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order of probability with respect to some of the chronic diseases, then dramatic breakthroughs in their elimination are not to be expected.

Control of the factors which exacerbate disease brings us to the second of Rogers' challenges. Will knowledge of the values and goals of societies or subsets of societies lead to public health policies congruent with these goals and values? I doubt it. Controversies over fluoridation, pollution, cigarette advertising, and a number of other problems, some of which were mentioned by Rogers, suggest that the goals and values at different levels of society (individual, family, and various levels of government) and among various groups in society (corporations, professional groups, and so forth) are often basically incompatible. In a democratic society, the multiple allegiance of individuals to a number of these groups is probably one of the basic deterrents to the war of all against all. Health values and goals occupy a variable position in this labyrinth of value and organizational structures. The result may be a uniqueness of each type of health problem which prevents one from developing an overall rational health plan.

There is little doubt that medical sociologists have much to contribute and could make their findings more relevant to clinical medicine and public health. And the pessimism expressed above does not mean that one should not try to accomplish the ends outlined by Rogers. However, as every good scientist knows, one must be prepared for failure.

Leon S. Robertson
Medical Care Research Unit,
Harvard Medical School,
83 Francis Street,
Boston, Massachusetts 02115

Rogers is concerned that public health and medical sociology are frustrated in the absence of a "holistic ecological concept of human organization." Sociology has been, and still remains, primarily an investigative field. It has filled libraries with detailed descriptions (sometimes mathematical) of how man acts or interacts in given situations. The point is, however, that it has never developed a conceptual responsibility of action. It has never set for itself the practical goal of how man should change as part of action to effect change. A "holistic ecological concept of human organization" is a nice academic formulation. In practice, it is

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quite utopian. What is needed is a human ecology that is action-oriented—that puts practice as primary. In this context public health fundamentally is practice. The philosophy will emerge only from the experience of action.

Leo Kartman
199 Bel Mar Avenue, No. 39,
Daly City, California 94015

Medical Research:
Fragmented or Goal-Oriented

I agree with Leaf ("Government, medical research, and education," 9 Feb., p. 604) that, in our rush to fund increased application of medical research, we should not allow funding of basic and applied medical research to falter. Not only must this research compete increasingly with other welfare programs, but it becomes increasingly expensive as it becomes more and more complex and detailed; hence the funding should probably accelerate.

Leaf’s attack on the awarding of some medical research contracts to industrial research laboratories (as opposed to awarding all research grants and research contracts to universities and university-operated research laboratories) is unwarranted. Has Leaf ever worked in private industry and experienced the freedom of action and goal-oriented programming possible when everybody on a project is working 100 percent of the time on the project, and is not splitting himself up into many little pieces between research, teaching, patient care, committee meetings, seminars, and government consultation? The point Leaf seems to be missing is that some industrial research laboratories are actually better qualified than any university group to do a certain task by virtue of hard-won expertise. After all, it is industry which gives us many of our really great scientific and technological breakthroughs . . . and even some of the medical ones.

Henry Lee
Epoxylite Corporation,
South El Monte, California 91733

All of us undoubtedly share Leaf’s frustrations with the effort report and would welcome its abolition. But even if the report cannot be stopped, at least it could be changed so that it makes sense. Effort reports should have a fourth category, self-education. Tabulated under this heading would be the many hours of the week spent in reading,
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(From Biochim. Biophys. Acts 74 (1963) 588, by permission of the author)

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<th>Type</th>
<th>Grade</th>
<th>Ionic Form</th>
<th>Capacity (mea/g)</th>
<th>Bed Volume (mL/g)</th>
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<td>40-120u</td>
<td>Cl^-</td>
<td>5.5 ± 0.5</td>
<td>5.9</td>
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<td>40-120u</td>
<td>Cl^-</td>
<td>5.5 ± 0.5</td>
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<th>Ionic Form</th>
<th>Capacity (mea/g)</th>
<th>Bed Volume (mL/g)</th>
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<td>40-120u</td>
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<tr>
<td>CM-Sephadex C-10</td>
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<td>Na^+</td>
<td>4.5 ± 0.5</td>
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<td>SE-Sephadex C-25</td>
<td>40-120u</td>
<td>Na^+</td>
<td>2.3 ± 0.3</td>
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<tr>
<td>SE-Sephadex C-50</td>
<td>40-120u</td>
<td>Na^+</td>
<td>2.3 ± 0.3</td>
<td>30.38</td>
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1. In Tris-HCl buffer, pH = 8.3, ionic strength = 0.05.
2. In sodium phosphate buffer, pH = 6, ionic strength = 0.06.

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listening, and chatting with colleagues and with visitors. After all, the outstanding feature of a great university is that it provides a way of life favoring the activities of self-education, as well as the tools of research. Therefore, granting agencies will not be astonished that self-education is a major and honorable consumer of their investigator's time. The availability of this category will remove a part of the ambiguity and outright dishonesty in filing the effort report.

WILLIAM G. VAN DER KLOOT
Department of Physiology,
New York University Medical Center,
550 First Avenue, New York 10016

Subpoenas: Show Probable Cause

Readers of Science, including especially Stalmer and Hall (“Un-American activities: Court rule aids Stalmer in contempt case,” 1 Dec., p. 1249) and Glass and Pond (Letters, 1 Mar.), may be interested in a “Note” in the Minnesota Law Review [52, 665 (1968)] entitled “The application of the Fourth Amendment to congressional investigations.” Brief excerpts will suffice:

It is suggested that the (Supreme) Court should require a showing of probable cause, as required by the fourth amendment, before allowing the issuance of a subpoena requiring an appearance before a congressional investigation.

The whole philosophical basis for the fourth amendment’s protection against searches and seizures without probable cause is the notion that the individual has the right to keep the affairs of his life private. While this right is admittedly not absolute ... it is a right so basic to our concept of limited government that it should not be lightly disregarded.

Furthermore, the right of privacy must protect the individual’s mind as well as his possessions. The Court has protected certain contents of the mind from governmental invasions in criminal proceedings under the fifth amendment. However, the basic recognition that a person’s mind is his most sacred possession and should be accorded the greatest protection from governmental invasion is equally applicable to all forms of governmental action. Moreover, the individual’s mind should be accorded as much, if not more, protection than his possessions for he therein keeps his most private possessions—his memory and his thoughts.

The protection which this requirement would afford the witness, in comparison with the burden it imposes upon Congress, is significant. The individual will be able to force investigators to show reason to believe that he will be able to provide useful information before they can interrupt this life. This will force the investigation to

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evaluate its need for his testimony before going to the trouble of subpoenaing him. Once subpoenaed, the individual will have a basis upon which to contest his duty to testify. He will not have to risk criminal prosecution in order to contest this duty for he will be able to challenge the probable cause for his subpoena prior to testifying. If the court finds that the individual does have a duty to testify, he will either have to rely on the fifth amendment, risk criminal prosecution for contempt, or provide the information required.

E. S. FETCHEK
Laboratory of Physiological Hygiene,
University of Minnesota, Minneapolis

A Just View of Systematics

When a systematist talks to his own set, a congratulatory tone is expected. But publication of Mayr’s address, “The role of systematics in biology” (1), exposing it to the nonsystematic public, irresistibly invites a rejoinder! Systematists may not have received due credit for their great contributions to biology but neither perhaps have they got just treatment for abetting biologists in the mistaken belief that taxonomic aggregates, such as populations, are substantial objects-in-nature.

Every ecologist, for example, who sets it down in chapter one that population and community are levels-of-integration (and hence “systems”) comparable in status to, though midway in complexity of organization between, individual organisms and individual ecosystems is a victim of taxonomy. The levels-of-integration that are demonstrable in nature and those that exist in the minds of systematists are rarely if ever discriminated. Some of the resulting problems were adumbrated in Ehrlich and Holm’s article “Patterns and populations” (2) where the authors wrote (unfortunately at the end rather than at the beginning): “The basic units of population biology (sic) are not communities, species or even populations, but individual organisms,” and in a footnote that should be pondered: “... if historically we had begun to think about biology in ecological rather than taxonomic terms we would now deal with biological ‘facts’ very differently.”

J. S. ROWE
Department of Plant Ecology,
University of Saskatchewan,
Saskatoon, Canada

References

26 APRIL 1968
New Clark-type electrode assembly can be used with Gilson Model KM or Model K Oxygraphs without modification. The Clark-type electrode eliminates the problems which occur when using a bare platinum electrode with high protein concentrations and particle suspensions such as whole blood and bacteria, and permits the use of the polarographic method in nonconductive solutions. The response time is only slightly greater than that of the bare platinum electrode.

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Harris says, he would like to spend his time "writing and teaching." He was, reportedly, pleased to have had his name suggested for the presidency of a state university in the Southwest. "I guess all politicians like to lecture," he grinned, "We really are sort of teachers, at heart."

Harris is already writing his own books. He recently finished his "personal view" of his work on the Civil Disorders Commission, which will be published in late May by Harper and Row. Staff members swear that he wrote the book himself on weekends. He is also working on two books which emanate from his subcommittee hearings, one on "health, science, and society" and another on "disadvantage and deprivation." He says that there are several other books he would like to write—one on five outstanding Senators, another on the American Indian, a third on Latin America.

**Similarity to Kerr**

In political ability and energy, Harris has often been compared to that one-time Senate potentate from Oklahoma, the late Robert Kerr, who brought his state much-needed federal largesse through power on the Public Works and Finance Committees. Harris originally served on Public Works; when appointed to the influential Finance Committee, he had to choose whether to give up Public Works or his seat on the Government Operations Committee, together with his chairmanship of the government research subcommittee. He overruled pressure from some of his Oklahoma supporters who wanted him to keep his seat on Public Works, and kept his seat on the Government Operations Committee.

Harris says he likes his work on the government research subcommittee, and that it has greatly enhanced the "rich education" which he says he has received "at the public expense." He thinks that his subcommittee has had three main impacts in its 2 years of existence:

"First, it has greatly increased attention to the social sciences within the federal government, and has resulted in additional funds.

"Second, there has been a great change within the scientific establishment on the question of equitable distribution of R & D funds around the country. There haven't been many results, but there has been a change in attitude. Now people recognize it as a problem. The spending of R & D funds has an educational impact and an economic one. I don't believe in dismantling existing centers of excellence but, rather, in supplementing them.

"Third, more and more people are coming to believe in a goals-oriented health policy. They're coming to that position after being reassured that such a policy will not be implemented to the detriment of basic research. A lot of people are concerned that we aren't doing better in health. This change of attitude, however, hasn't brought much change in results yet."

Recently, Harris has begun wondering whether it would not be better to have his government research subcommittee "phase out and die," to be replaced by a joint House-Senate study committee on science and technology, somewhat along the lines of the Joint Economic Committee. Harris emphasizes that he hasn't refined his thinking on these matters but has been asking himself, "Is there any way, without sacrificing the values of our pluralistic scientific system, to bring more coherence into our scientific policy? We don't want the kind of scientific system the Soviet Union has, but we do need more planning, a more goals-oriented policy."

Even though Harris will be spending a portion of his time on research hearings in forthcoming months, it is apparent that his other activities, especially those on the Civil Disorders Commission, where he experienced at first hand the intense anger and hostility of an increasing portion of the residents of city ghettos, have had a much more profound effect on his recent thinking.

"I feel very alarmed and depressed about conditions in this country," the usually buoyant Harris says, "What really worries me is the fragmentation of this country into black and white, rich and poor, old and young."

Harris' supporters don't believe that his participation on the civil disorders commission will do him any good politically at present in Oklahoma (which is more than 90 percent white), but Harris thinks the conclusions of the report have to be confronted whatever their immediate political consequences. "Racism is a fact of American life," he said quietly; "it is an ugly fact but we have to see it to deal with it."

Even more impressive than Fred Harris' other important attributes is his capacity to face the grimmest aspects of our national life squarely while retaining the determination to do something to change that reality.—BRYCE NELSON

**APPOINTMENTS**

Robert B. Mautz, vice president for academic affairs, University of Florida, to chancellor of the Florida University system. . . . H. Burr Steinbach, chairman of the department of zoology, University of Chicago and director and president of the Marine Biological Laboratory, Woods Hole Oceanographic Institution, on leave as dean of graduate studies, Woods Hole. . . . John Summerskill, president of San Francisco State College has resigned. . . . Patrick J. Friel, director of the Office of Ballistic Missile Defense, Advanced Research Projects Agency, to deputy assistant secretary of the Army, and director of the newly established Advanced Ballistic Missile Defense Agency, which will combine some elements of the Advanced Research Projects Agency, Office of Ballistic Missile Defense and the on-going NIKE-X advanced development. . . . Edward D. Jordan, head of the division of nuclear engineering, Catholic University, to director of the newly established Office of Institutional Research and Planning at the university. . . . Harriott O. Kunkel, acting dean and director of the Texas Agricultural Experiment Station, to an additional post as dean of agriculture, Texas A&M University. . . . Peter Dehlinger, head of the geophysics program, ocean science and technology group of the Office of Naval Research, to director of the newly established Institute of Marine Sciences, University of Connecticut. . . . Floyd L. Thompson, director of Langley Research Center, NASA, to special assistant to James E. Webb, administrator of NASA. He will be succeeded by Edgar N. Cortright, deputy associate administrator for manned space flight, NASA headquarters. . . . W. Peter Crowcroft, director, South Australian Museum, to director of the Chicago Zoological Park. . . . Aaron Ganz, training grants and fellowships officer, NIH, to chief of the program planning office, National Institute of Dental Research.
erved transits of Venus to obtain distance measurements, devised a diving bell, edited the mortality tables of Breslau, thus pioneering in the application of statistical methods for sociological studies, wrote on meteors, grasped the nature of nebulae, thus anticipating Herschel, noted the proper motion of stars, investigated Roman excavations. He was a Deputy Controller of the Mint, Savilian Professor of Astronomy, Secretary of the Royal Society, Astronomer Royal.

To put Halley's work in its proper perspective the author of this book also presents other scientists and their work. Thus the reader can appreciate the importance or lack of importance of each of Halley's activities. The author has chosen to treat each of these activities as a unit. This leads to an understanding of the state of each project during Halley's lifetime and makes it possible for the reader to use the book as a reference and confine himself to the material dealing with one topic. On the other hand, it makes for a disjointed story, going backward and forward in time, with considerable repetition.

The author is well qualified to handle his topic and has produced a very useful book which will serve both laymen and scientists well. However, the question arises as to what audience was intended. Some passages or concepts which seem elementary are explained, whereas a considerable knowledge of geometry, trigonometry, and physics on the part of the reader is assumed.

C. DORIS HELLMAN
Department of History,
Queens College,
Flushing, New York

Chelation


This is the first volume in a series that intends to "employ chelation as a concept serving to unify a large area of analytical chemistry." The subjects to be covered fall into three categories: chelates formed by certain elements, selected chelating reagents and families of chelating reagents, and analytical methods and techniques employing chelation. This first volume contains seven chapters treating topics in these categories. For example, two of the chapters are "Chelates and chelating agents in the analytical chemistry of molybdenum and tungsten" by Püschel and Lassner and "Xylenol orange and methylthymol blue as chromogenic reagents" by Budčinskiy.

In addition, this volume contains a chapter by Szabadvary and Beck entitled "An outline of the history of analytical methods based on complex formation." This chapter has two main faults. The important contributions toward understanding the fundamentals of chelate formation made by certain researchers are not mentioned, and more space should have been devoted to chelating agents of current analytical importance. For example, the important research of Schwarzenbach on aminocarboxylic acid chelates warrants more than two sentences.

The chapter by Blasius and Brozio on "Chelating ion-exchange resins" presents a fairly complete picture of current research on chelating agents bonded to a resin matrix in the chromatographic separation of cation mixtures. The chapters "Chelates in inorganic polarographic analysis: fundamentals" and "Chelates in inorganic polarographic analysis: applications," however, do not contain many of the developments of the last five years. The remaining chapters, "Conductometric and high-frequency impedimetric titrations involving chelates and chelating agents" by Vydra and Štůlik and "The thermal dissociation of chelating agents and chelates of analytical interest" by Wendlandt, are complete and well referenced. However, the material presented by Wendlandt is also treated in his recent book.

The information compiled in this volume should prove valuable to those doing research on these specific subjects. Equally important, this volume will be useful to those developing analytical procedures or modifying already existing ones. The principles forming the basis for the analytical usefulness of particular chelating agents are presented, methods using these chelates for specific problems are recommended, and, in some cases, procedures are given in working detail.

Both research chemists and analysts should find this volume of use to be of interest. However, some of the topics discussed are quite specific and may be of only limited interest to many. Also, some of the topics have already been treated in other texts.

DALLAS L. RABENSTEIN
Department of Chemistry,
University of Wisconsin, Madison

Books Received


Basic Instrumentation for Engineers and Physicists. A. M. P. Brookes, Perga-
relations for organomercuric compounds and on the mechanism of fungicidal action. The action of two fungicidal organophosphorus compounds useful in rice blast control, O,O-diethyl and O,O-diisopropyl S-benzyl phosphorothiolates, was reported by M. Kado (Ihara Chemicals Co., Shimizu, Shizuoka). Pentachlorobenzyl alcohol is highly active for rice blast control; it specifically prevents penetration of hyphae into leaves but fails to control other plant diseases. M. Ishida (Sankyo Co., Tokyo) reported that, when pentachlorobenzyl alcohol-C¹⁴ is administered orally to rats in metabolism studies, the unchanged compound is excreted in the feces, and pentachlorobenzoic acid and the β-glucuronide of pentachlorobenzyl alcohol appear in urine.

Strychnine nitrate is potentially useful for control of brown bears, which frequently are a pest in Hokkaido; it is metabolized in the bear so that toxic products do not persist in the meat (T. Inukai, Hokkaido University, Sapporo).

Insecticide metabolism and mode of action were the major topics of discussion. The general steps involved in radiotracer studies on insecticide action include (i) selection of the site of radio-labeling, (ii) performing the radiosynthesis, (iii) introduction of the labeled compound into an appropriate biological system or degradation situation, (iv) determination of the chemical and physical fate of the compound, and (v) interpretation of the results in relation to the mechanism, selectivity, and efficiency of action of the insecticide chemical (J. Casida, University of California, Berkeley). The toxicity of nico tinoids is conferred by the highly basic nitrogen, a carbon-atom bridge, and the pyridine ring (I. Yamamoto, Tokyo University of Agriculture, Setagaya, Tokyo). Studies on structure-activity relations and metabolism of pyrethroids and rotenoids were also reviewed. Detoxification primarily involves initial oxidation of one methyl group in the isobutenyl moiety of pyrethroids and of the isopropenyl group of rotenone.

Specificity in cholinesterase inhibition and in detoxification are factors contributing to the selective toxicity of O,O-dimethyl trichloroethoxyethyl- and dichloroethoxyethyl phosphonates and related compounds (T. Saito, Nagoya University). The type of biological activity of saligenin cyclic phosphorus esters is remarkably affected by the exocyclic substituent group on the phosphorus (M. Eto, Kyushu Univer-

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The inhibitor specificity for target esterases is also greatly influenced by steric factors resulting from varying the size of the exocyclic substituent group, although the reactive site with the esterase is probably, in all cases, the enolic ester portion of the hetero ring.

Toxicity of certain organophosphorothionates to mammals is antagonized by compounds that induce microsomal enzymes; these enzymes catalyze detoxification reactions, particularly phosphorothionate cleavages (S. Murphy, Harvard University School of Public Health, Boston). Increased activity of liver A-esterase and of liver and plasma aliesterase, in response to certain drugs, may result in additional sites for reaction with the esterase inhibitors, thus sparing the more vital target enzyme, acetylcholinesterase. Organophosphorus esters potentiate malathion and dimethoate if, at low doses, they inhibit carboxylesterases and carboxyamidases in species in which these pathways of detoxification are critical. According to K. Fukunaga (National Institute of Agricultural Sciences and Institute of Physical and Chemical Research, Tokyo), soluble enzymes from mammalian liver and insect fat body and midgut, which require reduced glutathione for activity, may contribute to the selective toxicity of O,O-dimethylphosphorothionates by virtue of their O-demethylation activity. Pathways for diazinon metabolism by oxidation, hydrolysis, and conjugation reactions were defined by in vitro studies with enzyme preparations from rats and American cockroaches. Studies with insect microsomal enzymes, which oxidize many insecticides, are limited by natural inhibitors of the enzymes released during homogenization. The mechanism of low mammalian toxicity of sumithion, as compared with methyl parathion, was discussed by J. Miyamoto (Sumitomo Chemical Co., Osaka). Differences in metabolism by pathways involving phosphorothionate oxidation, hydrolysis, and O-demethylation probably do not play a major role in the selective toxicity of the two compounds. The low toxicity of sumithion probably results, in part, from the relatively poor penetration of sumithion into the brain compared to that of methyl paraoxon and, as a result, there is a lower degree of brain cholinesterase phosphorylation in the case of sumithion.

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(C. Kearns, University of Illinois, Urbana). Chromatography of diethylaminoethylicellulose partially resolves the fly preparation into two fractions, which differ in extent of activation by butanol and in the ratio of activity on acetyl- and butyrylcholine. Nerve components from insects and mammals were also considered with respect to the binding of various insecticides. Data were presented on the marked differences in binding of diethrin, DDT, BHC, phthalathrin, and nicotine to nerve components which were prepared and separated centrifugally from rat brain, and from axonic and ganglionic portions of cockroach nerve cords (F. Matsumura, University of Wisconsin, Madison). Electrophysiological approaches (involving arthropod nerve preparations) to the mode of action of insecticides were discussed by T. Narahashi (Duke University Medical School, Durham, North Carolina). The voltage-clamp method proved highly successful in analyzing the actions of DDT and allethrin. DDT delays the turning-off process of peak sodium current and suppresses steady-state potassium current. Allethrin suppresses both peak sodium and steady-state potassium currents from either side of the nerve membrane and it also delays the turning-off process of peak sodium current when applied internally.

Insecticide resistance mechanisms in houseflies in relation to biochemical genetics were reviewed by M. Tsumamoto (Nagasaki University). The linkage-group distribution of major insecticide resistance factors was defined and the importance of factors on each of the 2nd, 3rd, 4th, and 5th chromosomes was emphasized. Enzymes involved in insecticide metabolism, including DDT-dehydrochlorinase, organophosphate-detoxifying esterases, and mixed functional oxidases of microsomes depend on factors present on the 5th chromosome. A factor on the 2nd chromosome confers low nerve sensitivity to DDT.

A relation was reported between electronic and hydrophobic characters of substituents and the activity of substituted phenols causing chlorosis in Lemna minor (T. Fujita and M. Nakajima, Kyoto University). The results suggest action or factors limiting the action, such as a one-step partitioning involving adsorption of the molecule to the cell surface. With regard to organophosphorus insecticides, there is good correlation between anticholinesterase activity and reactivity of the phosphorus ester, as determined by such parameters
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as hydrolysis and solvolysis. Hammett's sigma constants, and shifts in infrared absorption (T. Fukuto, University of California, Riverside). Improved correlations result from taking steric factors into account. Additional effects are: (i) the stereospecificity in cholinesterase inactivation associated with an asymmetric center, and (ii) the possible contribution to selective toxicity of the significant structural difference between insect and mammalian enzymes. Absorption phenomena on the surface of insects and considerations of insecticide chemical transport into the body were discussed by M. Suwanai (Tokyo University of Agriculture and Technology, Fuchu, Tokyo). A method for calculating the rate of insecticide action based on kinetic and diffusion equations was illustrated.

The papers presented at the Nikko seminar are scheduled for publication as a separate volume of the international book series, *Residue Reviews*, edited by F. Gunther and published by Springer-Verlag New York, Inc.

Both Japan and the United States were among the first to recognize certain serious problems resulting from the adverse effects on animals and plants arising from the rapidly increasing use of pesticides. Cooperation between the two countries can accelerate a solution to problems arising from contamination by pesticides.

J. E. Casida
Division of Entomology, University of California, Berkeley

K. Fukunaga
National Institute of Agricultural Sciences and Institute of Physical and Chemical Research, Tokyo, Japan

Calendar of Events

May

3-4. Physical Medicine and Rehabilitation, Northwest Assoc., Palo Alto, Calif. (J. C. Montero, Div. of Rehabilitation Medicine, Stanford Univ. School of Medicine, Palo Alto 94304)

3-4. Society for Pediatric Research, Atlantic City, N.J. (Secretary, The Society, 1/8, 7th of Pediatrics, J. H. Miller Health Center, Univ. of Florida, Gainesville, Fla.)


4-5. Economics and Evaluation Symp.,

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