimentation are the exercise of due care in administering the procedures, soundness of experimental design, and informed, voluntary consent. Attention should also be paid to plans for the compensation of subjects for harm resulting to them irrespective of the blamelessness of the investigator, and the author offers various suggestions for such compensation.

IU-70-L0019

EXPERIMENTATION WITH HUMAN SUBJECTS, 1ST ED., P. A. Freund, ed., George Braziller, New York (1970)

The premise of this collection of articles is the American Academy of Arts and Sciences' belief that experimentation with human subjects is an integral part of modern scientific research, and that the many ethical issues raised by such research must be carefully considered. There are many interests involved in this area: those of the subject; of the investigator, as well as the scientific team with which he is associated; and of the larger society that in one way or another sanctions such experiments.

Contributors to the book include physicians, historians, sociologists, lawyers, philosophers, anthropologists, and psychiatrists. The topics covered range from philosophical reflections on human experimentation and legal frameworks for experimentation, to protection and compensation for injury and the ethical design of human experiments.

IU-68-L0020

PHYSICIAN'S VIEW OF INFORMED CONSENT IN HUMAN EXPERIMENTATION, R. E. Ritts, Fordham Law Review v36 p631-638 (1968)

The author discusses the important practical considerations involved in informed consent for human experimentation, both for normal subjects and those incompetent by reason of age or mental impairment. Where the subject gives consent for his own participation in experimentation, not only is divulgence of more than the risks and benefits known by the investigator mandatory, but also it is essential that the investigator himself, if he is not the patient's own physician, explain in comprehensible language the appropriate information and techniques involved in the proposed experiment.

There are two major premises that most physician-investigators embrace in the course of their studies. First, science and humanity demand the participation of humans as subjects for medical experimentation. Second, the conditions and circumstances of the particular experiment are merely extensions of the usual patient-physician relationship. Thus, it is essential that while humanity and science are served, the individual's rights must be protected with vigor and vigilance, and if this means that certain experiments cannot be conducted, then it is appropriate that they are not.

IU-68-L0021

IMPLIED CONSENT LAW. PHYSICIANS WARNED OF POSSIBLE CONSEQUENCES OF WITHDRAWING BLOOD FOR DRUNK DRIVING TEST, Ohio State Medical Journal v64 p605-608 (May 1968)

The Ohio State Medical Association's legal counsel has advised the medical profession of that state that before withdrawing blood for alcohol tests under the new implied consent law, the physician must be satisfied that such consent is with complete information and understanding of the consequences. The statute affords no immunity from civil liability for the withdrawal of blood, but physicians cannot be ordered to withdraw blood from a person accused for driving under the influence of alcohol. Although the law could be improved by including an immunity from liability for a physician, nurse, or other person administering the test, it has withstood constitutional attack in other states.

IU-70-L0022

LAW AS A SYSTEM OF CONTROL, L. L. Jaffe, IN EXPERIMENTATION WITH HUMAN SUBJECTS, P. A. Freund, ed., George Braziller, New York, p197-217 (1970)

A system of concepts, standards, and rules governing human experimentation must be adopted which gives due recognition to the various interests entitled to protection. These interests are the individual subject's interest in the integrity of his personality and physical well-being, the experimenter's interest in pursuing his vocation, and the interest of the collectivity in increasing knowledge.

There is not as yet much law explicitly dealing with human experimentation, but the common law has developed and continues to develop doctrines that are applicable. Therefore, the experimenting professions must develop their own controls, either internalized controls of conscience and the acceptance of socially required limitations on conduct, or by using institutional committees whose approval must be secured before the experiment can proceed.

IU-72-L0023

EXPERIMENTATION WITH HUMAN BEINGS, 1ST ED., J. Katz, Russell Sage Foundation, New York (1972)

Although there are no easy answers to the questions raised by human experimentation, the author hopes that this book will encourage more thoughtful and conscious recognition of the values involved. The book presents materials from many sources, organized around an analytical framework which is intended to raise questions which should be entertained in examining the material. Although the volume is conceived along the general lines of a law school casebook, it is addressed to all disciplines.

After a general introduction to the human experimentation process via several landmark cases and a discussion of the impact of societal dynamics on experimentation, the authority of the investigator as guardian of science, subject, and society is discussed. In this context, such issues as experimentation without restriction, and what consequences to subjects and society should affect the authority of the investigator, are raised.

IU-67-L0024

ETHICAL ISSUES IN THE USE OF HUMAN SUBJECTS IN PSYCHOPHARMACOLOGIC RESEARCH, M. W. Katz, American Psychologist v22 n5 p360-363 (May 1967)

The frequency of unethical practices in the field of drug research with human subjects has been increasing, and unless researchers develop their own solutions soon, the public, and various federal agencies, will probably do so. There is a large class of problems with both clinical investigations and basic research, ranging from mild breaches of ethics to serious violations of subject's rights. The evaluation of the seriousness of the infraction on the one hand, and the potential importance of an experiment on the other, are essentially value determinations which should best be left to committees formed to review research projects.

IU-67-L0025

RIGHTS, RESPONSIBILITIES, AND PROTECTION OF PATIENTS IN HUMAN STUDIES, I. Ladimer, Journal of Clinical Pharmacology v7 n3 p125-130 (May-June 1967)

It is the human subject who is the fundamental figure in clinical investigation, and however noble, sincere, and important the objectives of the study, the rights of the individual who contributes to its pursuit must be respected and protected.

This article is concerned mainly with the duty of the relationship, and a distinction is drawn between clinical practice and clinical research. However, in both there must be mutual responsibility and an agreement based on understanding, as well as consent. The applicability of legal liability is discussed, and various suggestions as to protection of subjects, primarily in the form of compensation, are offered.

IU-66-L0026

ETHICAL AND LEGAL ASPECTS OF MEDICAL RESEARCH ON HUMAN BEINGS, I. Ladimer, Journal of Public Law v3 n2 p467-511 (Fall 1954)

Because progress in the improvement of health depends ultimately upon medical research on humans, it is necessary and proper to conduct research involving both use of unestablished procedures and occasional hazard on humans under legally and medically accepted standards. Although human research has been a concomitant of medical sciences since antiquity, its increasing extent and expansion today warrants recognition as a separate endeavor affected with a public interest as significant as medical practice itself. Therefore, the law should appreciate this need and apply appropriate criteria including, but not relying solely on, the standards of knowledge, skill, and care required of physicians in regular practice.

The medical and scientific professions concerned with human research have manifested an interest in maintaining the highest scientific, ethical, and legal standards, and have developed controlling safeguards and disciplines. Group consideration of all proposals should ensure that prior to and during the actual investigation, participation by any patient or subject will be purely voluntary, based on an informed understanding appropriate to the subject's condition and comprehension.

IU-70-L0027

PROTECTION AND COMPENSATION FOR INJURY IN HUMAN STUDIES, I. Ladimer, In EXPERIMENTATION WITH HUMAN SUBJECTS, P. A. Freund, ed., George Braziller, New York, p247-261 (1970)

In view of the inherent hazards of clinical investigation, appropriate protection for all participants should be established through a form of compensation insurance, whereby restitution may be made for any untoward result. The cost should be borne by the sponsors as an accepted cost of the enterprise. Such an approach will provide proper and needed protection for all and should prove reasonably inexpensive. It accords with the nature and dignity of clinical research and demonstrates the public and social responsibility of the profession. A voluntary, organized method will accommodate all interests and also avoid the present inequities and uncertainties, and the imposition of undesirable controls.

IU-70-L0028

NEW DIMENSIONS IN LEGAL AND ETHICAL CONCEPTS FOR HUMAN RESEARCH, I. Ladimer, ed. Annals of the New York Academy of Sciences v163 art2 p293-593 (21 Jan 1970)

The conference on which this monograph is based was convened to enable representatives of major disciplines, mainly in medical and legal fields, to present their experience and recommendations for meeting current and anticipated problems of experimentation with humans. The conference was designed to emphasize realistic and practical issues leading to action solutions, with awareness that physicians and medical researchers are not alone--and should not be-- either in assuming these problems or in exercising responsibility.

Ethical and legal base lines for professions and the community are presented, followed by a discussion of special problems of medical disciplines and related

professions. Experience in design, conduct, and evaluation of research concerns such subtopics as reducing the hazards of human experiments, ethics in clinical trials, and investigational drug studies. Professional controls, both internal and external, are discussed, and the final section on social responsibility through communication is concerned with protecting participants in human studies, control through public response, and community information programs. In the concluding remarks the editor stresses the importance of education and communication, public involvement, guidance and control, and properly designed research, and presents a brief discussion of fundamentals and innovation, patients and subjects, protection, and progress and its responsibility.

IU-66-L0029

HUMAN EXPERIMENTATION. NEW YORK VERDICT AFFIRMS PATIENT'S RIGHTS, E. Langer, Science v151 n3711 p663-666 (11 Feb 1966)

The New York Board of Regents decision regarding the two doctors who injected live cancer cells in patients under ambiguous circumstances is discussed in the context of two key issues: informed consent and the physician's role of experimenter. The author feels that the decision to suspend the doctor's licenses for one year is an affirmation that there is public interest to be protected in the field of medical research, and an omen that the public may begin to set the rules in this area.

IU-68-L0030

HUMAN LABORATORY ANIMALS. MARTYRS FOR MEDICINE, M. F. Ratnoff; J. C. Smith, Fordham Law Review v36 p673-694 (1968)

The purpose of this paper is to examine, for the benefit of lawyers, the moral and legal dilemmas faced by doctors dealing with human experimentation, and to describe some of the attempts of the medical community to deal with the conflict which arises when the good of society and the good of the individual clash. The phenomenon of medical research is first explored, and a definition of human experimentation is provided which incorporates the differentiation between therapeutic and manipulative experiments, and individual questions of morality. The medical view of the problem is then examined in terms of various codes of ethics, the essence of these codes, and interdisciplinary help for doctors.

In the section on the legal view of the problem, the authors describe the physician's peril doctrine, legal recognition of the necessity for experimentation, and the development of the consent doctrine; in this context, consent by parents for minors and consent by the incompetent are mentioned. Prisoner, Army, U.S. Public Health, and municipal regulations are described in the section on statutes and regulations affecting the use of human volunteers. Finally, consent is explained in terms of legal precedent, religious views, and informed consent.

The question remains whether medical advances should be treated on a piecemeal basis, or whether legislative bodies should come forth and define the parameters of acceptable experimentation. The authors conclude that enlightened attitudes on the part of the general public, particularly the law, are necessary if society is to benefit from the recent advances in experimental medicine.

IU-75-L0031

HUMAN GUINEA PIGS. THE LAW AS BAD MEDICINE, F. Melcher, Student Lawyer v3 n6 p39-42, 49 (Feb 1975)

No body of law has as yet established a set of specific guidelines which are easily understood and applicable to ensure that medical research on humans is of the highest scientific and ethical standards. Although a few recent guidelines and regulations have improved the situation, they have hardly stemmed the abuses. According to recent evidence, there is more risk than benefit to

research subjects, and these [illegible] are more than twice as likely to be indigent. However, no effective [illegible] dealing with the evaluation of risks and benefits exist.

Protection against abuses in human experimentation involves the usual civil remedies: suits for malpractice, assault and battery, invasion of privacy, and intentional infliction of emotional distress. However, there are a number of things that could be done now to prevent further abuses. These include extending a ban to all subjects who cannot adequately give consent and restricting research to a definite proportion of people from different groups. Eventually changes in rules and regulations may force experimenters to view each subject as a human with full human rights.

IU-69-L0032

INDISPENSABLE ROLE OF INDEPENDENT ETHICAL JUDGMENT, R. C. Moffatt, University of Florida Law Review v21 n4 p477-483 (Spring 1969)

It is vital to recognize that each profession has certain institutionalized values which represent to the profession the best interests of both society and that profession itself. The author believes that impartial judgment of the social interest demands full and free discussion, including the participation of individuals who make ethical issues their primary concern.

A humanistic perspective to human experimentation may provide guidance at a fundamental level. Researchers must refuse to permit scientific method to replace ethics, and in the face of all claims of inevitability, they must insist upon this freedom to exercise true social control.

IU-67-L0033

LEGAL IMPLICATIONS OF CLINICAL INVESTIGATION, H. N. Morse, Vanderbilt Law Review v20 n4 p747-776 (May 1967)

The author acknowledges the absence of legal rules of liability dealing with clinical investigation and suggests that the general laws of consent which were developed for the traditional patient-physician relationship are inadequate as presently applied to the legal problems surrounding clinical investigation. He looks to certain widely accepted codes which deal with the ethical considerations attendant upon clinical investigation, and concludes that these could provide a basis for new court-made rules specifically dealing with these problems.

IU-67-L0034

EXPERIMENTATION ON HUMAN BEINGS, Note, Stanford Law Review v20 p99-117 (Nov 1967)

This note is an attempt to ascertain some standards and safeguards that will permit useful medical and scientific research, yet protect the safety, privacy, and dignity of the experimental subject. The topic of informed consent is first discussed; the need for consent is stressed, but its inadequacies, such as the difficulty of achieving consent, and the problem of researchers minimizing risks, are also presented. Other safeguards are suggested, and these include the investigator's sense of professional responsibility, prior group review of proposed human research, and the inclusion of a monitor, who is concerned solely with the subjects' welfare, in every research team.

Researchers' liability is discussed in three different contexts: professional sanctions, civil liability, and criminal liability. The author concludes that abuses in this area have occurred, and will continue to do so as long as standards and safeguards are insufficiently articulated. The greatest need today is for a wider public airing of the standards involved in the area so that unwarranted restrictions on the legitimate and necessary activity of human research are not imposed.

IU-72-L0035

PUBLIC SCHOLAR AND THE FIRST AMENDMENT. A COMPELLING NEED FOR COMPELLING TESTIMONY?, Note, George Washington Law Review v40 n5 p995-1024 (July 1972)

In view of the importance to the public of the first amendment rights claimed to be in danger when a scholar is subpoenaed, it is essential that courts give adequate consideration to the competing interests at stake when a government body exercises its power of compulsory process. The government's need for compulsory process to obtain information through the grand jury, legislative committees, administrative agencies, and courts, and the abridgement of first amendment interests which may result from insensitive use of the subpoena power as it is applied to scholars are examined.

The potential of compulsory process to impede scholars' performance of first amendment functions includes the drying up of sources and the chilling effect on research. The authors suggest a method of analysis to resolve the conflict between the use of compulsory process and the first amendment rights of the public scholar. This involves a balancing between the government's need of a subpoenaed witness's testimony and the infringement of rights which the testimony necessitates.

IU-70-L0036

SOCIAL RESEARCH AND PRIVILEGED DATA, Note, Valparaiso University Law Review v4 n2 p368-400 (Spring 1970)

The social sciences' contributions to both government and society have been of great importance, but the conflict between the individual's right of privacy and the social researcher's need to gain knowledge mitigates strongly against the effectiveness of the relation between the government, social sciences, and society. Presently, the burden of safeguarding the research subject's confidential disclosures belongs to the researcher himself as imposed upon him by his own sense of integrity and ethical standards. Researchers contend that these safeguards are inadequate, and that the ultimate safeguard is dependent upon legal recognition of the confidentiality of research data in the form of a privilege.

The basic factor which the researcher must consider in maintaining confidentiality is control; confidentiality implies inaccessibility of data for purposes other than those to which the respondent has consented. Where the researcher is compelled to make disclosures by subpoena, control is lost and confidentiality destroyed. Only a privilege will provide the control necessary to the preservation of confidentiality.

IU-67-L0037

PRIVACY AND BEHAVIORAL RESEARCH, Panel on Privacy and Behavioral Research, American Psychologist v22 n5 p345-349 (May 1967)

The focus of this article is the issue of privacy arising in connection with programs of data collection and study which are intimately associated with behavioral research. There exists an important conflict between two values which are strongly held in American society--the individual's right to dignity, self-respect, and privacy; and the right of citizens to know anything that may be discovered about any part of the universe. It is this conflict which gives rise to many of the ethical problems in human research, and greater attention must be given them.

Various recommendations are made which the writers believe will ensure that more attention is paid to the rights of research subjects. These include consideration of the subject's right to privacy, voluntary participation in studies, and the securing of informed consent.

IU-67-L0038

HUMAN GUINEA PIGS, 1ST ED., M. H. Pappworth, Beacon Press, Boston, (1967)

After a brief introduction to the subject of human experimentation, numerous examples of what the author considers unethical experiments are given. These include research on children, pregnant women, mental defectives, prisoners, the dying and old, non-patient volunteers, patients awaiting operations, and patients with various diseases. Ethical principles and legal considerations, as well as proposed legislation, are discussed, and the author concludes with an explanation of what is a true volunteer, and an expression of his desire to return to the 'physician-friend.'

IU-68-L0039

EXPERIMENTS WITH HUMAN SUBJECTS, O. M. Ruebhausen, Record of the Association of the Bar of the City of New York v23 n2 p92-104 (Feb 1968)

There is increasing public concern with scientific experimentation involving human subjects, and the law will respond to this new public awareness in its three most traditional ways -- through statutes, in judicial decisions, and by administrative regulations. Some fundamentals that will shape these future legal boundaries are the paramount place assigned to human dignity, the individual's claim to life and physical integrity, the scientists' own sense of ethics, and the principle of free and informed consent.

The author explores a recent California statute which exemplifies what can develop when lawyers do not take counsel with scientists. The extent to which lawyers and scientists recognize and actively share with each other the mutuality of their interests, could be the most powerful force in accommodating the ends of science with the values of man.

IU-65-L0040

PRIVACY AND BEHAVIORAL RESEARCH, O. M. Ruebhausen; O. G. Brim, Columbia Law Review v65 n7 p1184-1211 (Nov 1965)

The conflict of values between scientific research and private personality is explored in this article. The right of privacy is a positive claim to a status of personal dignity and a claim for freedom of a very special kind. However, not every threat to private personality is a matter of sufficient concern to warrant social protection; the test is whether the invasion is unreasonable or intolerable.

The recent advances in science make it clear that society must now work out some reasonable rules for the protection of private personality. The authors identify some of these rules of conduct which, by providing balance and sensitive awareness, can accommodate and perhaps resolve the confrontation of the values of privacy with other values.

The two main privacy issues presented by behavioral research are consent and confidentiality, and seven principles are suggested for inclusion in a general code of ethics for behavioral research. The authors believe that the lead should be taken by the scientific community through its own codes, attitudes, and behavior to correct the growing imbalance between research and the values of privacy.

IU-69-L0041

PROTECTION OF CONFIDENTIALITY IN THE COURTS. THE PROFESSIONS, G. Schroeter, Social Problems v16 n3 p376-385 (Winter 1969)

This paper focuses on the distribution of privileged communication statutes in

the U.S., both across professions and across geographical regions. This topic is deemed worthy of sociological attention, and several interesting findings are elaborated. It is noted, for instance, that prestige rankings are not a totally adequate predictor of those professionals who can protect the confidences of clients or patients in the courts. Two important questions that remain are whether laymen take a sufficient interest in the lack of privileged communication statutes to bring pressure to bear on legislators, and how important the lobbying activities of professional associations may be in influencing the prevalence of these statutes.

IU-67-L0042

ROLE OF LAW IN MEDICAL PROGRESS. PT. 5. THE SUBJECT'S CONSENT TO HUMAN EXPERIMENTATION, E. B. Stason, Law and Contemporary Problems v32 n4 p586-596 (Autumn 1967)

This is an excerpt from a work dealing with the role of law in such medical areas as abortion, homotransplantation, and human experimentation; it is the latter which is of concern here. The article focuses on the subject's consent to experimentation, and is concerned mainly with healthy persons who volunteer for medical studies.

Existing codes, standards, and rules are laid out and evaluated by the author, in an attempt to suggest tentative answers to the questions which these standards raise. These problems include identifying risks and duties with greater precision, defining disclosure requirements, evaluating the voluntariness of the consent obtained, and the future of human experimentation. The author feels that the optimum approach to these problems is through carefully drawn and objectively considered codes or guidelines drafted by the professions for themselves.

IU-69-L0043

INFORMED CONSENT TO THERAPY, J. R. Waltz; T. W. Scheuneman, Northwestern University Law Review v64 n5 p628-650 (Nov-Dec 1969)

The authors attempt to place the existing codes and commentary on the doctrine of informed consent into an analytical structure. The informed consent issue separates into two elements: information and consent. The physician must disclose certain information about collateral risks, and he must not proceed without consent to the risks which were, or should have been, disclosed. In the context of information disclosure, the authors discuss risks that could be disclosed, unknown risks and innovative therapy, risks that should be disclosed, materiality of risks, and the privileges to withhold collateral risk data. After a discussion of consent, the issues of causation and damages are explored, and the authors conclude that the problems of informed consent are indeed susceptible of rational solution.

IU-61-L0044

REFLECTIONS ON THE PROBLEMS OF HUMAN EXPERIMENTATION, L. G. Welt, Connecticut Medicine v25 n2 p75-78 (Feb 1961)

It is often impossible to draw a clear line between the practice of medicine and experiments or research. Developing a code to guide clinical investigators may be impossible since it must be neither too restrictive, nor too ambiguous. The Nuremberg Code was an attempt at such a code, and is today the most seriously considered public code governing human experimentation. However, it is ambiguous, and its lack of precision could be devastating to the proper development of a research program.

The author recommends that specific codification be deferred until a careful study of the problem has been implemented, and that committees to review experimental designs be established. Documents and codes cannot substitute for the integrity of the individual investigator.

IU-67-L0045

ETHICAL ISSUES IN RESEARCH WITH HUMAN SUBJECTS, M. Wolfensberger, Science v155 n3758 p47-51 (6 Jan 1967)

Many disciplines confront ethical problems in research; situational details may vary, but the same ethical principles prevail. The author demonstrates how situations posing ethical problems can be reduced and more readily resolved by rational analysis of underlying issues and principles.

In the consent agreement the subject may yield various of his rights to the experimenter, and the rigor of requirements for consent may be permitted to vary according to what is being asked of the subject. There are different levels of research and types of risks, and ethical guidelines must be based on these distinctions. It will be particularly helpful if researchers in a wide range of disciplines contribute experiences, permitting a sharpening of these guidelines.

IU-74-L0046

BURGEONING LAW OF MEDICAL EXPERIMENTATION INVOLVING HUMAN SUBJECTS, L. E. Bryant, John Marshall Journal of Practice and Procedure v8 n1 p19-31 (Fall 1974)

The purpose of this article is to advise Illinois attorneys and other interested parties on the status of the law presently applicable to medical experimentation involving human subjects in Illinois hospitals. Medical investigation is first defined, followed by a discussion of various codes dealing with human experimentation. Detailed explanations of federal regulations such as FDA and HEW guidelines are provided, as well as possible sanctions for violations of these regulations.

Proposed Illinois legislation is presented, and the author believes that the enactment of this legislation, coupled with the finalized HEW regulations, will not necessarily resolve all the problems of medical experimentation, but will constitute a significant step forward. Hospitals and their attorneys need to familiarize themselves with the rules now in effect and the forms necessary to comply with those rules, to assure that human subjects involved in medical investigations are adequately protected, and that inadvertent noncompliance does not expose the hospitals to malpractice claims or to loss of research funds.

The appendices to the paper include detailed instructions and forms for hospital use to assure compliance with present law. These forms include a suggested model set of by-laws for an institutional review committee, a form to provide the committee with information to determine whether subjects are at risk, an investigational new drug application, a special consent form, and guidelines on witnessing consent forms.

IU-68-L0047

ETHICAL PROBLEMS IN HUMAN EXPERIMENTATION, O. E. Guttentag, In ETHICAL ISSUES IN MEDICINE, E. F. Torrey, ed., Little, Brown and Co., Boston, p195-226, (1968)

The two main topics covered in this article are the basic ethical principles that underlie experimentation on humans as it is viewed in the Western world, and the demands that these principles make of the experimenter in any particular experiment. This approach is intended to establish guidelines for an ethic which will permit an experimenter to resolve any specific problem because it can be viewed against a background provided by the ethic, which is common to all problems.

Although today's experimenters are well-trained and familiar with the manipulation of impersonal data, they are little trained and insecure in evaluating personal relationships. The experimenter's obligation to show respect for the

opinions of mankind is easily met; all that is necessary is to assert, in every statement dealing with human experimentation, whether informed consent was sought and obtained, and what the subject was told.

Two practical recommendations are offered: first, a climate of spiritual values should be fostered in which experiments done not for the immediate good of the subject but for the welfare of mankind would be performed only by experimenters who are not simultaneously responsible for the clinical care of these subjects. Second, a climate of spiritual values should be fostered in which ethical explicitness in all scientific utterances dealing with human experimentation would be encouraged.

IU-67-L0048

EXPERIMENTATION--AN ARTICULATION OF A NEW MYTH, L. V. Kaplan, Nebraska Law Review v46 n1 p87-109 (1967)

This article is concerned with the ethical problems of medical experimentation, primarily in the area of the doctor-patient relationship. The author believes that any medical intervention, whether treatment or calculated omission, is necessarily experimental because the results at best are only probable. Therefore the problem of experimentation requires a resolution of the conflict between individual responsibility, and environmental encroachments on that autonomy; it must attempt to safeguard individual rights without shattering societal precepts.

All intervention and experimentation is permissable given informed consent. The legal standard should be one of full disclosure of known risks, and the patient should have the responsibility of asking or attempting to clarify all misunderstanding or omission after such disclosure. The author recommends a signed, notarized, witnessed writing as an indication of consent; this document should state in non-technical terms briefly the purpose of the experiment and the degree of physical or mental harm which can potentially be expected. Once the experimenter has framed his experiment, the author would require submission of his protocol to a selected board which would apprise him of any perceived difficulties, shortcomings, or necessary alterations.

IU-68-L0049

HUMAN USE OF HUMAN SUBJECTS, H. C. Kelman, In A TIME TO SPEAK OUT: ON HUMAN VALUES AND SOCIAL RESEARCH, Jossey-Bass Inc., San Francisco p202-225, (1968)

The social scientist must concern himself with the ethical implications of his treatment of human subjects and of the relationships that he establishes with them. This article addresses itself to this problem, focusing on the ethical and methodological problems that arise in social-psychological experiments. Specifically, the author is concerned with the use of deception in such experiments, which raises obvious questions about informed consent and invasion of privacy.

What concerns the author most is not so much that deception is used, but that it is used without question; it is now standard operating procedure in the social psychologist's laboratory. There are three considerations on which the author's concern about the use of deception is based: the ethical implications of such procedures, their methodological implications, and their implications for the future of social psychology. Some of the ways the problems of deception can be solved are discussed, and these include increasing active awareness of the problem, exploring ways of counteracting and minimizing the negative effects of deception, and giving careful attention to the development of new experimental techniques that dispense with the use of deception. The author feels that there is a definite need to devote energy to active exploration of alternative approaches to deception.

IU-73-L0050

CONFIDENTIALITY OF NARCOTIC ADDICT TREATMENT RECORDS. A LEGAL AND STATISTICAL ANALYSIS, R. M. McNamara; J. R. Starr, Columbia Law Review v73 n8 p1579-1612 (Dec 1973)

Medical treatment is essential in dealing with drug addiction; law enforcement alone is not enough. For treatment to be effective, patients must be assured that both the treatment relationship and the records of that treatment are kept totally confidential. Without the confidence and trust established by ensuring confidentiality, those who need help most will not ask for it because of fear of being reported to law enforcement officials and subsequent legal action.

After a brief introduction to the problem of drug abuse and the need for confidentiality, some of the threats to confidentiality are considered. These include overzealous law enforcement, reporting statues, and inadequate record-keeping procedures. The authors believe that laws and procedures for handling governmental data on addiction can be strengthened to insure confidentiality of individual treatment records. This can be done by holding to a minimum the identification of individuals, and by limiting centralized data collection to absolute details. If confidentiality can be maintained, treatment registries of drug abuse information can remain an effective tool for research and program evaluation without deterring addicts from seeking treatment. Legal mechanisms to protect confidentiality, including various state and federal laws, are discussed, and special attention is given to the recent New York case of People v. Newman which was decided under those laws.

IU-67-L0051

PRIVACY AND BEHAVIORAL RESEARCH, Office of Science and Technology, Government Printing Office, Washington (1967)

In this report the Panel on Privacy and Behavioral Research proposes guidelines for those engaged in behavioral research or associated with its support and management. Attention is restricted to issues of privacy arising in connection with those programs of data collection and study which are intimately associated with behavioral research.

Two main criteria should generally be met to insure the subject's well-being and integrity; he must be allowed to decide whether he will participate in a given study, and if he consents, the information which he provides must be treated as privileged and confidential. If the subject cannot be completely informed, the consent must be based on trust in the scientist and in the institution sponsoring him. In any case, the scientist and his sponsoring institution must insure privacy by the maintenance of confidentiality.

The primary responsibility for the use of ethical procedures must rest with the individual investigator, but government agencies that support behavioral research should satisfy themselves that the institution which employs the investigator has effectively accepted its responsibility to require that he meet ethical standards. The methods used for institutional review should be determined by the institutions themselves; since they differ in their internal structures and operating procedures, no single, rigid formula will work for all.

The Panel contends that legislation to assure appropriate recognition of the rights of human subjects is neither necessary nor desirable if scientists and sponsoring institutions fully discharge their responsibilities in accommodating to the claim of privacy. In the last section of the pamphlet the Panel sets forth its views on the responsibilities of the scientist, his home institution, the federal government, scientific societies and associations, and the editors of scientific journals.

IU-74-L0052

HUMAN EXPERIMENTATION, J. L. Perlman, Journal of Legal Medicine v2 n1 p40-50 (Jan-Feb 1974)

A just balance must be struck between advancement of science and safeguarding the rights of human subjects in research. Abusive practices must be checked if medical research is to retain the approval of society, which is so necessary for its continuation. Therefore proper precautions and procedures must be introduced to create a balance between health and justice.

Although no reported court decision has yet hinged on the issue of human experimentation and there is no specific legislation on this point, some regulation has evolved through directives from the FDA, NIH, and the Surgeon General. Codes have increasingly served as guidelines for human experimentation in research institutions, but these documents are felt to be best if they guide rather than rule, as they cannot substitute for the integrity of the individual investigator. By invoking the various codes, the requirements of informed consent and peer review committees, along with the researcher's own conscience, medical research with humans as subjects will gain the support and respect of society it needs to continue.

IU-72-L0053

ON THE PROTECTION OF HUMAN SUBJECTS AND SOCIAL SCIENCE, P. D. Reynolds, International Social Science Journal v24 n4 p693-719 (1972)

The focus of this article is the problem of simultaneously protecting research participants without destroying the potential for developing scientific knowledge about social and human phenomena. First, the effects of research on the individual are examined. The author classifies research procedures into five categories based on the direct effects of the research procedure on those who participate in the research. It is the author's belief that there is absolutely no evidence of any permanent damage to any individual as a direct result of participation in social science research, in contrast to medical research. The issue of lack of legal protection for research data is raised, and the author stresses that as social science becomes more potent, some research questions may require that subjects take risks in order to advance knowledge, much as in medical science.

The second section of the article is a discussion of the effects of systems of control on the development of science. In the final section a suggested control system that provides a balance between the need to protect subjects and the claims of social science is presented. The author stresses that if social scientists do not control the conduct of social science research, society will.

IU-60-L0054

SYMPOSIUM ON THE STUDY OF DRUGS IN MAN. PT. 2. BIOLOGIC AND MEDICAL STUDIES IN HUMAN VOLUNTEER SUBJECTS. ETHICS AND SAFEGUARDS, F. D. Moore, Clinical Pharmacology and Therapeutics v1 n2 p149-155 (1960)

Observation alone, injection, and loss of voluntary control represent three contrasting and progressively more serious aspects of responsibility for the investigator in human experimentation. Medicolegal precautions, such as physical examinations of volunteers, signed and witnessed permission slips, and careful attention to minors and families, must be taken. Reward must be considered realistically in terms of whether the subject derives any scientific, personal, intellectual, or biologic information from the study; if he does not, some type of reward should be provided.

IU-71-L0055

INSTITUTIONAL GUIDE TO DHEW POLICY ON PROTECTION OF HUMAN SUBJECTS, Public Health Service, National Institutes of Health, Government Printing Office, Washington (1971)

Safeguarding the rights and welfare of human subjects involved in activities supported by grants or contracts from the DHEW is the responsibility of the institution which receives or is accountable to the DHEW for the funds awarded for the support of the activity. In order to provide for the adequate discharge of this institutional responsibility, it is the policy of the Department that no grant or contract for an activity involving human subjects shall be made unless the application for such support has been reviewed and approved by an appropriate institutional committee.

This review shall determine that the rights and welfare of the subjects involved are adequately protected, that the risks to an individual are outweighed by the potential benefits to him or by the importance of the knowledge to be gained, and that informed consent be obtained by methods that are adequate and appropriate. In addition the committee must establish a basis for continuing review of the activity in keeping with these determinations.

The institution must submit to the DHEW, for its review, approval, and official acceptance, an assurance of its compliance with this policy. The institution must also provide with each proposal involving human subjects a certification that it has been or will be reviewed in accordance with the institution's assurance.

IU-73-L0056

HUMAN EXPERIMENTATION -- THE ETHICAL QUESTIONS PERSIST, R. M. Veatch; S. Sollitto, Hastings Center Report v3 n3 p1-3 (June 1973)

This article is a collection of experiments published in reputable medical journals or professional proceedings since 1966 which the authors feel involve violations of the principles of informed consent. These studies are discussed in the context of grave risks to subjects, risks to incompetent and incarcerated subjects, rights of subjects in research with a placebo group, responsibility for harm to subjects, and the pervasiveness of human experimentation.

The authors feel that the problem of human experimentation is mainly one of developing mechanisms for consent and review which give greater assurance to the subject that his rights and interests will be protected. Therefore, the minimum that is required is the immediate establishment of a governmental committee to formulate rigorous procedures to insure reasonably informed consent and review.

IU-72-L0057

ACT AUTHORIZING THE COMMISSIONER OF MOTOR VEHICLES TO STUDY AND APPROVE ACCIDENT-INVESTIGATION UNITS, New York Vehicle and Traffic Law §210 (McKinney, Supp. 1972)

Because of the need for accurate knowledge about the causation of automobile collisions, this statute was adopted to encourage and promote the work of accident-investigation units. All records collected by such units will be confidential to ensure the privacy of accident victims, and unit employees charged with the custody of records and reports will not be required to produce them as evidence in any legal action or other proceeding.

IU-65-L0058

HALUSHKA V. UNIVERSITY OF SASKATCHEWAN, 53 D.L.R. (2d) 436 (1965)

In this Canadian case, plaintiff, a college student, volunteered to undergo

anesthetic tests for purposes of medical research. After being convinced that "it was a safe test and there was nothing to worry about" and that he would receive $50 as renumeration, plaintiff signed a consent to the test. He was not told, however, that the test involved a new drug, of which defendant doctors had no previous knowledge, nor that there was a risk involved in its use. Also defendants failed to inform him fully as to the way in which the experiment would be conducted, of the methods that would be adopted.

As a consequence of the test plaintiff suffered a heart stoppage, was unconscious for four days, and hospitalized for ten days. After his discharge, plaintiff was unable to concentrate and experienced a dimunition of mental ability which required him to leave college. Plaintiff then sued for damages on the grounds of trespass to the person and was awarded judgment for $22,500. The appellate court affirmed, stating that the test performed by the doctors constituted an actionable trespass unless done with consent, and for consent to be effective it must be an informed consent, freely given. The court held that it was the duty of the doctors to give a fair and reasonable explanation of the proposed treatment including its probable effect and any special or unusual risks.

IU-73-L0059

PEOPLE V. NEWMAN, 298 N.E.2d 651, 32 N.Y.2d 379 (Ct. App. N.Y. 1973), cert. denied, 414 U.S. 1163

Following a homicide allegedly committed by a person within a methadone treatment program, police requested Dr. Newman, director of the program, to submit photographs of persons undergoing treatment. Upon his refusal to comply with the request, Dr. Newman was served a subpoena duces tecum for the photographs. When he defied the subpoena, the New York Supreme Court sentenced him to thirty days in jail for contempt.

On appeal, the New York Court of Appeals held that the state doctor-patient privilege did not apply to preclude disclosure of the pictures. However, federal provisions relating to the confidentiality of records and information concerning patients undergoing methadone treatment did bar such disclosure. Therefore, the adjudication of contempt was vacated and the subpoena quashed.

IU-65-L0060

HYMAN V. JEWISH CHRONIC DISEASE HOSPITAL, In EXPERIMENTATION WITH HUMAN BEINGS, 1ST ED., J. Katz, Russell Sage Foundation, New York (1965)

In July 1963, three doctors, with approval from the director of medicine of the Jewish Chronic Disease Hospital in Brooklyn, New York, injected live cancer cells subcutaneously into 22 chronically ill patients. The doctors did not inform the patients that live cancer cells were being used or that the experiment was designed to measure the patients' ability to reject foreign cells -- a test unrelated to their normal therapeutic program.

The issues of the duties and obligations of the various participants in the human experimentation process were confronted directly when the Board of Regents of the University of the State of New York heard charges brought by the Attorney General against two of the doctors involved. The result was that sanctions were imposed upon the two doctors, including suspension of their licenses for one year, which was stayed, and each was placed on probation for one year.

IU-73-L0061

PROSECUTOR AND THE RESEARCHER. PRESENT AND PROSPECTIVE VARIATIONS ON THE SUPREME COURT'S BRANZBURG DECISION, P. Nejelski; K. Finterbusch, Social Problems v21 n1 p3-21 (Summer 1973)

For social science to develop, confidential research data must be protected from demands by government and other sources, and recent episodes suggest the seriousness of these demands. In this context the Supreme Court decision of Branzburg v. Hayes is explored and its implications for American social science clearly set forth.

The authors offer suggestions to help resolve these issues for social scientists. The agenda for action includes the use of research administration, ethical codes, documentation, a clearing house for confidentiality problems, models for regulation of prosecutorial discretion, and direct action through publicity, lobbying, litigation, and boycott. The authors feel that if social scientists require special rights to perform their role, they must assert their claims to these rights before society can be expected to grant them.

IU-71-L0062

RESEARCHER-SUBJECT TESTIMONIAL PRIVILEGE. WHAT TO DO BEFORE THE SUBPOENA ARRIVES, P. Nejelski; L. Lerman, Wisconsin Law Review v1971 n4 p1085-1148 (1971)

Ability to conduct research in various areas of public concern, such as crime, poverty, and foreign relations, is being increasingly jeopardized by demands for confidential data, generally from law enforcement agencies. Outside demands threaten to compromise the rights of both researchers and the persons they study. This article deals with the problem of under what circumstances, if any, a researcher should be compelled to reveal confidential information about individuals in his study. The focus of the paper is on the recognition of a testimonial privilege as the major shield in resisting outside demands.

The need for protection is first described, and the types of confidential information collected and possible demands for such information are outlined. The seven parties at interest, the subject, researcher, sponsor, facilitator, prosecutor, the state, and society are discussed within this context.

The legal rationale for protecting the researcher-subject relationship is discussed in relation to the constitutional doctrines of freedom of expression, the right of privacy, and the rights of criminal defendants. The authors note that a testimonial privilege would be the best vehicle for protecting this relationship from outside demands, by absolving the researcher from the necessity of testifying in court about the identities of his subjects or their confidential communications. The privilege could be implemented either through legislative or judicial recognition of constitutional imperatives, or through expansion of existing evidentiary privileges.

IU-73-L0063

RESEARCHER-SUBJECT RELATIONSHIP. THE NEED FOR PROTECTION AND A MODEL STATUTE, Note, Georgetown Law Journal v62 n1 p243-272 (Oct 1973)

Except for statutory protection in a few isolated and narrow areas, the confidential personal data compiled by empirical researchers enjoys no legal immunity from compelled disclosure. Legal protection of research confidentiality is necessary in order to avoid destruction or hindrance of important social research.

This article examines the existing protection of confidentiality in research situations and analyzes the justifications for further protection. As a solu-

tion to the confidentiality problem, a model statute creating a researcher-subject privilege which seeks to balance the competing interests involved in the protection of research confidentiality is proposed. This statute is designed to serve as a catalyst for public debate on the issue as a model for future legislative action.

IU-73-L0064

HUMAN EXPERIMENTATION, Medical World News p37-51 (8 June 1973)

The central theme of this article is the difficulty of weighing medicine's need to know against the individual's rights and safety in human experimentation. In order to define what constitutes permissable experimentation, experimentation is broken into four levels, ranging from Level 1, the perfectly permissable, to Level 4, the intolerable. Examples of each level are provided, and each level is discussed in terms of the risk/benefit ratio and the quality of the subject's consent.

Opinions of many leading experts in the field, such as Dr. Henry K. Beecher, Dr. Jay Katz, Paul Freund, and Dr. M. H. Pappworth are presented. The need for new constraints and proposed reforms are discussed, and the author concludes that courses in ethics taught in medical schools may be the best possible answer.

IU-68-L0065

ANALYSIS OF "INFORMED CONSENT", M. L. Plante, Fordham Law Review v36 p639-672 (1968)

The general thesis of this paper is that there is no basic conceptual, doctrinal, or procedural innovation in the informed consent cases; that the use of this "unfortunate journalistic expression" has caused confusion in judicial opinions and in some of the commentary literature; that this confusion has generated litigation and will probably continue to do so; and that what is needed is a little careful thinking in the legal profession on some relatively elementary principles of the law of torts.

The genesis of the confusion over the doctrine is first traced via several landmark cases, and applicable principles are laid out. The practical differences between battery cases and medical negligence cases are explored through the nature of the plaintiff's right and the defendant's duty, proof of the wrongful act, the causal relationship and damages, and the statute of limitations.

IU-75-L0066

FREEDOM OF INFORMATION ACT. THE 1974 AMENDMENTS, R. L. Strausbaugh, Res Gestae v19 n6 p191-200 (June 1975)

The 1974 Amendments to the Freedom of Information Act of 1966 seek to establish a more efficient, prompt, and fuller disclosure of information by redefining obligations of agencies, and by providing a more definitive procedural format through which disclosure may be compelled. In particular, the amendments are concerned with the following areas: publication and distribution of agency indexes; clarifying the meaning of "identifiable records"; requiring a uniform schedule of fees; clarifying complaint procedures, court review, and expediting appeals; providing for the assessment of attorney fees and costs, and the imposition of sanctions; amending certain statutory exemptions; and requiring annual reports to Congress by administrative agencies and the U.S. Attorney General.

The Amendments are treated by the author according to the following classifications: locating and identifying information, time for compliance, judicial

procedures, exemptions, segregable portions of records, fees, and annual reports to Congress. The author concludes that responsible use of the Freedom of Information Act by citizens should help enhance our democratic society by reducing secrecy in government, but there is room for substantial abuse.

IU-75-L0067

JUSTICE REPORT. AGENCIES PREPARE REGULATIONS FOR IMPLEMENTING NEW PRIVACY LAW, R. E. Cohen, National Journal Reports v7 n21 p774-777 (24 May 1975)

The Privacy Act of 1974, which was designed to guarantee citizens that personal information will be accurate and used only for the purpose for which it was collected, is currently being implemented by federal agencies. Rules are being drafted by various agencies, and the process is being coordinated by the Office of Management and Budget. OMB's role as the lead agency in implementing the Act, other agencies which will be incorporated into the procedures of all federal agencies, compliance with the Act, and the impact on federal record-keeping practices are discussed.

IU-75-L0068

PRIVACY AND SOCIETY, H. M. Jackson, The Humanist v35 n3 p30-32 (May-June 1975)

The Privacy Act of 1974, cosponsored by the author, gives individuals the right to know they are subjects of a file, to examine its contents, to challenge its contents, and to correct inaccurate, incomplete, or out-of-date information. The Act itself is discussed, as are wiretap investigations and the congressional committee proposed to oversee the activities of all government agencies with investigative or surveillance powers. The author concludes that, having used, refined, often benefited, and sometimes suffered from our technology, we have reached a watershed in the protection of our right to privacy.

IU-64-L0069

THE NEW PROPERTY, C. A. Reich, Yale Law Journal v73 n5 p733-787 (Apr 1964)

This article represents an attempt to explore the changes which the growth of government largess, accompanied by a distinctive system of law, is having on individualism, independence, and private interests. It begins with an examination of the nature of government largess, then reviews the system of law, substantive and procedural, that has emerged. Some of the consequences to the individual, to private interests, and to society are examined, and the functions of property and their relationship to "the public interest" are considered. Finally, the author turns to the future of individualism in the new society that is coming, his object being to present an overview, or a way of looking at many seemingly unrelated problems.

IU-75-L0070

RIGHT OF PRIVACY. DATA BANKS AND DOSSIERS, A. R. Miller (1975)

The topic of this article is the effects of certain data-gathering activities and applications of information technology on individual and commercial privacy. Federal agencies and private companies are now using computers and microfilm technology to collect, store, and exchange information about the activities of private citizens to an astounding degree. The development of information systems magnifies both the threat to personal privacy and the potential "chilling effect" of informational surveillance. Therefore, what is necessary is the development of a framework for the protection of the public and to minimize misuse of an otherwise socially desirable instrument.

The only completely effective guardian of individual privacy is the imposition of strict controls over the information that can be collected, stored,

and disseminated. The author feels that the solution to the computer-privacy dilemma lies in the enforcement of various controls through legislation, administrative regulation, and the judicial process.

The author has explored the subject matter of this paper more fully in A. Miller, The Assault on Privacy: Computers, Data Banks, and Dossiers (1971), and Miller, "Personal Privacy in the Computer Age: The Challenge of a New Technology in an Information-Oriented Society," Michigan Law Review v67 p1089 (1969).

IU-71-L0071

PRINCIPLES OF ETHICAL CONDUCT IN THE TREATMENT OF SUBJECTS. REACTION TO THE DRAFT REPORT OF THE COMMITTEE ON ETHICAL STANDARDS IN PSYCHOLOGICAL RESEARCH, D. Baumrind, American Psychologist v26 p887-896 (1971)

This article is concerned with the misuse of the trust which experimental subjects place the investigators and the research enterprise to deceive, manipulate, and devalue them as people, and to violate their human rights. It is the author's view that there are times when the objectives and commitments of the investigator directly conflict with the well-being of the subject, and that there should be a code of ethics which contains provisions that unequivocally protect the subject from the investigator.

The draft report of the Committee on Ethical Standards in Psychological Research is discussed, and the author feels that the risk/benefit approach which the Committee has adopted may have the effect of justifying violations of subjects' human rights by offering to the investigator appealing rationalizations for risking the subjects' welfare based upon the anticipated "benefits" to society of the proposed research.

IU-72-L0072

RIGHTS OF THE SUBJECT IN SOCIAL RESEARCH. AN ANALYSIS IN TERMS OF RELATIVE POWER AND LEGITIMACY, H. C. Kelman, American Psychologist v27 p989-1016 (Nov 1972)

The increasing use of social research and its increasing relevance to public policy and social decisions have engendered widespread concern about the ethical implications of such research activities. These concerns are of two kinds: concerns relating to the processes of social research, such as the invasion of privacy, and concerns relating to the products of social research.

Topics discussed in this article include: the power deficiency of the subject in social research, ethical problems relating to the processes of social research, and ethical problems relating to the products of social research. The author believes that the democratization of the community of research producers and research users must be seen as part of the process of redistributing power within our society at large. Social and other scientists can contribute to this larger process by correcting the imbalances within their own spheres.

IU-74-L0073

RIGHTS OF THE PUBLIC AND THE PRESS TO GATHER INFORMATION, Note, Harvard Law Review v87 p1505-1533 (1974)

Widespread availability of information of general interest is necessary for meaningful democratic decision-making and for the public to perceive and respond to the world. Maintaining the flow of this information requires the protection of both its acquisition and dissemination, but the Supreme Court has dealt primarily with dissemination only. This note analyzes the scope of the public and press right to gather news by identifying the weight of these interests in three general situations -- when a source is unwilling to provide information, when a source is neutral and access to it is prevented by the state, and when a source would voluntarily provide information were it not for the state's interference.

IU-75-L0074

ACT PROVIDING FOR THE CONFIDENTIALITY OF RECORDS OF ACCIDENTS COMPILED BY SPECIAL ACCIDENT-INVESTIGATION TEAMS APPROVED BY THE NEW MEXICO TRAFFIC SAFETY COMMISSION, N.M. Stat. Ann. § 64-33-8 (Supp. 1975).

This statute provides that all records of accident-investigation teams approved by the state are to be confidential, and will be available only to members or employees of the team. These records cannot be required to be produced in any legal action or other proceeding.

IU-75-L0075

ACT PROVIDING THAT MEMBERS OF STATE CRASH INVESTIGATION TEAMS NOT BE REQUIRED TO GIVE EVIDENCE IN CERTAIN CASES, Va. Code Ann. § 8-296.1 (Supp. 1975)

This statute provides that members of the state crash investigation teams will not be required to produce evidence in any court or grand jury case involving a traffic accident which was investigated pursuant to a directive from the Director of the State Highway Safety Division.

IU-75-L0076

ACT AUTHORIZING SCIENTIFIC STUDIES TO REDUCE MORBIDITY AND MORTALITY WITHIN THE COMMONWEALTH, Mass. Gen. Laws ch. 111, § 24a (1975)

This statute provides that all information collected by accident researchers is to be confidential, to be used only for medical or scientific purposes, and shall not be used to subject anyone to any action for damages, or to serve as evidence in any proceeding. Anyone who discloses such information will be punished by a fine of $50.

IU-73-L0077

PROTECTION OF PRIVACY AND CONFIDENTIALITY, W. J. Curran; E. M. Laska; H. Kaplan; R. Bank, Science v182 p797-802 (23 Nov 1973)

This article describes the legal, administrative, and technical mechanisms employed to protect the privacy and confidentiality of patient information collected in a research and demonstration program in psychiatry that involves patients from several states. The discussion of legal safeguards involves two areas: the protection of the system itself, and the specific legal environment of confidentiality and privacy of mental health records and information in the group of cooperating jurisdictions.

This system provides adequate legal and administrative protection for confidentiality and privacy, and access to the records can be restricted for the welfare of the patients. However, at the same time, access to aggregate data in the system can be allowed, under proper standards, for important research and planning purposes. The authors suggest that these may prove to be an important model for the development of protective methods in other fields where the data collected are sensitive and confidential.

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