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To find out how easy gel scanning can be, simply circle the reader service number or contact us directly using the coupon below. Also available is the latest Heath/Schlumberger catalog which gives complete descriptions and specifications for all spectrophotometer systems and accessories.
THE NEW CARWORTH CATALOGS
MYTH OR REALITY?

In the course of this newspaper's investigations into the new Carworth guinea pigs, our reporters have also uncovered the fact that Carworth is about to release two new catalogs.

The first of these catalogs presumably deals with Carworth rats and mice and, we suspect, the "secret" guinea pigs, too.

The second catalog seems to cover Carworth's extensive line of laboratory animal care equipment including: animal housing systems, contamination control products like laminar flow devices, bedding, cleaning materials and other accessories and supplies.

We queried the Carworth advertising agency about the existence of these new catalogs and were told by a representative that they know nothing (Editor's Note: an unusual agency admission!), but that if Carworth were to issue new catalogs soon, "they would be likely to be beauties," they stated with characteristic immodesty.

The New City Times can't help but wonder what other surprises these Carworth people have in store for us. In any event, for now we suggest that you write Carworth, New City, (Rockland County), N.Y. 10956 (or call 914/634-8931) and say: "If these new catalogs are not a myth, please send!"

Rats and Mice by the Thousands
THOSE OTHER CARWORTH ANIMALS

Surreptitious investigation of the multiple Carworth facilities indicates that the company's apparent entry into guinea pigs has in no way diminished their activity in—or apparent enthusiasm for—supplying researchers with quality rats and mice.

Carworth mice include the well-known CF 1, CFW, and BALB/c CF inbred strain. The Carworth rats are the widely-used CFN and CFE strains.

CARWORTH INTO GUINEA PIGS
RESEARCH COMMUNITY PLEASED
Surprisingly, Company Says "No Comment"

The New City Times today learned from an unidentified but usually reliable source, that Carworth, a leading supplier of high quality rats and mice since 1935, has expanded its service to the research community by adding guinea pigs to its line.

Calls by this newspaper to a random selection of research people indicate that the guinea pig, always a popular animal for bacteriologic and vitamin C work, is now also being widely used in immunologic, pharmacologic, virologic, and endocrinologic studies of all types.

Thus, it seems obvious to this paper that the entry into this field of a quality house like Carworth provides researchers with a valuable new source for this important laboratory animal.

Our investigative reporters have also uncovered the fact that the Carworth guinea pigs are actually Dunkin/Hartley animals from a closed colony meticulously maintained for over 15 years.

Carworth personnel have routinely responded to our inquiries about this development with enigmatic smiles and "no comment" and will neither affirm nor deny any of the above allegations.

Despite this uncharacteristic reticence, our reporters are firm in their conviction that all researchers interested in Carworth-quality guinea pigs are entitled to know more. The New City Times suggests, therefore, that interested parties demand more data. Write CIA (Carworth Information Agency), c/o Carworth, New City, (Rockland County), New York, 10956 (or call 914/634-8931). They'll get the message.

Rumor also has it that Carworth supplies researchers with surgically-modified mice and rats at prices far below that which can be achieved by the purchaser in his own institution. (Can that be?)

The New City Times has learned that if you write to Carworth, New City, (Rockland County), New York 10956 (or call 914/634-8931) and ask for further information on their rats and mice, you'll get it.

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- When you're reading the oscillograph recording of a mass spectrum, it's easy to identify the mass number of any peak because the recording contains two mass marker channels, one at 10 and the other at 100 amu intervals. In this oscillograph record of the mass spectrum of "Mestranol" for example, compare how easily you can identify the molecular ion at mass 310...against how difficult it would be without the mass markers.

- With the computerized data system, you can choose automatic mass number readout at 1.0 or 0.1 amu intervals for all plots and tabulations.
- And regardless of the mode of operation, the mass number is reliable. So reliable that mass calibration of the HP system is required only during routine maintenance periods...compared to at least daily calibration with most other systems.

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Worthington Collagenase...

White fat cells, obtained by enzymatic digestion of parametrial adipose tissue as used in study of membrane mediated responses.

specificaly blended for cell isolation.

In microbiological studies of animal cells, it often is desirable to isolate and separate the cells for further study. The researcher's need is to separate the cells from the connective and cementing materials without damaging the cells themselves.

Many researchers found that a natural mixture of digestive enzymes produced by a non-toxigenic strain of the bacterium Clostridium histolyticum provided the separation remarkably well. The enzymes, without the toxin that many of the Clostridia produce, effectively digest away the materials connecting the cells into a tissue, but leave the cells themselves virtually untouched.

The enzyme mixture is named after its more unique member, Collagenase. Worthington supplies Collagenase in several degrees of purity ranging from crude to highly-purified; researchers have generally found that the less purified material is more effective in releasing intact cells from tissues. The effectiveness, however, seemed to differ with different tissues, and it did not always match the quantitative differences noted in our assay labs.

A program was therefore initiated by Worthington aimed at correlating effectiveness of samples on specific tissues with results of our own biochemical assays. We enlisted the support of several dozen prominent researchers; they evaluated more than a hundred samples of regular production and specially prepared lots of Collagenase in their own studies.

Evaluation of these studies has enabled us to categorize our crude Collagenase into four different types which are blended and classified according to the specific tissues for which each is best suited. The four types are available as listed in our current catalog.

<table>
<thead>
<tr>
<th>TYPE</th>
<th>CHARACTERISTIC</th>
<th>TISSUE BEST SUITED</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Normal balance</td>
<td>Fat cells; Adrenal tissue</td>
</tr>
<tr>
<td>II</td>
<td>High Clostridiopeptidase</td>
<td>Liver, Bone, Thyroid</td>
</tr>
<tr>
<td>III</td>
<td>Low Proteases generally</td>
<td>Mammary</td>
</tr>
<tr>
<td>IV</td>
<td>Low Tryptic activity</td>
<td>Pancreatic Islet cells</td>
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The increasing use of Collagenase in cell isolation is encouraging. Credit for the program's success is due to the many researchers who cooperated so openly with their time and talent.

Your comments and interest are welcome. Additional information on this application of Collagenase and a copy of our current catalog are available on request.
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Readers who found Westfall's article "Newton and the fudge factor," of great interest, as I did, might like to look at what one man, at least, took to be some fudging in Newton's development of calculus—or "fluxions," as he called it. I am referring, of course, to George Berkeley's *The Analyst* (1734) and the additional writing to which it led. This can be found in any collection of Berkeley's works. Not only is it of historical interest, but there are points raised which even now a teacher of introductory calculus, in particular, might do well to ponder.

Incidentally, is there not a moral to be found in all of this? Is it not likely that a time will come when some of the work of which we are now most proud will be seen to contain outrageous fudges? Nor is it too hard to see some places in which this might come about. Our "renormalizations," for instance, may some time be called by a much less charitable name. It seems now to be agreed that some of the early papers on relativity contained actual mistakes, which had the same effect as fudges.

In one sense, we need not make too much of all this. It would appear that
"to fudge is human." But because of that very fact, we should be ready to admit the possibility that we may, perhaps almost unconsciously, have committed a fudge, or overlooked one by someone else. Recently, when Dingle (1) and others suggested that there is something wrong—call it a mistake or call it a fudge—with the theory of relativity, what they encountered could scarcely be described by any term other than "persecution." Earlier, O’Rahilly, who had rather similar experiences, said that the heretic is treated worse in physics than in theology. We should remember that a theory which is to a great extent true may still be fudged here and there; those who point this out are in the same position as physicians who tell us that, while we are mainly healthy, we have such and such an illness, which fortunately can be cured.

H. L. ARMSTRONG

Department of Physics,
Queen’s University,
Kingston, Ontario, Canada

Reference

While reading Westfall’s article I was reminded of an anecdote told by the late J. C. McLennan during a lecture at the University of Toronto about 40 years ago.

McLennan said, as I remember, "One time I remarked enthusiastically to Nils Bohr, how wonderful it was that his equations yielded such an accurate value of Rydberg’s constant. Nils said to me ‘Of course, McLennan, I made it come out that way.’"

McLennan then said to us, "Perhaps that is the difference between Nils Bohr and me."

ARTHUR H. BOULTBEE

70 Bush Avenue,
Greenwich, Connecticut 06830

In reply to McHugh, I am unable to find in Newton’s language any grounds for the assertion that he offered the two corrections to the velocity of sound as hypotheses to account for the discrepancy. He did not present them in such a manner. Moreover, he assigned “quantitative exactitude” to them, and did so without any evidence external to the calculation that such “side effects” even exist.

RICHARD S. WESTFALL

Clare Hall, Herschel Road,
Cambridge, CB3 9AL, England

Effects of Marijuana Use

John Kaplan’s review (12 Jan., p. 167) of the recent American and Canadian government-sponsored reports (1, 2) on cannabis does justice to neither.

Like the British Wootton Report of 1968 (3), these North American studies did, indeed, recommend a more humanitarian approach to the legal issues. What Kaplan fails to mention is that the reports contain much cautionary clinical material which led both the American commission (1, p. 134) and the Canadian commission (2, p. 301) to conclude, as had the British committee (3, Section 71), that the use of marijuana was to be discouraged for various individual and public reasons.

These reasons are perhaps best stated by the Canadian commission (2, p. 274):

To sum up, then, it seems to us that there are at least four major grounds for social concern: the probably harmful effect of cannabis on the maturing process in adolescents; the implications for safe driving arising from impairment of cognitive functions and psychomotor abilities, from the additive interaction of cannabis and alcohol, and from the difficulties of recognising or detecting cannabis intoxication; the possibility suggested by reports in other countries and clinical observations on this continent, that the long-term heavy use of cannabis may result in a significant amount of mental deterioration and disorder; and the role played by cannabis in the development and spread of multi-drug use by stimulating a desire for drug experiences and lowering inhibitions about drug experimentation.

A number of people have discontinued the use of cannabis because of these and other problems, and even continuing users are becoming more willing to admit that—as Gabriel Nahas demonstrates in his excellent coverage of the subject (4)—marijuana is a “deceptive weed.”

CONRAD J. SCHWARZ

Student Health Service and
Department of Psychiatry,
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Vancouver 8, Canada

References
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reflects a very narrow view of "science" and is wrong on two counts. First, it has been shown in a recent paper (1) that there are subgroups in the human population that are highly susceptible to low levels of radiation — levels which have no demonstrable effect on the vast majority of persons. It is doubtful whether it is "scientific" to study radiation effects in human populations that are not inbred by doing experiments on inbred mice. Second, it is possible to do studies of human beings which are every bit as scientific as in vivo or in vitro laboratory studies (2) and which are directly relevant to the protection of the public against environmental hazards.

The real issue is whether scientists are willing to face up to their responsibilities as scientists, or whether they will play language games to escape these responsibilities. Are we going to debate whether an issue is "trans-scientific" or not, or are we going to go out and get hard data which will settle the issue? The need is not for "trans-scientific debate," but for effective measures to protect the public against low level radiation.

An immediate need is an adequate surveillance system (1). This system would be expensive, and entail inconvenience. For instance, a card might have to be filled out to report every diagnostic x-ray, every SST flight, every visit to installations of the Atomic Energy Commission (AEC), and so forth. Annual surveys of all persons living near nuclear power plants might be needed. Leukemia and other diseases might have to be made "reportable" throughout the United States and monitored as infectious diseases currently are throughout the United States.

This "commitment in perpetuity" to protecting the public is part of the cost of nuclear and other technology. The sooner we recognize this and get down to the scientific task of setting up protective systems, the better.

IRWIN D. J. BROSS
Roswell Park Memorial Institute,
Buffalo, New York 14203

References

I am prepared to concede that an issue which appears to be trans-scientific at one stage of scientific development may, at a later stage, be susceptible to resolution by a more sophisticated science. I doubt whether most experts in either radiobiology or epidemiology would agree at this time that the effects of radiation doses of about 10 millirads per year (the present AEC standard for reactor emissions), or even the 170 millirads per year previously accepted, can be shown to have an unequivocal effect on humans. On the other hand, if the sample is large enough and if the studies can be successfully carried out over a long enough time, then I agree there is no reason in principle why the issue cannot be resolved. The disagreement then is mainly one of deciding whether the enormous effort required for such studies is an appropriate allocation of resources. The evidence Bross presents in his paper in the New England Journal of Medicine (1) on incidence of leukemia in children exposed to intrauterine diagnostic radiation of around 1000 millirads hardly seems relevant to the issue of chronic exposure at a rate of 10 millirads per year.

ALVIN M. WEINBERG
Oak Ridge National Laboratory,
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light, although with low probability. There are a number of direct and sensitized mechanisms that can conceivably permit light absorption by pesticides in the environment. On the surfaces of soil particles, for example, charge-transfer processes may be very important. Electronic energy transfer is likely to be the least important process for pesticides in the environment. Mechanisms involving ground-state complex formation and excited complex formation, electron transfer, and “chemical” sensitization are much more likely to occur, and their operation will depend on the nature of the microenvironment.

C. S. Foote (University of California, Los Angeles) outlined mechanisms of photochemical oxidation reactions occurring in the presence of oxygen. Oxygen may function as an energy acceptor in a reaction with the photoexcited triplet state of an organic molecule to give singlet oxygen, a metastable excited species. The reaction pathways of singlet oxygen with olefins, dienes, heteroatoms, and phenol were outlined. Another significant oxidation reaction is the reaction of free radicals with oxygen to give a peroxy radical which often initiates a chain autoxidation process.

O. L. Chapman (Iowa State University) outlined the relationship of organic photochemistry to pesticide chemistry. Predictably, pesticide molecules might be expected to undergo a number of types of photochemical reactions. These include rearrangement of heterocyclic or aromatic systems, photo-Fries reactions, elimination processes, and rearrangements of aromatic or olefinic nitro compounds to nitrites. Photooxidation, photoreduction, photo-\textit{dimerization}, halogen bond cleavage, and the enhancement of phenol acidity by light are among the types of photochemical reactions that may be significant in the natural environment.

Research in photodynamic action was summarized by J. D. Spikes (University of Utah). Photodynamic damage to biological macromolecules results by selectively sensitized photooxidation of component residues such as the guanine residues in DNA and several amino acid residues in proteins. The formation of a triplet-excited state of a dye is the first stage of photodynamic action, and, subsequently, singlet oxygen may be produced by the reaction of triplet dye-stuff with molecular (triplet) oxygen. In a second pathway, the triplet dye may abstract a hydrogen atom from a substrate molecule to give a free radical that undergoes oxidation. Finally, other metastable states of the dye may be formed and react with substrate. Several examples of the practical importance of photodynamic reactions were cited. The possible role of photodynamic reactions in the photodegradation of pesticides in the environment was also discussed.

W. Klein (Radiation Biology Laboratories, Smithsonian Institution) discussed efforts to quantify the intensity and quality of the visible and ultraviolet radiation which reaches the earth and which would be available for photochemical reactions. He presented results which indicated that this radiation exposure is highly variable depending on season and cloud cover, as well as smog and haze.

A general discussion of the practical significance of pesticide photoalteration followed, with D. G. Crosby (University of California, Davis) as chairman. Several panels considered various aspects of the problem, and their conclusions and recommendations may be briefly summarized as follows:

The use of pesticides, especially synthetic pesticides, undoubtedly will continue for many years, but an accounting of the distribution of pesticides is very incomplete. A fundamental problem is the location and fate of residual pesticides. Present information indicates that most pesticides are altered by sunlight, but there is very little indication of the magnitude of photoalteration processes that affect pesticides. The principal concern is with the identity and the potential hazard of photoalteration products. Development of reliable information on the toxicology of the photoproducts is impeded by several considerations: (i) ignorance of the chemical nature of the photoproducts produced; (ii) a lack of standardized procedures for the investigation of photochemical reactions; and (iii) a lack of knowledge of the nature of the macro- and microenvironments to which pesticides are exposed in the field, including the intensity and spectral distribution of solar energy at the earth’s surface, the effects of adsorption on soil or foliar surfaces, and the effects of sensitizers in the solid phase or in water.

The most likely sites in which photoalteration can occur appear to be the atmosphere, either in the vapor phase or on particulates, and organic films on the surface of water, soils, and plants. A case was made for the study of the distribution of pesticides and their photoalteration products throughout all components of the environment.

Regulation of pesticides will require protocols for standardized estimation and prediction of photoalteration. Before such protocols are closely defined, gaps in current knowledge must be filled. Furthermore, many of the potential alternative methods of pest control such as the use of microbial agents, insect juvenile hormones, pheromones, and chemosterilants are not exempt from photoalteration reactions.

There is a lack of communication between researchers in basic photochemistry and those concerned with pesticide use and development. There is enough common ground between these two groups to ensure fruitful exchanges of information, and this needs encouragement. It is also possible to be critical of industry and government because of their reluctance to make public research information that has been developed to ensure the registration of proprietary compounds. Some clearinghouse of photochemical information generated, regardless of source, would be extremely beneficial for more rapid progress on these problems.

Despite the proportions of the problem delineated, a somewhat unanticipated piece of information which emerged from the meeting was that research support for the general area appeared to be decreasing. A more extensive summary of the proceedings is in preparation and will shortly be available on request from J. R. Plimmer.

Robert Rabson
Biology Branch, Division of Biomedical and Environmental Research, U.S. Atomic Energy Commission, Washington, D.C. 20545

Jack R. Plimmer
Pesticide Degradation Laboratory, Agricultural Environmental Quality Institute, U.S. Department of Agriculture, Beltsville, Maryland 20705

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1-7. Electroencephalography and Clinical Neurophysiology, 8th intern. congr., Marseile, France. (G.-C. Lairy, Laboratoire d'EEG, Hôpital Henri Rousselle, I, rue Cabanis, Paris 14e France)
2-6. Victimology, intern. symp., World Psychiatric Assoc., Jerusalem, Israel. (I. Drapkin, Organizing Committee of Criminology, Faculty of Law, Hebrew Univ. of Jerusalem, P.O. Box 4051, Jerusalem)
2-7. International Congr. on Mercury, sponsored by the Inst. Tecnologico Metalurgico Emilio Jimeno-Univ. of Barcelona, and the Consejo de Administracion de las Minas de Almaden y Arrayanes, Barcelona, Spain. [Secretaria del Congreso, Facultad de Ciencias (Pedralbes), Univ. of Barcelona, Barcelona-14]
2-10. Society of Protozoologists, Clermont-Ferrand, France. (D. M. Hammond, Dept. of Zoology, Utah State Univ., Logan 84321)
2-14. Tropical Medicine and Malaria, 9th intern. congr., Athens, Greece. (E. M. H. Mofidi, School of Public Health, Univ. of Tehran, Tehran, Iran)
3-6. Chemical Thermodynamics, 3rd intern. conf., Intern. Union of Pure and Applied Chemistry, Baden, Vienna, Austria. (F. Kohler, Inst. of Physical Chemistry,


3-7. Molecular Sieves, 3rd intern. conf., Eidgenössische Technische Hochschule and the Swiss Chemical Soc., Zurich, Switzerland. (W. M. Mieter, Inst. für Kristalllographie der ETH, Sonneggstr. 5, 8006 Zurich)


3-7. International Union of Pure and Applied Chemistry, 24th intern. congr., Hamburg, Germany. (Secretariat, 7 Via Cornelio Celso, 00161 Rome, Italy)


5-7. Nuclear Structure: Heavy Ions Conf., Inst. of Physics, Manchester, England. (Meetings Officer, IP, 47 Belgrave Sq., London, S.W.1)


5-12. American Phytopathological Soc., 65th meet., Minneapolis, Minn. (R. J. Green, Jr., Dept. of Botany and Plant Pathology, Purdue Univ., Lafayette, Ind. 47907)

5-12. Plant Pathology, 2nd intern. congr., Intern. Soc. for Plant Pathology, Minneapolis, Minn. (J. E. Mitchell, Dept. of Plant Pathology, Univ. of Wisconsin, Madison 53706)


8-15. Chemotherapy, 8th intern. congr., Athens, Greece. (P. Kontomichalou, P.O. Box 1554, Athens)

8-15. Neurology, 10th intern. congr., Barcelona, Spain. (J. M. Espadaler, Consejo de Cienctos, 318, Barcelona 7)

9-12. American Ceramic Soc. (Electronics Div.), Atlanta, Ga. (F. P. Reid, ACS, 4055 North High St, Columbus, Ohio 43214)


9-13. International Assoc. on Water Pollution Research, 7th, Paris, France. (B. B. Berger, Room 211, Graduate Research Center, Water Resources Research Center, Univ. of Massachusetts, Amherst 01002)


9-21. International Assoc. of Geomagnetism and Aeronomy, Kyoto, Japan. (Prof. Rikitake, Earthquake Research Inst., Univ. of Tokyo, 2-11-16, Yayoi, Bunkyo-ku, Tokyo Japan)

10-11. Turbulence in Liquids, 3rd symp., Univ. of Missouri–Rolla, Rolla. (J. L. Zaklin, Dept. of Chemical Engineering, Univ. of Missouri–Rolla, Rolla 65401)


10-13. European Conf. on Pediatric Nephrology, Strbske Pleso, Czechoslovakia. (F. Demant, Clinic of Pediatrics of the Faculty Hospital, Kosice, Czechoslovakia)


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10-15. International Assoc. for Cybernetics, 7th, Namur, Belgium. (J. Lemaire, Place Andre Ryckmans, Palais des Expositions, B-5000, Namur)

12-14. American Ceramic Soc. (Electronics Div.), Atlanta, Ga. (F. P. Reid, ACS, 4055 North High St., Columbus, Ohio 43214)

12-14. Physics of Semimetals and Narrow-Gap Semiconductors, Univ. of Wales and Inst. of Science and Technology, Cardiff, Wales. (J. E. Aubrey, Dept. of Applied Physics, UW and IST, King Edward VII Ave., Cardiff CF1 3NU)

12-17. American Medical Writers Assoc., Bethesda, Md. (E. Stahl, Ayerst Labs., Montreal, P.Q., Canada)

13-14. Society for Management Information Systems, 5th annual conf., Chicago, Ill. (A. Suter, SMIS, 221 North La Salle St., Chicago 60601)

13-15. International Congr. on the Knee Joint, 75th, Dutch Orthopaedic Assoc., Rotterdam, Netherlands. (Secretariat, Holland Organizing Centre, 16 Lange Voorhout, The Hague, Netherlands)

16-20. American Oil Chemists Soc., Chicago, Ill. (J. Lyon, AOCS, 508 S. Sixth St., Champaign, 61820)

16-20. American Acad. of Ophthalmology and Otolaryngology, Dallas, Texas. (C. M. Kos, 15 Second St., SW, Rochester, Minn. 55901)

24-28. Noble Gases Symp., jointly by U.S. Environmental Protection Agency, Natl. Environmental Research Center, and Univ. of Nevada, Las Vegas. (D. S. Barth, NERC, P.O. Box 15027, Las Vegas 89114)

October


1-4. American Acad. of Family Physicians, Denver, Colo. (R. Tusken, AAFP, Volker Blvd. at Brookside, Kansas City, Mo. 64112)


1-5. American Assoc. for Laboratory Animal Science, 24th annual conf., Miami Beach, Fla. (Joseph J. Garvey, AALAS, 2317 W. Jefferson St., Joliet, Ill. 60435)

1-5. Symposium on Remote Sensing in Oceanography, American Soc. of Photogrammetry, Orlando (Disney World), Fla. (J. S. Beazley, 330 Ponce St., Tallahassee 32303)

1-6. International Congr. of Rheumatology, 13th, Kyoto, Japan. (S. Sasaki, Japanese Rheumatism Assoc., Shimbunkaikan 63, 3-8-4 Ginza, Chuo-ku, Tokyo, Japan)

3-5. Clinical Orthopaedic Soc., Cleveland, Ohio. (M. L. Clayton, COS, 2045 Franklin St., Denver 80205)

4-6. Refractories Div., American Ceramic Soc., Bedford, Pa. (F. P. Reid, ACS, 4055 N. High St., Columbus, Ohio 43214)


5-6. Psychopharmacology Symp., World Psychiatric Assoc., Wroclaw, Poland. (A. Bukowczyk, Kraszewskiego 25, Wroclaw)

5-9. Sigma XI, Fostana, Wis. (T. T. Holme, SX, 345 Whitney Ave., New Haven, Conn. 06510)

6-12. American Concrete Inst., Ottawa, Ont., Canada. (ACI, Box 4754, Redford Stat., 22400 W. Seven Mile Rd., Detroit, Mich. 48219)

6-13. World Federation for Mental Health, 25th congr., Sydney, Australia. (A. Stoller, Mental Health Authority, 300 Queen St., Melbourne C1, Australia)

7-11. Clay Minerals Soc. (10th mtg.) and Clay Minerals Conf. (22nd), Banff, Alta., Canada. (J. E. Gillott, Dept. of
12-14. National Assoc. of Biology Teachers, St. Louis, Mo. (J. P. Lightner, NABT, 1420 N St., NW, Washington, D.C. 20005)
12-20. American Soc. of Clinical Pathologists, Chicago, Ill. (M. Damron, ASCP, 710 S. Wolcott Ave., Chicago 60612)

14-18. American Inst. of Ultrasound in Medicine, Ann Arbor, Mich. (M. A. Wainstock, Dept. of Ophthalmology, Univ. of Michigan Medical Center, Ann Arbor)
14-20. Allergology, 8th intern. congr., Tokyo, Japan. (Japanese Soc. of Allergology, c/o Dept. of Microbiology and Immunology, Nippon Medical School, 1-1 Sendagi, Bunkyoku-ku, Tokyo)
14-20. World Medical Assoc., Munich, Germany. (A. Z. Romualdez, WMA,
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produced a variant with increased resistance to the antibodies. This new variant was isolated and grown in the presence of antibodies specific for it.

After several such cycles of growth and mutation, Hannoun isolated a variant that no longer mutated under the experimental conditions. This variant, he postulates, represents the end point of evolution within the A₉ subtype, and is thus a virus that would be expected to appear in the late 1970's. Support for this postulate was provided by the discovery that the London influenza variant first isolated in 1972 was antigenically quite like the first mutant Hannoun had produced in his laboratory a year earlier.

As a result of an only partially understood aspect of the mutation process, the Pasteur group believes, antibodies specific for any one influenza mutant also provide protection against all antecedent mutants within that subtype. Vaccines produced from Hannoun's final variant should thus provide protection against all A₉ variants that might appear within this decade—although the emergence of the next major variant will necessitate beginning all over again. Limited studies have already shown that a killed virus vaccine produced from the Pasteur variant is effective against current strains of influenza, and the French government has licensed it for use as soon as possible. It is unlikely that the vaccine will be licensed for use in the United States for at least another year, however, because of the need for more data on its efficacy.

Because the Pasteur vaccine is made with inactivated viruses, it is expected to be no more effective than current killed virus vaccines. If Hannoun's methodology is proved correct, then, the best approach might involve a combination of techniques. That is, the final variant isolated by Hannoun could be used to produce attenuated virus vaccines by the method of Chanock, Davenport, or Kilbourne. In that fashion, almost complete protection could be provided from shortly after the appearance of a major new subtype until the appearance of the next subtype. Given adequate funding for the development and application of these techniques, some investigators argue, there need never be another influenza pandemic.

—THOMAS H. MAUGH II

RESEARCH NEWS

(Continued from page 1162)
NEWS AND COMMENT

(Continued from page 1158)

Lewis Daniels, 42; professor of pedodontics, University of California; 28 January.

Lewis M. Daniels, 43; associate professor of dentistry, University of Southern California; 23 January.

J. Fenton Daugherty, 75; professor emeritus of physics, University of Delaware; 19 February.

Earl H. Dearborn, 57; former head, pharmacology department, Boston University School of Medicine; 28 February.

Harry G. Detwiler, 58; chairman of education, George Washington University; 17 February.

Harold M. Dorf, 76; former dean of state-wide education, University of Michigan; 31 January.

Nathan B. Eddy, 82; retired chief, analgesics section, chemistry laboratory, National Institute of Arthritis, Metabolism, and Digestive Diseases; 28 March.

Elsa M. Ehrenstein, 71; former professor of pharmacy, Philadelphia College of Pharmacy and Science; 21 February.

Immanuel Estermann, 73; professor emeritus of physics, Israel Institute of Technology and University of Hamburg, Germany; 30 March.

Chester N. Frazier, 81; professor emeritus of dermatology, Harvard University; 14 February.

Ernst Gelhorn, 80; professor emeritus of physiology and neurophysiology, University of Minnesota; 20 April.

Vernon H. Goerke, 68; former visiting professor of acoustics, Washington State University; 27 February.

T. Campbell Goodwin, 71; professor emeritus of pediatrics, Columbia University; 30 May.

Douglas P. Head, 74; former professor of medicine, University of Minnesota; 14 April.

C. Doris Heilman, 62; professor of history of science, Queens College; 28 March.

A. Stanley Holt, 52; research professor of biology, University of Ottawa; 26 December 1972.

Jules D. Holzberg, 57; chairman, psychology department, Wesleyan University; 18 February.

George L. Kaltsounis, 46; professor of education, State University of New York College, Buffalo; 30 March.

Louis N. Katz, 75; director emeritus, Cardiovascular Institute, Michael Reese Hospital and Medical Center; 2 April.

Newell C. Kephart, 62; former professor of education, Purdue University; 12 April.

Robert N. Kersey, Jr., 52; associate professor of electrical and computer engineering, Clemson University; 3 February.

Herbert J. Kildee, 87; dean emeritus, College of Agriculture, Iowa State University; 10 February.

Edward H. Kraus, 97; former dean, College of Literature, Science and Arts, University of Michigan; 3 February.

Edward T. Ladd, 52; professor of education, Emory University; 24 January.

Charles E. Lawall, 81; former president, West Virginia University; 5 April.

Francis L. Lederer, 74; professor emeritus of otolaryngology, University of Illinois; 3 April.

Frank C. Mathers, 92; professor emeritus of chemistry, Indiana University; 23 March.

Ferdinand Menefee, 87; professor emeritus of engineering mechanics, University of Michigan, 12 February.

David W. Northup, 66; professor emeritus of physiology and biophysics, West Virginia University; 13 March.

Dickinson W. Richards, 77; professor emeritus of medicine, Columbia University; 23 February.

Edwin H. Rohrbeck, 77; professor emeritus of agricultural extension, Pennsylvania State University; 11 February.

Peter A. Tavormina, 55; director of biochemistry, Mead Johnson Research Center; 26 March.

Thurio Thomas, 64; professor of sociology, Carleton College; 14 April.

Derrick Vail, 74; professor emeritus of ophthalmology, Northwestern University; 19 April.

Joan F. White, 49; assistant professor of zoology, Eastern Illinois University; 26 March.

BACKGROUND

fessor of education, Purdue University; 12 April.

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Erratum: In the caption of the cover photograph for 25 May 1973, the word "below" is misspelled; it should be deleted from the first sentence, and the second sentence should read: "(Below) Same view taken through a cylindrical lens...". Two errors occurred in the report by Freeman and Athibos in the same issue, p. 876: in column 2 line 4, "Freeman and co-workers" should be changed to "Freeman et al."; in column 3 line 44, "the visual resolution" should be changed to "visual resolution".--Ed.

Erratum. The major affiliations of the following new members of the National Academy of Sciences (Science, 11 May) are: Edward H. Ahrens, Jr., Rockefeller University; Robert W. Fogel, University of Chicago; and Gilbert F. White, University of Rochester.

Erratum. In the illustration accompanying the review of Valentin Bost's "Newton and Rusi" (11 May, p. 624), the drawings designated "Left" and "Right" were interchanged. The three drawings that appear at the right represent the "Newtonian-Gregor-Lomon.-tubus" and the one at the left represents the "tubus naptocyticus modos Lomonosov-Newton."