SCIENCE

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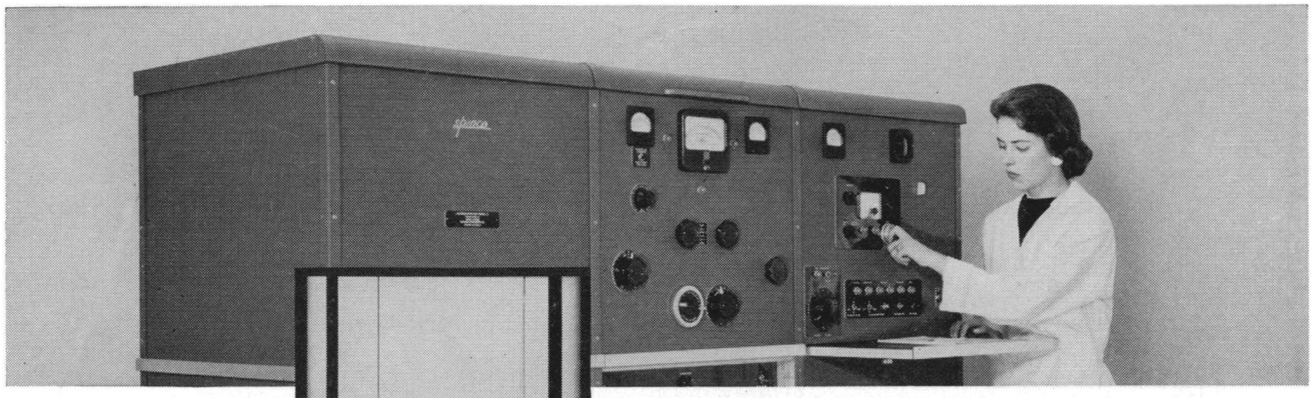
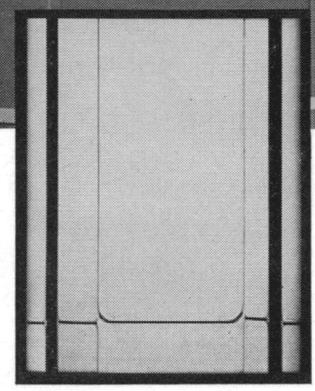
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

New Methods Extend the Usefulness of the Ultracentrifuge

Recent studies by research scientists have further increased the uses of the Analytical Ultracentrifuge for measuring molecular weights and purity of viruses, enzymes, proteins, polymers and a variety of organic and inorganic molecules. Here are four new developments as reported in the technical literature.



Interacting Systems

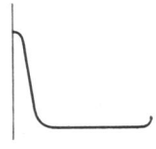


Kegeles and Rao at Clark University have measured the molecular weights of chemically reacting systems in the ultracentrifuge cell using the Archibald "approach-to-equilibrium" method. Studying the enzyme system alpha-chymotrypsin, they showed it to be present in the ultracentrifuge cell as an equilibrium mixture of monomers, dimers, and trimers. This is an extension of previous work which showed that the Archibald method applies to polydisperse non-ideal solutions, as well as to monodisperse ideal solutions.

Improved Accuracy

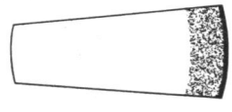
Trautman, at New York's Rockefeller Institute for Medical Research, showed that the accuracy of the Archibald method can be improved by more precisely locating the position of the meniscus on the ultracentrifuge photographic plate. He made a detailed study of the optical fine structure at the meniscus, and used a special optical aligning procedure with a mirror in the ultracentrifuge cell.

Simplified Measurements

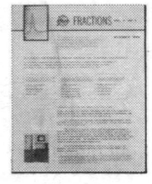


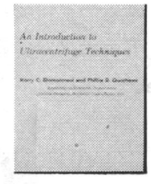
At Stockholm's Nobel Medical Institute, Ehrenberg reports a simplified approach-to-equilibrium method which makes measurements from the schlieren curve easier. He runs the ultracentrifuge fast enough for a peak to begin forming at the meniscus so that the schlieren curve is parallel with the baseline and no extrapolation is necessary. His measurements of molecular weight and diffusion constants agree closely with those by other methods.

Rapid Equilibrium



Van Holde and Baldwin at the University of Wisconsin have used short liquid columns to achieve complete sedimentation equilibrium in a fraction of the time previously required. Using liquid columns of only 3 mm, they report equilibrium with sucrose in 3½ hours, and with a 1 mm column in only 30 minutes. In addition, the authors report that measurements during approach-to-equilibrium permit calculation of a diffusion coefficient.





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Letters

Teaching and Research

Impressed by what Caplow and McGee bring out in their book *The Academic Market Place* [see *Science* **129**, 357 (1959)], Victor G. Fourman deplores the deemphasis on teaching ability and the concomitant stress on publication in the academic evaluation of college professors. With this aspect of Fourman's argument I most heartily agree. Unless he be frankly engaged as a research professor, no member of a college or university faculty should be advanced on the basis of publications alone.

However, in all the literature I have seen on this troublesome subject there is little or no mention of what seems to me the really critical thing in the whole question of teaching versus research—the one valid reason why department heads, deans, and presidents may be justified in demanding that a faculty man publish. Unless a college teacher is actively engaged in grappling with the unknown somewhere on the forefront of knowledge, he will not bring into the classroom the point of view, the frame of mind, the mode of attack, the general air of the investigator, and these qualities are just what is essential if a teacher is to show, in the presence of the student, by various forms of example, how to go about dealing with the problems in his subject.

These remarks are directed mainly at the problem of college teaching—teaching in the undergraduate world. Graduate work deserving of the name is concerned with educating the student in the ways of original investigation, and to put a noninvestigator in charge of such work is indeed asking the blind to lead the blind. But even here the investigator should be a good teacher, not necessarily in the way that his colleagues in the undergraduate field are good teachers—and in fact there is often a difference—but a good teacher nevertheless.

Now it is publication that is nearly always emphasized in this picture and, unfortunately, not always research; this is one vice of which Fourman justly complains. Quality of publication should of course take first place in any individual evaluation, for the prime value of publication itself, in this context, is the evidence it affords that the author is really an investigator. Over and above all the cant and hypocrisy that have, regrettably, invested much discussion of the matter, the valid case is after all rather simple: A man can hardly go very far in sound research without finding out something new, and when he does he owes it to his fellow scholars to make known the results of his work.

And there is also the negative side of the picture. If a teacher does no more than read and absorb the literature on his subject (this he must do as minimal preparation) it is highly likely that in the course of a few years he will go stale in his own thinking.

And finally, all this must probably be qualified by the truism that in a broad field like college teaching all kinds of genius are needed. Many years of association with many kinds of teachers have brought me to realize that there probably are some people who can stimulate students in certain desirable ways without doing any kind of research. But for the reasons given above, in view of the essential fact that the main thing college can do for a student is to show him how to learn and how to think, such teachers should be the exception and not the rule. Men and women who can do a good job of both teaching and research are probably not as rare as many would have us believe.

EDMUND M. SPIEKER
Department of Geology,
Ohio State University, Columbus

Department of Science

I should like to express my strong approval of the article on "Government sponsorship of scientific research" by L. V. Berkner [*Science* **129**, 817 (1959)].

Like many members of the scientific community I have had grave doubts about the wisdom of setting up a federal department of science headed by an officer of cabinet rank. Increasingly, however, I have become convinced that such a department is practically a necessity, if science is to play the role that it must play in any vigorous society today. Berkner's article provides the most powerful argument that I have seen in favor of such action, and to me the argument seems practically unanswerable.

As regards the scope of such a department I should go along with Berkner's argument almost entirely except that I should like to see the National Science Foundation included in the proposed department. It is true that its inclusion would modify the structure, and expand the responsibilities, of the department, as envisaged by Berkner. I believe, on the other hand, that the National Science Foundation would probably flourish more vigorously and obtain more adequate support if it were a part of a federal department of science. The foundation has hitherto been almost a stepchild of the government. Its functions are of enormous importance; it should be the government agency with prime responsibility for the promotion of fundamental scientific research in this coun-

(*Continued on page 1369*)

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Science Writing Awards

The interpretation of science to the public is an activity of such high importance that we are glad indeed to announce that the AAAS is again sponsoring two annual awards of $1000 each for excellence of science writing. One award will be made for newspaper and the other for magazine articles. Funds are being supplied by the Westinghouse Educational Foundation. General management is in the hands of the AAAS and a committee representing the three sponsoring organizations, the Westinghouse Electric Corporation, the National Association of Science Writers, and the AAAS. Announcements and rules of eligibility are being distributed to science writers and to newspapers and magazines. The rules are given on page 1348. Entry blanks may be secured from the AAAS. Because excellence of medical reporting is already recognized by the Lasker Awards, writing in the clinical medical field will not be eligible. The new awards are therefore complementary to the Lasker Awards.

A panel of judges representing newspaper and magazine editors, schools of journalism, science, and the general public will select the winning entries. Winners will be informed early in December, and the awards will be presented during the AAAS annual meeting at the annual dinner of the National Association of Science Writers.

Improving the communication of science to the public is a AAAS responsibility that we have not been carrying out as well as we should like. The new awards are one aspect of what we hope will be a more effective program. Fortunately, other organizations are also interested in improving science reporting. The British Association for the Advancement of Science is one that is trying out a rather different approach. Three special lectureships have been established, tenable only by comparatively young scientists who have demonstrated exceptional skill in lecturing to general audiences. Each year the three lectures will be given at the annual meeting of the British Association, and may be repeated later in other cities.

The British Association lectureships are—if the term may be used—for talented amateurs. The AAAS-Westinghouse Awards, in contrast, will probably usually go to professional science writers. That both groups include members with real talent for popularizing science is evident from the list of winners of UNESCO's annual Kalinga Prize. American winners of this award have been Waldemar Kaempffert and George Gamow. Karl von Frisch was last year's winner, and a particularly worthy one, for he has not only provided a wide audience with accounts of interesting zoological work, but in some of his writing, for example *Bees, Their Vision, Chemical Sense, and Language,* has also done the more difficult task of conveying to the general reader a beautifully clear picture of the mode of thought, the point of view, and the interplay of hyopthesis and experiment that characterize scientific work.

There is nothing in the rules of the AAAS-Westinghouse Awards to prevent a scientist from winning. In fact we hope that once in a while a dyed-in-the-wool scientist will be announced as the winner. But any scientist will face stiff competition, for there is a growing body of highly competent professionals in the field.

Whoever wins, this new program will provide an opportunity to reward excellence in an activity that is of importance both to science and to society.—D.W.

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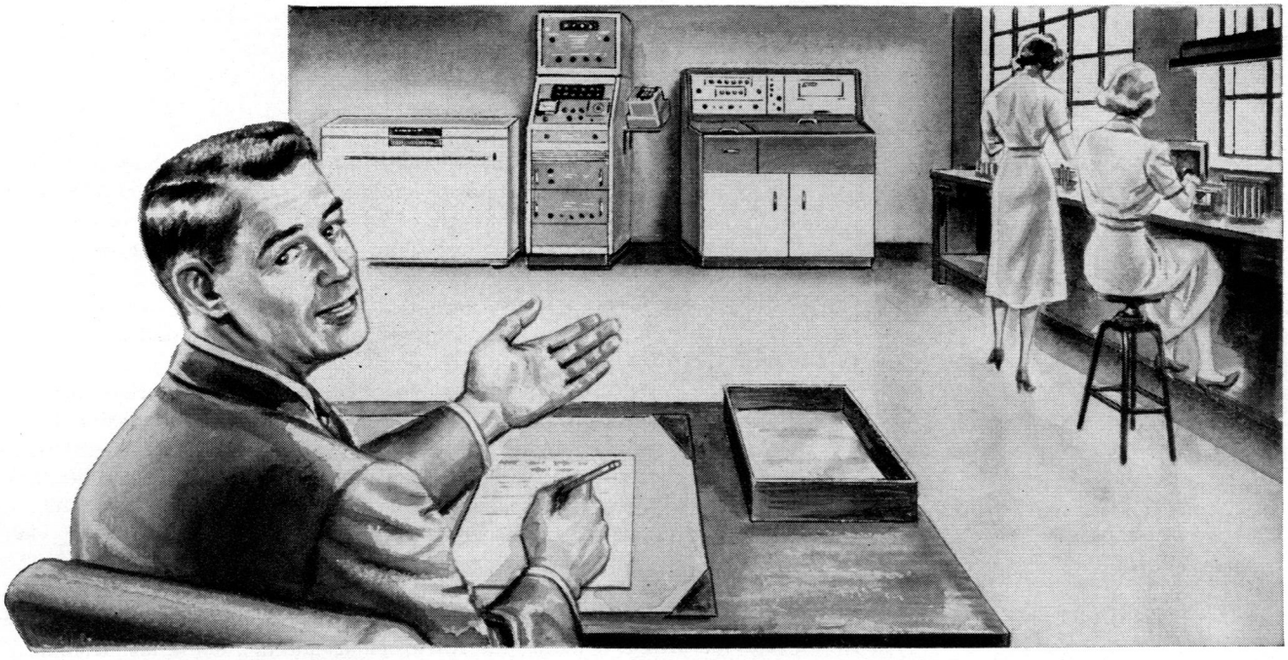

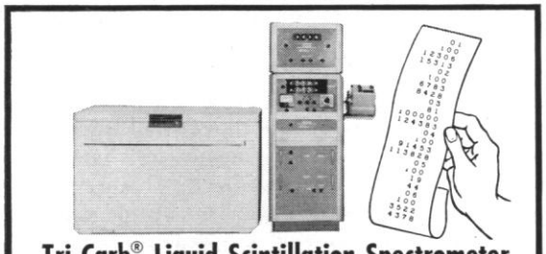

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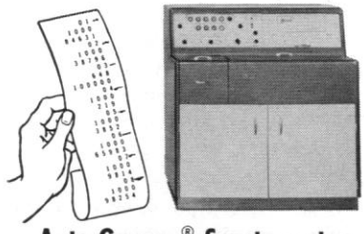

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Letters

(*Continued from page 1324*)

try. Relative to the Atomic Energy Commission, the Public Health Service, or the Armed Services, it has been, however, starved of funds. I believe that the National Science Foundation is more likely to come into its own and receive the support it deserves if it is a part of a department of the government headed by an officer of cabinet rank.

The size of the research program of the United States Public Health Service is, of course, largely due to the intense interest of the public and of Congress in matters related to health, but I think the program has also been strengthened by the fact that the United States Public Health Service is part of the Department of Health, Education, and Welfare and has a cabinet officer with the departmental organization behind him to speak on its behalf. The actual function of the National Science Foundation, with respect to the support of scientific research, should involve support of research over a much wider area than that of the Public Health Service, since it includes the whole realm of fundamental research in the physical and biological sciences, with overlapping into the area of medicine and social sciences. I believe that the National Science Foundation will stand a better chance of growing to its proper stature as part of a federal department headed by an officer of cabinet rank than it would as a separate and isolated agency.

This criticism, of course, deals with only one aspect of Berkner's proposals, which in general I would endorse wholeheartedly. I hope that his powerful and convincing article will receive the attention it deserves from scientists throughout the country—and from the politicians.

JOHN T. EDSALL
Harvard University,
Cambridge, Massachusetts

Philanthropy

I confess that I was jarred by the editorial, "How to be generous cheaply" [*Science* **129**, 805 (1959)]. I am aware of the fact that many pleas for philanthropy are supported primarily by the argument that "you can deduct it from your income tax." But I had not expected the AAAS to be promoting a considered plan for the encouragement of such practice.

Basically, the editorial is an expression of distrust in the capacity of the Federal Government—which is all of us—to make wise expenditures of its tax receipts. Better, the editorial says, to create a condition in which each individual has increased latitude to decide for himself the social causes and institutions (privately operated and controlled) which he cares to support.

I believe such thinking is headed in the wrong direction. If we traveled far enough along this road, disaster could overtake us. Granted that the Government sometimes does not spend wisely, it does not follow that private, individual judgments in "giving" are certain to be formed in the public interest. Private philanthropy has often been irresponsible and wasteful.

Certainly, citizens should have reasonable encouragement to form and to support private, volunteer organizations for religion, education, and charity. But the primacy of the larger society should not be undermined. AAAS members should understand this principle better than any other group and not become just another pressure group out to shoot a few more holes in the income tax.

P. W. HUTSON
University of Pittsburgh,
Pittsburgh, Pennsylvania

Meetings

Autoradiography

A conference on autoradiography, sponsored by the American Cancer Society and the National Cancer Institute of the National Institutes of Health, was held at the Westchester Country Club, Rye, N.Y., 22–24 Sept. 1958. Thirty-five leaders in the field were invited to a "retreat" conference. Twelve of the participants were from Great Britain, Sweden, Denmark, Belgium, and Canada; the others were from the United States. Twenty-five scientific papers were presented and discussed.

A day was spent on theoretical considerations and technique. R. H. Herz (Kodak Ltd., Harrow) reported that latent-image fading of photographic emulsions, particularly in the AR-10 stripping film so useful to the biologist, might be greatly reduced, and the speed of the film doubled, by exposing the emulsion in an atmosphere of very low humidity and devoid of oxygen. J. Spence (Eastman Kodak Co., Rochester, N.Y.) emphasized the desirability of doing experimental control studies in autoradiography to evaluate accurately latent-image fading. The problem of the production of tritium (H^3) tracks in emulsion was discussed at some length.

Hilde Levi (Copenhagen) pointed out the quantitative validity of relative grain-counting and track-counting techniques but also the potential errors of these methods when G-5 liquid emulsion and C^{14} and S^{35} are used. J. E. Gullberg (University of California, Berkeley) emphasized the value of dark-field illumination for both the visual examination and the automatic, instrumental grain counting of autoradiograms. It was agreed that with this technique there is an increase in the number of visible events, both in the background emulsion and over the radioactive source, but there was no unanimity on the part of the discussants as to whether there was a gain or loss in signal-to-noise ratio.

W. Tolles (Airborne Instruments Laboratory, Mineola, N.Y.) discussed methods of automatic quantitation of autoradiograms. He indicated that the principles of the instrumentation used in the automatic scanning of Papanicolaou smears of exfoliated cells and utilized also in the design of a nuclear track scanner that counts the proton tracks in film badge emulsion might readily be applied to autoradiography. Practical difficulties such as a wide spread of density in a field or the overlapping of grains might become significant. S. Pelc (Kings College, London) reminded the group that the biologist in doing quantitative studies usually spends considerable time preparing his specimen and selecting the few areas that he wishes to measure. He raised the question of whether it is profitable to build large-scale grain-counting instruments inasmuch as only a small fraction of the work involved is that of grain counting.

E. Odeblad (Caroline Institute, Stockholm) gave a mathematical evaluation of the density of photographic emulsions by a matrix system. This interesting approach to problems of resolution and "cross-fire" dosimetry has not yet been evaluated in terms of the results that have already been achieved by other techniques.

D. L. Joftes (Cancer Research Institute, Boston) discussed a technique in which fluid, nuclear-track emulsions are used with H^3- and C^{14}-labeled isotopes. Its chief advantage seems to be speed and ease of processing large numbers of autoradiograms. L. Bélanger (Ottawa) showed how autoradiography could be used as a histochemical tool by studying the uptake of Ca^{45} and S^{35} in bone sections that had been incubated in a medium containing the isotope. Differences in uptake of Ca^{45} in normal and pathologic bone were indicated by the autoradiograms. R. L. Swarm (National Cancer Institute, Bethesda) used the uptake of I^{131} and S^{35} in autoradiograms of thyroid and cartilage transplants as a measure of the viability of the transplant.

A morning session was devoted to radiation effects and radiation carcinogenesis. H. Lisco (Argonne National Institute, Chicago) illustrated the pathogenesis of lung cancers secondary to the inhalation of plutonium by concomitant histological changes and autoradiographic distribution of the isotope. The experimental lesions resembled the Joachimstahl lung cancers of man. L. Lamerton (Royal Cancer Hospital, London) discussed the problems of dosimetry in evaluating radiation-induced bone cancers and pointed out the wide range of possibilities for the production of focal injury and subsequent carcinogenesis. The microscopic distribution of isotopes can be determined by thick-section autoradiography, and there is great need for this type of approach which, in combination with an assessment of histologic damage, is so important to the unraveling of problems in carcinogenesis.

Janet Vaughan (Oxford) discussed autoradiography and dose-rate measurements in bone and showed a correlation between the different types of damage observed and the different patterns of dose rate and total dose received in the tibia of rabbits receiving Sr^{90}. Bone tumors arose in the areas of maximum dose or maximum damage after intravenous injection. In the animals fed Sr^{90}, the site of origin of tumors appeared to be generalized in association with the more generalized distribution of maximum dose.

J. Arnold (Veterans Administration Hospital, San Francisco) showed that plutonium (Pu^{239}) is more diffusely concentrated in the lung and flat bones of dogs. With time and remodeling of bone traveculae and at certain dosages of Pu^{239} the distribution is more diffuse and tends to resemble the Ra^{226} distribution. Dziewiatkowski (Rockefeller Institute) showed by autography the decreased uptake of S^{35}-sulfate in the epiphyseal plate of the tibia of the mouse after radiation.

An afternoon session was devoted to papers on nucleic acid, protein, and mucopolysaccharide metabolism. L. G. Lajtha (Oxford) pointed out many of the disadvantages of the tritium label in nucleic acid studies, in particular its radiation effects. There was considerable disagreement about the matter, the Brookhaven group being less convinced of the effect. All agreed that relatively little was known about many features of tritium, especially about its radiation effect.

S. Pelc (London) stated that the percentage of cells concentrating thymidine-H^3 is higher in many systems than the known rates of mitosis would lead one to expect. He concluded that deoxyribonucleic acid (DNA) metabolism might occur independently of any replication activities and have a turnover distinct from mitotic activities. There was considerable discussion about whether mitotic rates were as low as Pelc assumed or whether mitosis occurred as infrequently as he believed.

A. Ficq (Free University of Brussels) indicated that protein synthesis occurred in the salivary gland chromosomes of dipteran larvae and that there were areas of the chromosome which incorporated tritiated thymidine in high concentrations at certain stages of larval life.

I. Tessman (Massachusetts Institute of Technology) reported on the "star" technique of studying bacteriophage multiplication by pouring emulsion plates containing P^{32}-labeled DNA in bacteriophage particles. He compared the number of "stars" in parental T_2 phage with the number of "stars" in progeny resulting from the parental phage growth in bacteria, lysis of the bacteria, and the release of progeny phage. This technique shows that some progeny phage contain 20 percent as much DNA as the parental phage. The significance of this approach in terms of knowledge concerning the replication of DNA, as well as its importance in virus metabolism, were pointed out.

G. Asboe-Hansen (Copenhagen) used $S^{35}O_4$ and the Rous sarcoma to show that the mast cell, nongranulated metachromatic cells, and the extracellular ground substance incorporate S^{35}. Autoradiograms indicate that the mast cell is

not necessarily the origin of extracellular sulfomucopolysaccharides.

One session was given to tritium-labeled isotopes. C. P. Leblond (McGill) used thymidine-H^3 as an indicator of the replication rate, and he divided cells of the body into three groups on the basis of the percentage of cells labeled after the injection of thymidine-H^3. In his study, the cells that turned over the thymidine-H^3 most rapidly were found to be those of the skin, the thymus, and the gastrointestinal tract. The cells that responded most slowly were those of the central nervous system and muscle. Activity for most other organs was between these limits.

E. Cronkite (Brookhaven National Laboratory, Upton, N.Y.) presented data on the life-cycle time determination, DNA synthesis, and the turnover of cells in the reticuloendothelial and marrow cells. The Brookhaven group emphasized that the percentage of labeled cells in an organ after a single, rapid injection of labeled thymidine is equal to the percentage of the total cell lifetime devoted to DNA synthesis. If DNA synthesis is assumed to be a prelude to division, a high percentage of labeling indicates that a large percentage of cells is preparing to divide. These investigators believe that there is a widespread pool of primitive progenitor mesenchymal cells which is continually migrating and appears able to respond to many types of stress leading to repair, defense, or regeneration.

R. Painter (Brookhaven) used tritiated thymidine to determine subdivisions of the lifetime cycle of HeLa cells in tissue culture. W. Plaut (University of Wisconsin) raised questions about the damage to chromosomes caused by thymidine-H^3 and the effect upon conclusions drawn from tritium replication studies. In rebuttal, Taylor (Columbia) stated that the percentage of intrachromosomal changes and exchanges between sister chromatids of *Bellevalia* after irradiation did not increase in succeeding generations, thereby implying that since increasing exposure to radiation did not bring about an increase in radiation effects, the radiation effect was not great.

P. Woods (Brookhaven) showed that in plant cells cytidine-H^3 was quickly taken up in ribonucleic acid (RNA) of the nucleoli. When the cells were removed from a radioactive medium where they had been kept for a short period to allow for nucleolar labeling and placed in a nonradioactive medium to permit growth to continue, autoradiograms of the cells after some hours showed the label in the RNA of the cytoplasm. P. J. Fitzgerald (State University of New York, Brooklyn) showed that in the rat the tritium of cytidine-H^3 was localized in the nucleolus of the pancreas acinar cells half an hour after injection, and at 24 hours was predominantly cytoplasmic. These two studies suggest that some RNA, or a portion of the RNA molecule, of the nucleolus passes into the cytoplasm.

The chairmen of individual sessions pointed out in summary the need for further parallel studies of radiation effect with respect to histologic damage, isotope localization, and dosimetry. They urged study of the range, absorption, and grain yield of tritium in photographic emulsions. Particularly emphasized was the lack of knowledge concerning the radiation effect of tritium on cell metabolism and replication. This was deemed most important in studies of such substances as tritiated thymidine, which concentrates in the DNA. The great value of tritium in cellular resolution warrants further study of these aspects of its use. It was emphasized that greater employment of biochemical techniques in conjunction with autoradiographic studies was desirable. The value of quantitative studies was reemphasized, but limitations and technical difficulties were noted.

In the attempt to avoid delay in the publication of the proceedings of the conference, a stenotypist recorded the discussion, and each participant, within a few hours after his remarks, was given a typewritten copy of them for correction. Through this arrangement and the prompt submission of papers by participants, publication of the papers and discussion in the January–February 1959 issue of *Laboratory Investigation*—4 months after the conference—was made possible.

PATRICK J. FITZGERALD
State University of New York, Brooklyn

American Heart Association

Forms for submitting abstracts of papers intended for presentation at scientific sessions of the American Heart Association in Philadelphia, Pa., 23–25 October, are now available from Dr. F. J. Lewy, Assistant Medical Director, American Heart Association, 44 E. 23 St., New York 10, N.Y. Applications for space for scientific exhibits may also be requested from Lewy. Both abstracts and applications for exhibit space must be postmarked no later than *12 June*. Space for industrial exhibits may be requested through Steven K. Herlitz, Inc., 280 Madison Ave., New York 16, N.Y.

This year for the first time the scientific sessions will include a joint program with the American College of Cardiology. The college, holding its eighth interim meeting concurrently, will conduct "fireside conferences" on the evening of 23 October in which AHA members will participate. On 25 October a panel on Cardiac resuscitation will be presented jointly by the college and the association's council on clinical cardiology.

Cold Spring Harbor Symposium

The 24th annual Symposium on Quantitative Biology will be held at the Long Island Biological Laboratory, Cold Spring Harbor, N.Y., 3–10 June. As part of its policy of fostering a closer relation between biology and other basic sciences, the laboratory each summer invites a group actively interested in a specific aspect of quantitative biology, or in methods and theories applicable to it, to take part in a symposium.

The topic this year will be Genetics and 20th Century Darwinism. Research findings will be presented during 16 sessions. Presiding over the opening session on the evening of 3 June will be I. M. Lerner of the University of California. Ernst Mayr of Harvard University will present the opening paper.

Participants from abroad will include: Hans Stubbe of the Institut for Kultur-

pflanzenforschung, Gatersleben, East Germany; A. A. Buzzati-Traverso of the Universita di Pavia, Pavia, Italy; M. Lamotte, Ecole Normale Superieure. Paris; F. H. W. Morley, Commonwealth Scientific and Industrial Research Organization, Canberra, Australia; A. E. Mourant, Lister Institute, London, England; L. L. A. Coutinho, Estacao Agronomica Nacional, Lisbon, Portugal; Franz Schwanitz, Staatsinstitut für Angewandte Botanik, Hamburg, Germany; N. A. Barnicot, University College, London; P. M. Sheppard, University of Liverpool, Liverpool, England; F. Ehrendorfer, University of Vienna, Vienna, Austria; B. Kurten, University of Helsinki, Helsinki, Finland; G. Heberer, Universitat, Göttingen, Germany; Pierre Dansereau, University of Montreal, Montreal, Canada; S. Smith-White, University of Sydney, Sydney, Australia; and B. Rensch, Universitat, Munster, Germany. For additional information, write to: Dr. Arthur Chovnick, Biological Laboratory, Cold Spring Harbor, N.Y.

Pharmaceutical Companies Aid International Physiological Congress

As it has done in the past, the American pharmaceutical industry has responded to a request for financial support of a triennial International Physiological Congress; this one, the 21st, is to be held in Buenos Aires, Argentina, 9–15 August.

The following companies have contributed: Burroughs Wellcome & Company, Inc.; Ciba Pharmaceutical Products, Inc.; Hoffmann–La Roche, Inc.; Eli Lilly & Company; Merck & Company, Inc.; Merrell-National (Overseas) Laboratories; Miles Laboratories, Inc.; Olin Mathieson International Corporation and the Squibb Institute for Medical Research; Smith, Kline & French Laboratories; and the Upjohn Company. The total amount is $8100.

This assistance is particularly significant because the forthcoming congress is both the first to be arranged in one of the South American Countries and the first to be held under the auspices of the International Union of Physiological Sciences.

Nuclear Society and Atomic Industrial Forum

The American Nuclear Society and the Atomic Industrial Forum have announced plans to conduct a series of coordinated meetings. The two organizations are the largest in the country concerned exclusively with nuclear energy and radiation.

These meetings are planned to bring

into focus the latest developments in both the technical and business phases of the peacetime uses of the atom. Independent sessions covering these two different aspects of nuclear science are planned. A partial overlapping of the meeting schedules of the two organizations is intended to be a constructive step toward the avoidance of duplicate travel.

The American Nuclear Society, founded in 1954, has a professional membership of around 3000 from all branches of nuclear science and technology. The Atomic Industrial Forum is a nonprofit membership association of more than 500 industrial and other business organizations, research and service companies, labor groups, and educational institutions engaged in the development and utilization of nuclear energy for constructive purposes.

Present planning includes coordinated meetings in the fall of 1959 in Washington, 1960 in San Francisco, and in 1961 in New York. Both organizations will continue to hold additional individual meetings throughout the year.

Isotope Effects

Argonne National Laboratory will conduct a conference on isotope effects in chemistry and biology on 8–9 June. The conference, sponsored jointly by the divisions of chemistry and of biological and medical research, will present a program of 14 papers concerned with the effects of isotopic substitution on chemical and biological processes. Further information may be obtained by addressing Miss B. Litt, Isotope Effects Conference, Argonne National Laboratory, P.O. Box 299, Lemont, Ill.

Symposium on Electrolytes

The program of the Trieste congress of the Societa Italiana per il Progresso delle Scienze, 4–9 June, will include a symposium on electrolytes. P. Debye of Cornell University will be honorary chairman of the symposium and opening speaker; the program chairman is professor Raymond M. Fuoss of Yale University.

Colloquium of College Physicists

The 21st annual Colloquium of College Physicists and the Associated June Lectures will be held at the State University of Iowa, Iowa City, 17–20 June. The program will consist of lectures on developments in contemporary physics and round-table discussions on the teaching of physics and on other current problems of the profession. One evening will be devoted to the exhibit of original demonstration equipment and other teaching devices prepared by the participants.

The Associated June Lectures will be given by Thomas Gold, professor at Harvard College Observatory, on magnetic fields and particles in the solar system and on large-scale structure of the universe.

Registration is without fee. The colloquium is assisted by the National Science Foundation.

Electron Microscopy

The 17th annual meeting of the Electron Microscope Society of America will be held 9–12 September at Ohio State University, Columbus. Special attractions of the meeting include symposia on the contributions of electron microscopy of viruses and cells to the problem of cancer, elementary techniques of electron miscroscopy from the point of view of experts, and problems in the electron microscopy of ceramic materials. Information concerning the meeting may be obtained from: Sydney S. Breese, Jr., program chairman, EMSA, Plum Island Animal Disease Laboratory, Greenport, N.Y. The deadline for 150-word abstracts of contributed papers is *1 June*.

Embryology

The editorial board of the *Journal of Embryology and Experimental Morphology* is sponsoring the fourth of its series of international embryological conferences at the College de France, Paris, from 21–24 September. Details of its organization and scientific program will be available on 1 June and can then be obtained from Prof. E. Wolff, Laboratoire d'Embryologie Experimentale, 49 Avenue de la Belle Gabrielle, Nogent-sur-Marne, France, or from Dr. L. Brent, Department of Zoology, University College, Gower Street, London, W.C.1, England.

Geology Teaching

Thirty school science teachers and professional geological scientists from all parts of the country will participate in a 6-week conference at the University of Minnesota, Duluth, from 20 July to 28 August, to prepare improved materials for the teaching of geology in school science programs. The Duluth conference, which is being sponsored jointly by the American Geological Institute and the University of Minnesota, Duluth, is a part of a broad and continuing program of public education by the institute. The conference is being conducted with the financial assistance of

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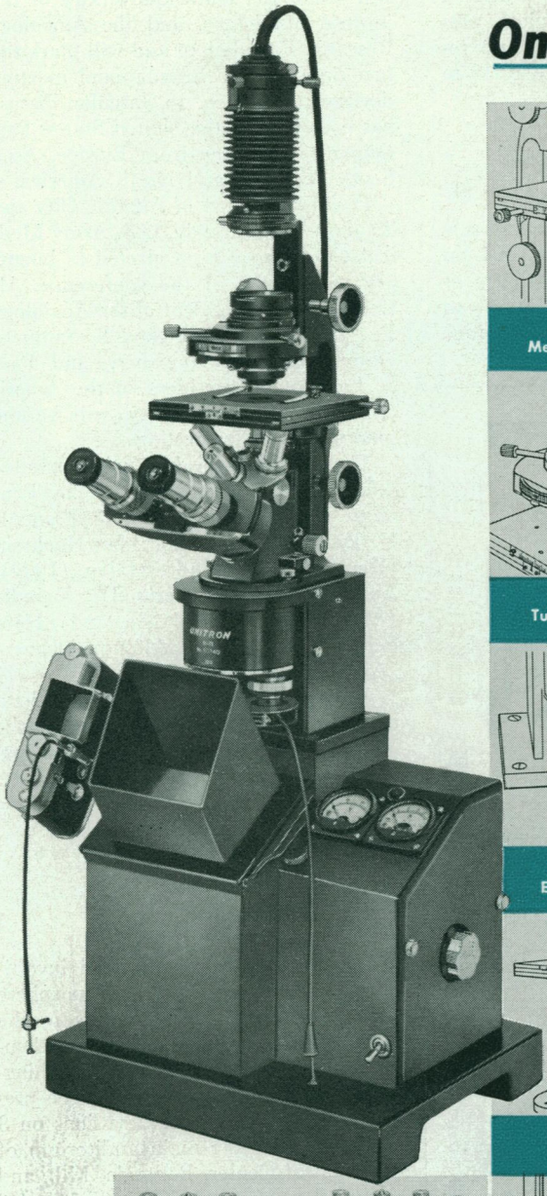

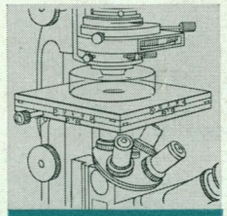

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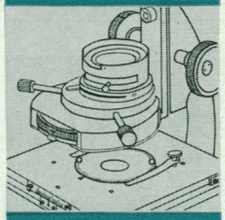

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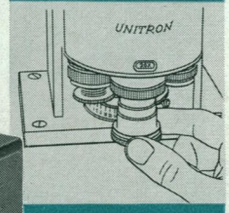

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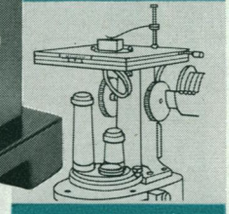

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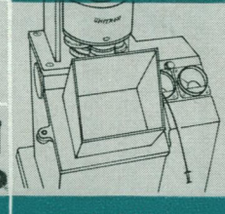

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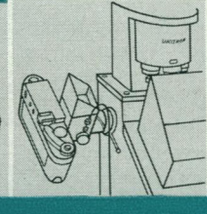

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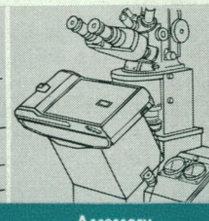
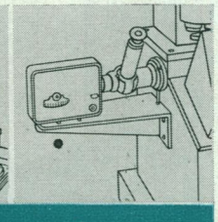


Accessory 3¼" x 4¼" Polaroid Land Camera



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the National Science Foundation. Robert L. Heller, associate professor and head of the geology department on the Duluth campus, has been selected by AGI to serve as director for the conference.

The conference will open with an orientation period of several days, after which the science teachers and geoscientists will be organized into small groups to consider specific problems. Under Heller's guidance, existing geology teaching materials now are being assembled, inventoried, and classified in advance of the summer session. These will be evaluated and supplemented by the conference. The materials produced and evaluated during the Duluth program will be tested, reviewed, and revised following the conference prior to distribution.

Vascular Disease

Leaders in vascular medicine and surgery will meet in Atlantic City, N.J. on 5–7 June, at the World Conference of Angiology, sponsored by the American College of Angiology and the Angiology Research Foundation. The conference will honor the tenth anniversary of the journal, *Angiology,* and the Angiology Research Foundation, and will mark the first time that an international meeting devoted exclusively to vascular disease has been held in the United States. Participants will come from Europe, Asia, South America, and North America.

David B. Allman of Atlantic City and Thomas W. Mattingly, U.S. Army Medical Corps, have been elected as honorary cochairmen of the conference. Alfred Halpern, president of the Angiology Research Foundation, Saul S. Samuels, editor-in-chief of *Angiology,* and Paul S. Lowenstein, president of the American College of Angiology, will be the chairmen for the meeting.

The overseas speakers will include: Gunnar Bauer (Sweden), Rene Fontaine (France), George Arnulf (France), H. Paessler (Germany), Max Hochrein (Germany), Edmondo Malan (Italy), Alex Dimtza (Switzerland), Kaindle (Austria), A. M. Boyd (England), Hans Selye (Canada), and Alfonso Albanese (Argentina).

A dinner and reception will be held on 6 June, when Charles Mayo of the Mayo Clinic will be the principal speaker. For further information, write to the World Conference on Angiology, 11 Hampton Court, Great Neck, N.Y.

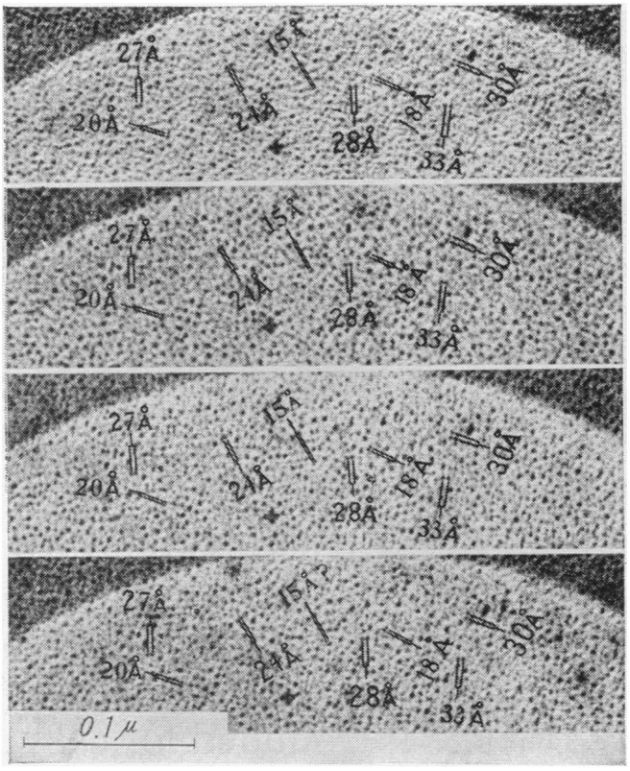
Rheumatic Diseases

Leading rheumatologists and investigators from the Western Hemisphere will report their latest findings to the second Pan-American Congress on Rheumatic Diseases, 2–6 June, in Washington, D.C. Some 88 papers will be presented during the plenary sessions on 3 and 4 June at the main auditorium of the Clinical Center, Bethesda, Md., and during the concurrent sessions, 5 and 6 June, at the Hotel Mayflower.

The congress will be officially opened by Christian A. Herter, Secretary of State, at the Pan-American Union Building on the evening of 2 June. Arthur S. Flemming, Secretary of Health, Education and Welfare, will also speak that evening.

Clay Conference

The eighth National Clay Conference will be held at the University of Oklahoma, Norman, 12–14 October, under the auspices of the clay minerals committee of the National Academy of Sciences–National Research Council. Symposia of invited papers will be held on the clay-and-water systems and on geochemical prospecting for clay minerals. In addition to these special symposia, there will be general sessions of con-



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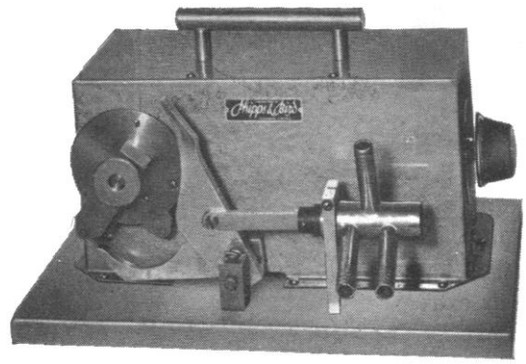

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tributed papers. All those having contributions should communicate with Prof. C. G. Dodd, Chairman, Eighth National Clay Conference, University of Oklahoma, Norman, Okla. A title and a letter of intent should be sent in *by 1 June*, a 250-word abstract *by 1 July*.

Forthcoming Events

June

14–17. American Dairy Science Assoc., Urbana, Ill. (H. F. Judkins, 32 Ridgeway Circle, White Plains, N.Y.)

14–18. American Soc. of Mechanical Engineers, semi-annual, St. Louis, Mo. (O. B. Schier, II, ASME, 29 W. 39 St., New York 18.)

14–19. Society of Automotive Engineers, summer, Atlantic City, N.J. (Meetings Div., SAE, 29 W. 39 St., New York 18.)

15–17. American Neurological Assoc., Atlantic City, N.J. (C. Rupp, 133 S. 36 St., Philadelphia 4, Pa.)

15–17. Some Problems of Normal and Abnormal Differentiation and Development, symp., Bar Harbor, Maine. (N. Kaliss, Roscoe B. Jackson Memorial Lab., Bar Harbor.)

15–17. X-Ray Microscopy and X-Ray Microanalysis, 2nd intern. symp., Stockholm, Sweden. (G. Hoglund, Institutionen for Medicinsk Fysik, Karolinska Institutet, Stockholm 60.)

15–18. American Proctologic Soc., Atlantic City, N.J. (N. D. Nigro, 10 Peterboro St., Detroit 1, Mich.)

15–19. American Meteorological Soc., (with Pacific Div., AAAS), San Diego, Calif. (H. G. Houghton, AMS, Dept. of Meteorology, Massachusetts Inst. of Technology, Cambridge 39, Mass.)

15–19. American Soc. for Engineering Education, Pittsburgh, Pa. (W. L. Collins, Univ. of Illinois, Urbana.)

15–19. Carbon, 4th biennial conf., Buffalo, N.Y. (Carbon Conf., Univ. of Buffalo, Buffalo, 14.)

15–19. Medical Library Assoc., Toronto, Canado. (Miss N. A. Mehne, Upjohn Co., Kalamazoo, Mich.)

15–19. Molecular Structure and Spectroscopy, symp., Columbus, Ohio. (R. A. Oetjen, Dept. of Physics and Astronomy, Ohio State Univ., Columbus 10.)

15–20. Combustion Engines, 5th intern. cong., Wiesbaden, Germany. (Intern. Cong. on Combustion Engines, 6 Grafton St., London, W.1, England.)

15–20. Electric Computers and Information Processing, conf., Paris, France. (Office of Public Information, United Nations, New York, N.Y.)

15–20. Electromagnetic Theory, symp., Toronto, Ont., Canada. (G. Sinclair, Univ. of Toronto, Toronto, Canada.)

15–20. Museums Assoc., 65th annual conf., Worthing, England. (Museums Assoc., 33 Fitzroy St., Fitzroy Sq., London, W.1.)

15–20. Pacific Div.-AAAS, San Diego, Calif. (R. C. Miller, California Acad. of Science, Golden Gate Park, San Francisco 18, Calif.)

15–24. International Commission on Illumination, 14th cong., Brussels, Bel-

gium. (L. E. Barbrow, c/o Natl. Bureau of Standards, Washington 25.)

16–18. American Orthopedic Assoc., Lake Placid, N.Y. (L. R. Straub, 715 Lake St., Oak Park, Ill.)

16–18. Circuit and Information Theory, intern. symp., Los Angeles, Calif. (G. L. Turin, Hughes Research Laboratories, Culver City, Calif.)

16–19. Safety and Site Selection for Nuclear Plants, intern. symp., Rome, Italy. (R. Levi, Comitato Nazionale per le Ricerche Nucleari, via Belisario 15, Rome, Italy.)

16–20. Congress on Nuclear Energy, Rome, Italy. (R. Levi, Comitato Nazionale per le Ricerche Nucleari, via Belisario 15, Rome, Italy.)

16–30. Chemical Arts, intern conf., Paris, France. (Conference Internationale des Arts Chimiques, 28, rue Saint-Dominique, Paris 7e.)

17–20. Colloquium of College Physicists, 21st annual, Iowa City, Iowa. (J. A. Van Allen, Dept. of Physics, State Univ. of Iowa, Iowa City.)

17–21. American Soc. of Ichthyologists and Herpetologists San Diego, Calif. (R. Conant, Philadelphia Zoological Garden, 34th and Girard Ave., Philadelphia 4, Pa.)

18–19. Colloid Symp., 33rd natl., Minneapolis, Minn. (B. R. Ray, Dept. of Chemistry, Washington State College, Pullman.)

18–19. Ecology of Algae, symp., Pittsburgh, Pa. (C. A. Tryon, Jr., Pymatuning Lab., Univ. of Pittsburgh, Pittsburgh 13.)

18–20. American Physical Soc., Milwaukee, Wis. (K. K. Darrow, APS, Columbia Univ., New York 27.)

18–20. Animal Reproduction, 4th biennial symp., Urbana, Ill. (P. J. Dziuk, 111 Animal Genetics, Univ. of Illinois, Urbana.)

18–20. Society of Nuclear Medicine, 6th annual, Chicago, Ill. (S. N. Turiel, SNM, 750 N. Michigan Ave., Chicago 11, Ill.)

19–23. Chronometry, intern. cong., Munich, Germany. (Sekretariat, Deutsche Gesellschaft fuer Chronometrie, Stuttgart-N, Koenigstrasse 4, Germany.)

21–24. American Soc. of Agricultural Engineers, Chicago, Ill. (J. L. Butt, 420 Main St., St. Joseph, Mich.)

21–26. American Physical Therapy Assoc., Minneapolis, Minn. (Miss J. Bailey, 157 N. 79 St., Milwaukee 13, Wis.)

21–26. American Soc. for Testing Materials, annual, Atlantic City, N.J. (R. J. Painter, ASTM, 1916 Race St., Philadelphia 3, Pa.)

21–27. American Library Assoc., Washington, D.C. (D. H. Clift, American Library Assoc., 50 Huron St., Chicago 11, Ill.)

21–27. Molecular Quantum Mechanics, intern. conf., Boulder, Colo. (R. G. Parr, Carnegie Inst. of Technology, Pittsburgh, Pa.)

22–24. American Soc. of Refrigerating Engineers, Lake Placid, N.Y. (R. C. Cross, 234 Fifth Ave., New York 1.)

22–25. Agricultural Inst. of Canada, annual meeting and conv., Winnipeg, Manitoba. (National Research Council, Scientific Liaison Office, Ottawa, Canada.)

22–25. British Computer Soc., 1st conf., Cambridge, England. (British Computer

Soc., 29 Bury St., London, S.W.1, England.)

22–25. Waste Disposal in the Marine Environment, 1st intern. conf., Berkeley, Calif. (Dept. of Conferences, University Extension, Univ. of California, Berkeley 4.)

22–26. Air Pollution Control Assoc., annual meeting, Los Angeles, Calif. (H. M. Pier, APCA, 4400 Fifth Ave., Pittsburgh 13, Pa.)

22–26. American Inst. of Electrical Engineers, summer general and Pacific meeting, Seattle, Wash. (N. S. Hibshman, AIEE, 33 W. 39 St., New York 18.)

22–26. Education in Materials, American Soc. for Engineering Education and American Soc. for Testing Materials, joint symp., Atlantic City, N.J. (R. J. Painter, ASTM, 1916 Race St., Philadelphia 3.)

22–26. International Whaling Commission, 11th meeting, London, England. (IWC, Room 413, 3 Whitehall Place, London, S.W.1.)

23–26. American Home Economic Assoc., Milwaukee, Wis. (Mrs. D. S. Lyle, National Inst. of Drycleaning, Silver Spring, Md.)

23–27. International Dairy Federation, 44th general assembly, London, England. (Secretary General, Intern. Dairy Federation, 202, rue de la Loi, Brussels 4, Belgium.)

24–26. Nuclear Instrumentation, 2nd natl. symp., Idaho Falls, Idaho. (H. S. Kindler, Technical and Educational Services, ISA, 313 Sixth Ave., Pittsburgh 22, Pa.)

24–26. Significant Trends in Medical Research, Ciba Foundation 10th anniversary symp. (by invitation), London, England. (G. E. W. Wolstenholme, Ciba Foundation, 41 Portland Pl., London, W.1.)

28–4. International Inst. of Welding, annual assembly, Opatija, Yugoslavia. (G. Parsloe, Secretary General, IIW, 54 Princes Gate, London, S.W.7, England.)

29–1. Military Electronics, 3rd natl. conv., Washington, D.C. (L. R. Everingham, Radiation, Inc., Orlando, Fla.)

29–3. Dairy Cong., 15th intern., London, England. (R. E. Hodgson, Animal Husbandry Research Div. Agricultural Research Service, U.S. Dept. of Agriculture, Washington 25.)

29–3. Problems in Pastoral Psychology (Inst. for the Clergy of All Faiths), New York, N.Y. (A. A. Schneiders, Committee for the Inst. for the Clergy, Dept. of Psychology, Fordham Univ., New York 58.)

29–3. Superconductivity, IUPAP colloquium, Cambridge, England. (D. Schoenberg, Dept. of Physics, Univ. of Cambridge, Mond Laboratory, Cambridge.)

29–4. Glass, 5th intern. cong., Munich, Germany. (P. Gilard, International Commission on Glass, 24, rue Dourlet, Charleroi, Belgium.)

30–10. International Electrotechnical Commission, Madrid, Spain. (IEC, 1–3, rue de Varembe, Geneva, Switzerland.)

July

1–3. Hydraulics, annual conf., Fort Collins, Colo. (W. H. Wisely, American Soc. of Civil Engineers, 33 W. 39 St., New York 18.)

1–4. British Tuberculosis Assoc., annual (closed), Cambridge, England. (BTA, 59, Portland Pl., London, W.1, England.)

1–5. International Radio and Electronics Conv., Cambridge, England. (British Institution of Radio Engineers, 9, Bedford Sq., London, W.C.1, England.)

2. Radiation and Ageing, Ciba Foundation 3rd annual lecture on ageing, London, England. (G. E. W. Wolstenholme, Ciba Foundation, 41 Portland Pl., London, W.1, England.)

3–5. International Union of the Medical Press, 4th cong., Cologne, Germany. (Dr. Stockhausen, Secretary of Bundesaerztekammer, Cologne.)

4–9. American Soc. of X-ray Technicians, Denver, Colo. (Miss G. J. Eilert, 16 14 St., Fond du Lac, Wis.)

6. Shortening of Lifespan of Mammals Following Irradiation, research forum, London, England. (G. E. W. Wolstenholme, Ciba Foundation, 41 Portland Pl., London, W.1, England.)

6–8. Cell Structure and Function, 10th annual symp., Ann Arbor, Mich. (J. M. Allen, Dept. of Zoology, Univ. of Michigan, Ann Arbor.)

6–8. Oxford Ophthalmological Cong., Oxford, England. (I. Fraser, 21, Degpole, Shrewsbury, Shropshire, England.)

6–8. School and University Health, 3rd intern. cong., Paris, France. (Comité d'Organisation du Congres d'Hygiene Scolaire et Universitaire, 13, rue du Four, Paris 6e.)

6–11. Seed Testing, intern. conv., Oslo, Norway. (Intern. Seed Testing Association, Danish State Seed Testing Station, Thorvaldsensvej, 57, Copenhagen V, Denmark.)

6–12. Chagas' Disease, intern. cong., Rio de Janeiro, Brazil. (C. Chagas, Instituto de Biofisica, avenida Pasteur 458, Rio de Janeiro.)

7–10. Royal Medico-Psychological Assoc., annual meeting, Glasgow, Scotland. (RM-PA, 11, Chandos Street, London, W.1, England.)

12–17. American Waterworks Assoc., annual conv., San Francisco, Calif. (H. E. Jordan, AWA, 521 Fifth Ave., New York 17.)

13–17. National Assoc. of Power Engineers, natl. conv., Boston, Mass. (A. F. Thompson, Secretary, NAPE, 176 W. Adams St., Chicago, Ill.)

13–17. Plastic Surgery, 26th intern. cong., London, England. (D. Matthews, Organizing Secretary, Intern. Cong. on Plastic Surgery, c/o Inst. of Child Health, Hospital for Sick Children, Great Ormond St., London, W.1.)

13–17. Standardization, intern. (council meeting), Geneva, Switzerland. (ISO, 1–3, rue Varembe, Geneva.)

15. American Soc. of Facial Plastic Surgery, New York, N.Y. (S. M. Bloom, 123 E. 83 St., New York 28.)

15–17. Fluorine Chemistry, symp., Birmingham, England. (Chemical Soc. of London, Burlington House, Piccadilly, London, W.1.)

15–17. Shaft Sinking and Tunnelling, symp., Olympia, London, England. (Institution of Mining Engineers, 3, Grosvenor Crescent, London, S.W.1.)

15–18. British Assoc. of Urological Sur-

geons (members and guests), Glasgow, Scotland. (Joint Secretariat, 45, Lincoln's Inn Fields, London, W.C.2, England.)

15–18. British Cong. of Obstetrics and Gynaecology, 15th, Cardiff, Wales. (BCOG, Maternity Hospital, Glossop Terrace, Cardiff.)

15–24. British Medical Assoc., Edinburgh, Scotland. (BMA, Tavistock, Sq., London, W.C.1, England.)

16–24. Canadian Medical Assoc., 92nd annual meeting in conjunction with the British Medical Assoc., Edinburgh, Scotland. (A. D. Kelly, CMA, 150 St. George St., Toronto 5, Ontario, Canada.)

17. High Energy Nuclear Physics, 9th annual intern. conf. (Intern. Union of Pure and Applied Physics, Moscow, U.S.S.R.). (R. E. Marshak, Univ. of Rochester, Rochester, N.Y.)

19–24. American Crystallographic Assoc., Ithaca, N.Y. (J. Waser, Rice Inst., Houston 5, Tex.)

19–25. Pediatrics, 9th intern. cong., Montreal, Canada. (R. L. Denton, P.O. Box 215, Westmount, Montreal 6.)

20–26. Radiation and Atmospheric Ozone, joint symp., by Intern. Union of Geodesy and Geophysics and World Meteorological Organization, Oxford, England. (WMO, Campagne Rigot, 1, avenue de la Paix, Geneva, Switzerland.)

22–23. Rocky Mountain Cancer Conf., Denver, Colo. (N. Paul Isbell, 835 Republic Bldg., Denver 2.)

23–30. Radiology, 9th intern. cong., Munich, Germany. (Sekretariat des 9 Internationalen Kongresses für Radiologie, Reitmorstrasse 29, Munich 22.)

26–30. International Psychoanalytical Assoc., Copenhagen, Denmark. (Miss P. King, 37 Albion St., London, W.2, England.)

27–4. International Federation of Translators, Bad Godesberg, Germany. (Dritter Internationaler FIT-Kongress, Kongress Sekretariat, Bundesverband der Dolmetscher und Übersetzer e. V. (BDÜ) Hausdorfstrasse 2, Bonn, Germany.)

30–31. Computers and Data Processing, 6th annual symp., Estes Park, Colo. (W. H. Eichelberger, Denver Research Inst., Univ. of Denver, Denver 10, Colo.)

August

1–8. World Congress of Esperantists, 44th, Warsaw, Poland. (Office of Intern. Conferences, Dept. of State, Washington 25.)

4–5. American Astronautical Soc., 2nd annual western, Los Angeles, Calif. (A. P. Mayernik, AAS, 6708 53 Rd., Maspeth 78, N.Y.)

6–8. Human Pituitary Hormones, colloquium (by invitation only), Buenos Aires, Argentina. (G. E. W. Wolstenholme, Ciba Foundation, 41 Portland Place, London W.2, England.)

9–12. American Soc. of Mechanical Engineers (Heat Transfer Div.), conf., Storrs, Conn. (D. B. MacDougall, ASME, 29 West 39 St., New York 18.)

9–15. Physiological Sciences, 21st intern. cong., Buenos Aires, Argentina. (C. F. Schmidt, Univ. of Pennsylvania School of Medicine, Philadelphia 4.)

10–13. National Medical Assoc., Detroit, Mich. (J. T. Givens, 1108 Church St., Norfolk, Va.)

10–13. Society of Automotive Engineers, natl. West Coast meeting, Vancouver, B.C., Canada. (R. W. Crory, Meetings Operation Dept., SAE, 485 Lexington Ave., New York 17.

16–19. Botanical Nomenclature, discussions (Intern. Bureau for Plant Taxonomy and Nomenclature), Montreal, Canada. (J. Rousseau, Natl. Museum, Ottawa, Canada.)

16–21. American Pharmaceutical Assoc., Cincinnati, Ohio. (R. P. Fischelis, APA, 2215 Constitution Ave., NW, Washington 7.)

17. Ultrasonics, natl. symp., San Francisco, Calif. (L. G. Cumming, Inst. of Radio Engineers, 1 E. 79 St., New York 21.)

17–21. Pacific Southwest Assoc. of Chemistry Teachers, Pacific Grove, Calif. (W. A. Craig, 416 N. Citrus Ave., Los Angeles 36, Calif.)

17–22. Logopedics and Phoniatrics, 11th intern. cong., London, England. (Miss P. Carter, 46 Canonbury Square, London N.1, England.)

19–26. Refrigeration, 10th intern. cong., Copenhagen, Denmark. (M. Kondrup, Danish Natl. Committee, Intern. Congress of Refrigeration, P.O. Box 57, Roskilde, Denmark.)

19–29. Botanical Cong., 9th intern., Montreal, Canada. (C. Frankton, Secretary-General, 9th Intern. Botanical Cong., Science Service Bldg., Ottawa, Ontario, Canada.)

19–29. International Assoc. of Wood Anatomists, Montreal, Canada. (IAWA, Laboratorium für Holzforschung E.T.H. Universitatstrasse 2, Zurich, Switzerland.)