One may now separate arteries, veins, and bronchial tree so that each may be viewed in isolation. In the laboratory, this step is usually done for the students simply by stripping blood vessels off the bronchial tree rapidly with forceps. This may result in a good deal of breakage of blood vessels, but the very apparent differences between arteries and veins may be pointed out. With careful and patient use of needles and forceps, however, it is possible to isolate the complete system of pulmonary arteries, and of pulmonary veins, each separate and intact. To accomplish this it is necessary, of course, to use a preparation in which the pulmonary artery has been severed close to the heart, and in which the proximal connections of the veins have been preserved by removing with them a part of the wall of the left auricle. The isolated arterial and venous systems, as well as the bronchial system, make striking demonstration specimens and may be mounted in formalin in museum jars for permanent display.

This method has obvious advantages over that of corrosion preparations, particularly in that, instead of casts, the various vessels themselves, with their noticeable differences in characteristics, are demonstrated. A more complete account of methods, with photographs of preparations, will be published elsewhere. The applicability of the method to the human lung is under investigation.

News and Notes

Editorial Announcement

In January of this year it appeared that conversion from a wartime basis was pretty well under way and that the year 1946 would see a return to fairly normal peacetime supplies of all kinds, including paper. We consequently made our plans to publish 48 pages in each issue of *Science* and also planned at least four special issues during the year, each one of which would consist of at least a hundred pages.

Time made it clear that paper supplies would not be available to consummate this plan, and as a consequence, we were forced to reduce the size of an issue to 32 pages on 24 May. With only minor modification we have remained at this level until the present issue, which contains an index for Volume 103. With the 12 July and succeeding issues, we shall have to drop back to the thirty-two page level again.

The reduction in size is shared equally between the advertising pages and the editorial content, and in order to conserve our regular book paper for the editorial section and the index, we used color stock for some of the advertising pages.

The first six months of 1946 saw the sudden declassification of a considerable amount of wartime research, resulting in a flood of manuscripts which we would not have been able to accommodate even though we were not faced with a paper shortage. Today the situation is so critical that manuscripts which were accepted in the faith that publication would normally take place within a reasonable time have had to be deferred beyond the expectation of the authors and editor.

During this critical period it is absolutely essential that authors use every means of making their papers as brief as possible. In some cases we have been forced to return papers that were already accepted for even further shortening.

The editor contemplates with distaste the unpleasant task of having to reject many worthy papers in the next six months due to previous commitments and inadequate paper supplies.

Science stands ready to relinquish all priority to papers now waiting in our files for publication if the author can find a suitable medium for prompter publication.

Announcements

Important changes in organization of the National Research Council were announced by Frank B. Jewett, president of the National Academy of Sciences, 28 June. Effective from 1 July, 1946, the following appointments have been made of administrative officers in the National Research Council:

Chairman of the Council: Detlev W. Bronk, director, Johnson Foundation for Medical Physics, University of Pennsylvania, to succeed Ross G. Harrison, Yale University—term expired.

Chairman, Division of Medical Sciences: Lewis H. Weed, director, School of Medicine, Johns Hopkins University, on a full-time basis, to succeed himself.

Chairman, Division of Physical Sciences: R. Clifton Gibbs, Department of Physics, Cornell University, to succeeed L. P. Eisenhart, Princeton University—term expired.

Chairman, Division of Chemistry and Chemical Technology: Louis P. Hammett, Department of Chemistry, Columbia University, to succeed W. Mansfield Clark, Johns Hopkins University—resigned.

Chairman, Division of Geology and Geography: Arthur Bevan, State Geologist of Virginia, Charlottesville, to succeed William W. Rubey, U. S. Geological Survey—term expired.

Chairman, Division of Biology and Agriculture: Robert F. Griggs, Department of Botany, George Washington University, to succeed himself.

Chairman, Division of Anthropology and Psychology: A. Irving Hallowell, Department of Anthropology, Northwestern University, to succeed Walter R. Miles, Yale University—term expired.

In addition, Frederick M. Feiker, George Washington University, will continue as chairman of the Division of Engineering and Industrial Research under his present appointment.

Also as foreign secretary of the National Academy of Sciences, Detlev W. Bronk will continue ex officio as chairman of the Division of Foreign Relations.

Dr. Harrison, who has served as chairman of the Council with great distinction for nearly eight and a half years on a part-time basis, will return to the Osborne Laboratory at Yale.

In accepting the chairmanship as Dr. Harrison's successor, Dr. Bronk has relinquished a large part of his responsibilities at the University of Pennsylvania so as to be able to devote the major part of his time to administering the affairs of the Council. The Council is thus assured of what is essentially full-time administration of its operations—something which the largely expanded work of the Council demands.

For the moment the Division chairmanships, with the exception of the Division of Medical Sciences, will continue on a part-time basis. In the case of the latter Division, however, the load of present and prospective demands for National Research Council assistance to Government and private agencies is so great as to require full-time supervision. In consequence, Dr. Weed has agreed to relinquish his duties at Johns Hopkins Medical School and devote his entire time to the administration of the Division.

For the time being and until his successor is elected Dr. Bronk will continue as foreign secretary of the National Academy of Sciences.

The Science Section of the Minnesota Independent Citizens' Committee of the Arts, Sciences, and Professions unanimously passed a resolution, dated 13 June, supporting the new bill, H.R. 6672 (*Science*, 28 June, 753), introduced by Representative Celler, which is identical with the Senate bill, 1850. The resolution pointed out that the bill, H.R. 6448, "fails to provide for equitable geographic distribution of funds; does not seem to provide for minority reports by the commission responsible for the administration of the funds; supports certain patent-right provisions detrimental to the public welfare."

Copies of the resolution were mailed to Chairman Priest, of the Interstate and Foreign Commerce Committee; Representative Mills, who introduced H.R. 6448; and Representative Celler, as well as the Minnesota Representatives in the House and Senators Kilgore and Magnuson.

The covering letter criticized the National Academy of Sciences saying that, ". . . it is not representative of American Scientists. It is, instead, a restricted group of self-selected scientists which has a record of inaction and favoritism which has caused the majority of American scientists to distrust it deeply. If H.R. 6448 is enacted into law, this country will suffer from the perpetuation of the policy of pouring money into the old, 'respectable' institutions, largely in the East, while the Middle West, South, and West will continue to hold the bag."

A $1,000 prize for newspaper science writing each year has been announced, to be administered by the AAAS, through a grant of funds from the Westinghouse Educational Foundation in celebration of the centennial of the birth of George Westinghouse. The purpose of the award is to encourage better science reporting in newspapers. It is believed that this contest will be a permanent program.

The deadline for this year's contest is 15 October. Information and entry blanks may be obtained by writing to the Chairman, Managing Committee, AAAS–George Westinghouse Science Writing Awards, Smithsonian Institution Building, Washington 25, D. C.

The Columbia Broadcasting System announced on 6 May that the Federal Telecommunication Laboratories, Inc., affiliate of the International Telephone and Telegraph Corporation, has been licensed to manufacture television transmitter equipment based on CBS' ultrahigh-frequency color television inventions. Federal Laboratories is the second major firm licensed under Columbia's color-television invention patents.

Provisions of the agreement between the two companies parallel the contract signed two months ago with Westinghouse Electric Corporation. Both arrangements are on a patent royalty basis of one per cent to CBS on the manufacture of television transmitter equipment, and cover a five-year period with options for extension.

The psychological effects of frontal lobotomies are being investigated by the Department of Psychology of the University of Pittsburgh under a grant from the U. S. Public Health Service. The research program is being conducted jointly by Y. D. Koskoff, neurosurgeon, Montefiore Hospital; Victor C. Raimy, assistant professor of psychology, University of Pitts-

burgh; and Erma Wheeler, instructor in psychology, University of Pittsburgh.

The Institute of Polymer Research at the Polytechnic Institute of Brooklyn announces the following summer laboratory clinics for 1946: "Weight and Shape of Polymer Molecules in Solution," 24–28 June and 15–19 July (two sessions); "Industrial Applications of X-ray Diffraction," 12–23 August; "Advanced X-ray Diffraction Course," 26–31 August; and "The Preparation of High Polymers in Bulk, Solution, Suspension, and Emulsion," 2–6 September.

Credit may be arranged for most of these clinics for those attending the course in the graduate curriculum. The laboratory fees for the various clinics will range from $100 to $200. Since the attendance will be limited to from 10 to 20 in the clinics, those interested are asked to register early by writing to the Institute of Polymer Research, 99 Livingston Street, Brooklyn 2, New York.

The Institute offers to assist registrants in finding convenient accommodations.

The Samuel S. Fels Fund of Philadelphia announces the erection of a new research laboratory building on the Antioch College Campus at Yellow Springs, Ohio. The new building, to cost about $400,000 exclusive of equipment, is to house the activities of the Fels Research Institute. The Institute's program, devoted to the study of growth and development of children, is being expanded considerably in the following areas: biochemistry with emphasis on blood and urinary enzymes, vitamin adequacy, ketosteroids, estrogens and other hormones, in relation to growth progress and behavior; genetics with emphasis on the inheritance of biochemical and physiological function patterns and growth patterns; physiology with emphasis on resistance level to physical or emotional stress in relation to predisposition to psychosomatic disease and personality.

To house these activities and those of the psychology and physical growth sections, physiological, physical growth, biochemical, and psychological laboratories, as well as office and library space, will be provided.

Six internships have been created, to be available annually to graduate students working toward advanced degrees in any accredited university in the fields of psychology, psychophysiology, physical growth, and biochemistry. These will provide an annual stipend of $1,200.

A new scientific advisory board has been created, consisting of: Robert Yerkes, Yale University, psychobiology; Ashley Weech, Cincinnati University, pediatrics; E. V. Cowdry, Washington University, anatomy; and Maurice Visscher, University of Minnesota, physiology. The Institute, established in 1929, is under the direction of L. W. Sontag.

The new Desmond Arboretum at Newburgh, New York, temporarily closed during the war period, will from now on be open again daily, free of charge, to interested visitors. Those wishing to inspect this arboretum can obtain permission by writing or calling at the office of New York State Senator Thomas C. Desmond, 94 Broadway, Newburgh, New York, or by contacting the arboretum superintendent, Rudolph M. Nocker.

Started in 1939, the arboretum now contains 499 species of trees and shrubs. Senator Desmond is endeavoring to include in this arboretum all native American trees and shrubs which may prove hardy in the Newburgh, New York, climate, together with some of the more interesting or more ornamental foreign trees and shrubs.

A research unit affiliated with the Institutum Divi Thomae was dedicated at the College of Saint Mary of the Springs, Columbus, Ohio, on 9 May. The principal address, "Research in the Liberal Arts College," was delivered by Elton S. Cook, dean of research of the Institutum Divi Thomae, Cincinnati.

The Tercentenary of Sir Isaac Newton's birth will be celebrated in London, 13–20 July. In response to the invitation of the Royal Society, London, the following have been appointed as delegates to represent the National Academy of Sciences upon this occasion: Walter Adams, Marston Bogert, Frederick E. Brasch, Leonard Carmichael, Leslie Dunn, Jerome Hunsaker, Herbert Ives, Walter R. Miles, Peyton Rous, and Theodor von Kármán.

The International Congress of the Anthropological and Ethnological Sciences, which last met in Copenhagen in 1938, has been reconstituted by a well-attended meeting of the Permanent Council, at New College, Oxford, 13–15 April, and at the Royal Anthropological Institute, London, 16–18 April.

At the final business session of the Council, attended by 34 delegates, it was voted to hold the next, or third, session of the Congress in Czechoslovakia during August 1947. Runners-up in the selection were Portugal and Mexico, with Belgium and Turkey extending contingent invitations in case the date were postponed to 1948.

The will to postwar scientific rehabilitation in Europe was encouragingly manifest in the attitude as well as by the attendance of the delegates.

Those present included: Alföldi (Hungary); Birket-Smith (Denmark); Breuil, Leroi Gourhan, Rivière, and Vallois (France); Charles, de Jonghe, and Olbrechts (Belgium); Felhoen Kraal, Fischer, and Jan-

sen (Netherlands); Gabus (Switzerland); Genna and Sergi (Italy); Kansu (Turkey); Kroeber (United States); Lindblom (Sweden); Macalister (Eire); Myres, Childe, Hutton, and Radcliffe-Brown (Britain); Schmidt (Vatican City); Spry (Canada); Stolyhwo (Poland); Tamagnini (Portugal); and Valsik (Czechoslovakia).

In addition to reports from six committees of the Congress, a number of scientific papers were presented, including the deferred Huxley Memorial Lecture for 1941 of the Royal Anthropological Institute, by Abbé H. Breuil on "The Discovery of the Antiquity of Man."

The State-owned Swedish research ship, "Skagerack," which has been placed at the disposal of the Swedish Marine-Biological Commission, recently left Gothenburg for a three-month cruise in the Mediterranean. The main task of this expedition is to take samples of the bottom sediments in various parts of the Mediterranean off the port of Algiers and probably also east of Malta.

These investigations form the first link in extensive Swedish research work which aims at shedding light on the climatic and volcanic catastrophes of past ages. It is also expected that the study of the old bottom layers of the oceans, dating back many millions of years, may tell the story of the ancient transatlantic plateaus over which animals and plants once spread from continent to continent.

Hans Pettersson, head of the Oceanographical Institute in Gothenburg, is the leader of this first expedition, in which 6 scientists are participating in addition to the crew of 21. The scientists will have an opportunity to test a new instrument, the vacuum plummet, by which they expect to take up 20-meter-deep samples of the bottom sediments.

It is hoped that these investigations in the Mediterranean will prove of value in preparing for the large-scale oceanographic expedition which the above-mentioned Swedish institute will start in the spring of 1947. This deep-sea expedition, which will circumnavigate the globe during a 15-month voyage, is to be undertaken on board the 1,100-ton training ship, "Albatross," which has been placed at the disposal of the Swedish Broström Concern. Other Swedish shipping companies have also contributed to the financing of the expedition.

The research work of the "Albatross" expedition will be carried on chiefly in the tropical zone within the areas of the equatorial countercurrent. Among the places to be investigated in the Atlantic is the Puerto Rico Deep of 9,000 meters and, in the Pacific, the remarkable Philippine Depths of 10,500 meters.—*The Swedish-International Press Bureau.*

The National Research Council, through its Fellowship Board in the Natural Sciences, has made the following fellowship appointments for the academic year 1946–47:

Mary Belle Allen (candidate for Ph.D. in chemistry, Columbia University, 1946), to study at Washington University.

James R. Arnold (Ph.D. in chemistry, Princeton University, 1946), to study at Harvard University.

Earlene Atchinson (candidate for Ph.D. in botany, University of Virginia, 1946), to study at the Atkins Institution of the Arnold Arboretum (Harvard University).

Jule G. Charney (candidate for Ph.D. in meteorology, University of California at Los Angeles, 1946), to study at the University of Oslo.

Robert D. Cowan (candidate for Ph.D. in physics, Johns Hopkins University, 1946), to study at the University of Chicago.

Bernard Hamermesh (Ph.D. in physics, New York University, 1944), to study at California Institute of Technology.

Ralph T. Holman (Ph.D. in physiological chemistry, University of Minnesota, 1944), to study at the Medicinska Nobelinstitutet.

Henry Kritzler (Ph.D. in zoology, State University of Iowa, 1942), to study at the Scripps Institution of Oceanography (University of California).

Paul M. Marcus (Ph.D. in chemical physics, Harvard University, 1943), to study at Massachusetts Institute of Technology.

Donald S. Miller (Ph.D. in mathematics, Cornell University, 1941), to study at Yale University.

John M. Reiner (candidate for Ph.D. in physiology, University of Minnesota, 1946), to study at Washington University.

Adrian M. Srb (candidate for Ph.D. in biology, Stanford University, 1946), to study at California Institute of Technology.

Walter C. Strodt (Ph.D. in mathematics, Columbia University, 1939), to study at Harvard University.

Merle E. Tuberg (Ph.D. in astronomy, University of Chicago, 1946), to study at Girton College (University of Cambridge).

Robert P. Wagner (Ph.D. in zoology, University of Texas, 1943), to study at California Institute of Technology.

Sherrerd B. Welles (Ph.D. in physics, Yale University, 1941), to study at Cavendish Laboratory (University of Cambridge).

Arthur H. Whiteley (Ph.D. in zoology, Princeton University, 1945), to study at California Institute of Technology.

Robert W. Wilson (Ph.D. in paleontology, California Institute of Technology, 1936), to study at California Institute of Technology.

Frank B. Wood (Ph.D. in astronomy, Princeton University, 1941), to study at the Steward Observatory (University of Arizona).

Elections

The American Rocket Society, national association of rocket and jet-propulsion engineers, has announced the election of Lovell Lawrence, Jr., as its president for 1946–47. Mr. Lawrence, pioneer rocket engineer and long a member of the Society, is president of Reaction Motors, Inc., of Pompton Plains, New Jersey, now heavily engaged in the development of liquid-fuel rocket motors in connection with the Navy and Army jet-propulsion and guided missile program.

The new vice-president is Roy Healy, jet-propulsion project engineer of the Air Technical Service Command. Mr. Healy is engaged in military rocket development at the Rocket Experimental Station, Dover, Delaware. Active in rocket development since before the war, he has been a member of the Society for more than 10 years.

The new secretary is G. Edward Pendray, pioneer rocket engineer and co-designer with H. F. Pierce of the Society's first liquid-fuel rocket in 1932. Mr. Pendray was one of the founders of the Society in 1930.

Hans Thatcher Clarke, biochemist, College of Physicians and Surgeons, Columbia University, was chosen chairman-elect of the American Chemical Society's New York Section at the Section's annual meeting in the Hotel Pennsylvania, 7 May.

The Virginia Academy of Science held its 24th annual meeting in Richmond on 9–11 May, under the leadership of President H. Rupert Hanmer, director of research for the American Tobacco Company. Officers elected for the coming year are: Jesse W. Beams, professor of physics at the University of Virginia, president-elect; E. C. L. Miller, directing librarian at the Medical College of Virginia, secretary-treasurer; George W. Jeffers, professor of biology at Farmville State Teachers College, assistant secretary; and Edward S. Harlow, of the American Tobacco Research Laboratory, new member of the Council. Arthur Bevan, state geologist of Virginia, was installed as president for 1946–47.

Over 600 members were in attendance, 150 papers were presented in the 10 sections, and 15 winners of the Virginia Science Talent Search, the first of its kind on a state level, were entertained by senior members of the Academy. Margaret E. Patterson, secretary of Science Clubs of America, was the principal speaker at the banquet and presented awards of War Savings Bonds on behalf of the Academy to the talent search winners. Scholarships valued at $30,000 have been offered these high school seniors by various colleges of the country. A meeting of the Junior Academy of Science, attended by 50 juniors, was held concurrently with the senior meeting.

The Wisconsin Academy of Sciences, Arts, and Letters held its 76th annual meeting on 12 and 13 April at the University of Wisconsin, Madison. The following were elected to office for 1946–47: L. E. Noland, Department of Zoology, University of Wisconsin, president; E. L. Bolender, Superior State Teachers College, vice-president in science; John Steuart Curry, artist-in-residence, University of Wisconsin, vice-president in arts; Robert K. Richardson, Beloit College, vice-president in letters; Banner Bill Morgan, Department of Veterinary Science, University of Wisconsin, secretary-treasurer; H. O. Teisberg, Historical Library, Madison, librarian; W. C. McKern, Milwaukee Public Museum, curator; and Banner Bill Morgan, University of Wisconsin, representative on the Council of the AAAS.

The following were elected to life membership: Charles E. Allen, University of Wisconsin; Ruth Marshall, Wisconsin Dells; William S. Marshall, University of Wisconsin; Edward R. Mauer, Richard Fischer, and Frederick E. Turneaure, Madison. The following were elected to honorary membership: Frank Lloyd Wright, architect; Alexander Wetmore, ornithologist; and Ester Forbes, writer.

A total of 20 papers were presented at the regular Academy session, 9 papers in the American Chemical Society Section, 15 papers in the Archeological, Folklore, and Museum Section, and 8 papers in the first Junior Academy section.

H. A. Schuette, in his presidential address, told of the progress which has been made in the prevention of adulterated foods and drugs. Guest speakers in social science were invited. John H. Kolb spoke on the "Background and Foreground of Wisconsin's Rural Communities"; L. A. Salter, on "Do We Need a New Land Policy?"; and Scudder MeKeel, on "Where is Social Science?"

The New York State Geological Association held its 18th meeting, the first since the war, on 10–11 May at Vassar College. Daniel T. O'Connell and Cecil H. Kindle, of the Geology Department of the College of the City of New York, were elected president and secretary of the Association, respectively, for 1946–47.

The first day was devoted to the folded Silurian and Devonian beds of the Kingston-Rosendale region; the second, to the increasing metamorphism of the Cambro-Ordovician sediments eastward from Poughkeepsie.

Sixteen different institutions contributed to the attendance of 110 persons. The next annual meeting will take place in New York City in the spring of 1947.

The Hawaiian Academy of Science held it 21st annual meeting 9–11 May, at the University of Hawaii, Honolulu. The following officers were elected for the year 1946–47: T. A. Jaggar, University of Hawaii, president; Harold St. John, University of Hawaii, vice-president; Chester K. Wentworth, Board of Water Supply, secretary-treasurer; Christopher J. Hamre, University of Hawaii, Joseph P. Martin, Hawaiian Sugar Planters Association, and Peter H. Buck, Bishop Museum, councilors.

The first two evenings were devoted to scientific papers. The annual dinner and business meeting were held on the last evening, followed by the address of the retiring president, Peter H. Buck, who spoke on "The Place of Hawaii in Pacific Research."

The Franz Theodore Stone Laboratory of Ohio State University, at Put-In-Bay, will begin its 50th summer on 17 June, according to the summer-quarter bulletin just issued. Advanced courses in the Departments of Botany, Chemistry, Entomology, Geography, and Zoology are to be offered to qualified students and research workers.

Recent Deaths

James P. Schooley, 42, assistant professor of anatomy in the Wayne University College of Medicine, died on 23 June.

Roswell P. Angier, 71, professor of psychology and director emeritus of the psychology laboratory at Yale University, who retired in 1941 after thirty-five years on the faculty, died in Tucson, Arizona, on 24 June.

Permian Studies at the Smithsonian Institution, Washington

The major postwar program of the Division of Invertebrate Paleontology and Paleobotany (Department of Geology) of the Smithsonian Institution is a thorough investigation of the invertebrate faunas of the Permian period. These studies will be based on collections from the Glass Mountains, Brewster County, Texas, but borrowed material from other parts of the country will be included. The majority of the specimens to be studied are silicified and will be freed by dissolving them out of their calcareous matrix.

In announcing this program we are heralding a plan already in full swing. In the beginning it was a modest scheme to investigate levels in the Permian of the Glass Mountains in order to determine the quality of the silicification and the best localities for fossils. The success of this preliminary work led to the present intensive program. In some five years the Smithsonian Institution should have a collection of many thousands of specimens of exquisitely preserved fossils; the faunas of the Wolfcamp, Leonard, and Word should become the best-known Paleozoic assemblages on the continent. Although the solution program is supported by the Smithsonian Institution, part of the field work was sponsored jointly by the U. S. Geological Survey and the Smithsonian Institution.

The present program was initiated in 1939 by Cooper when he and Josiah Bridge visited the Glass Mountains to obtain certain brachiopods then unrepresented in the National collections. The results of this visit were so gratifying that Cooper returned there the following year. Armed with a good counsel on promising localities from Philip B. King, U. S. Geological Survey, he collected more than a ton of blocks. During the fall and winter of 1940 nearly all of the blocks were dissolved. Unbelievably fine specimens of most of the invertebrate phyla were obtained.

Inasmuch as the possibilities for collecting and understanding the Permian fauna seemed limitless, several specialists were invited to join the study. Accordingly, the pelecypods were referred to N. D. Newell, then at the University of Wisconsin but now of the American Museum of Natural History. Several lots of cephalopods were sent to A. K. Miller, of the University of Iowa. The gastropods were turned over to J. Brooks Knight, then at Princeton University and now of the U. S. National Museum, who added to these a collection of similarly preserved and prepared gastropods from the Permian of the Sierra Diablo Plateau, Hudspeth-Culberson Counties, Texas, on which he was at work. The trilobites were referred to J. Marvin Weller, of Chicago University.

In the summer of 1941 Cooper and Newell, under a grant from the Smithsonian Institution, spent six weeks collecting from all parts of the Glass Mountains. This expedition resulted in an accumulation of four and one-half tons of blocks of which three-fourths of a ton was sent to Newell at Madison, Wisconsin, and the remainder to Washington. Newell dissolved all of his blocks and obtained from them an incomparable collection of pelecypods and gastropods. Scarcely a quarter of Cooper's material was prepared before the program was sent into low gear by the war.

In the spring of 1945 R. C. Moore joined the program and took over work on the crinoids, corals, and bryozoans. That summer another expedition to the Glass Mountains, sponsored jointly by the U. S. Geological Survey and the Smithsonian Institution and consisting of Moore, Knight, and Cooper, spent six weeks accumulating some seven tons of blocks, many of them of large size and some exceeding 100 pounds. Most of these are to be processed in the Smithsonian Institution, but Moore at Lawrence, Kansas, will dis-

solve more than two tons of blocks that he collected.

The original work of solution was carried out in miscellaneous glassware vessels up to a capacity of 5 gallons. Finally, a stone tub holding about 70 gallons was installed in the National Museum. Present plans call for increasing the facilities to three tubs. The new equipment will be capable of digesting some seven tons of blocks in four or five years.

The modest but persistent solution program carried on since 1939 has already yielded an important collection occupying some 270 trays (22½ in. × 28¼ in.). Brachiopods are the most abundant fossils freed from the blocks from all parts of the Glass Mountains. These specimens are of especial importance because of their perfect preservation. Modern generic splits of the productids have been denounced by some paleontologists, but this program is yielding new evidence supporting the validity of many of them and also of additional new genera. Specimens of *Krotovia, Yakovlevia, Dictyoclostus, Aulosteges, Avonia, Waagenoconcha, Linoproductus,* and *"Marginifera"* with virtually all spines in place give a new conception of these odd brachiopods. Definite information as to the living habits of these animals and the meaning of their spines has already been obtained. About 75 brachiopod genera and some 200 species occur in the collection. Knight estimates 250 new species and 100 genera, about half of them new, among the gastropods. Miller has already described many of the cephalopods taken from the blocks. The pelecypods, corals, bryozoans, and sponges are equally well preserved. Chitons, trilobites, scaphopods, and remains of other groups are less abundant. Growth series of many species have been taken. By the time the solution program is completed, sufficient material will have been accumulated for statistical studies of many species.

The Smithsonian program will require about five years to dissolve all blocks on hand. While the acid is simmering, the men working on the individual projects will sort and study the accumulating material as follows: bryozoans, crinoids, and corals—Moore; brachiopods—Cooper; gastropods—Knight; pelecypods—Newell; cephalopods—Miller; and trilobites—Weller.—*G. Arthur Cooper* and *J. Brookes Knight* (U. S. National Museum).

Letters to the Editor

Commercial Fertilizer in the Culture of Fresh-water Algae

The culture of *Chlorella, Nitzschia closterium,* and *Prorocentrum triangulatum* in media containing small amounts of commercial fertilizers was reported by Loosanoff and Engle (*Science,* 1942, 95, 487–488), who found that complete fertilizers of the formulas 5–3–5 and 6–3–6 gave the best results. Recently Strickland (*Science,* 1946, 103, 112–113) advocated the use of fertilizers of these formulas in the culture of marine algae (*Nitzschia, Navicula, Spirulina subsalsa,* and *Lyngbya semiplena*). Loosanoff and Engle used 1.0 gram of fertilizer in 1,000 cc. of sea water, although concentrations as dilute as 1: 10,000 were found satisfactory. Strickland employed 0.5 to 1.0 gram per liter.

We have used commercial fertilizer in the culture of a number of fresh-water algae for the past 18 months. All of the forms given below were maintained in unialgal culture for that period with little difficulty. After preliminary tests 1.0 gram of fertilizer per liter of spring water (or distilled water) was chosen as most favorable for the growth of a variety of algae. Several fertilizers of different formulas were tested, but 4–10–4 appeared applicable to the culture of more species than any other.

One gram of fertilizer was shaken well with 1 liter of spring water. The mixture was heated to 80° C., shaken again, and filtered while hot through filter paper (Reeve Angel, No. 201). The clear filtrate was poured in 200-cc. lots into ordinary finger bowls, which were then placed in a hot-air oven and pasteurized. After cooling to room temperature the medium was inoculated with the desired organism, and then the bowls were covered and placed in the light of a west window.

Generally, depending largely on the amount of light and temperature, these cultures attained a maximum development in a period varying from two to four weeks and remained in a productive state for several weeks longer. Subcultures were prepared at intervals of two or three weeks.

The following organisms were found to grow luxuriantly in the fertilizer medium: *Euglena deses, Chlamydomonas monadina, Pandorina morum, Eudorina elegans, Gonium pectorale, Chlorococcum, Zygnema, Spirogyra* (species with single chloroplast), *Stigeoclonium,* and numerous unidentified species of diatoms and desmids in mixed culture. *Ulothrix, Mougeotia, Pithophora,* and *Melosira* were cultivated for periods up to two months, but eventually died out. *Euglena spirogyra, E. oxyuris, Oscillatoria, Vaucheria, Volvox aureus, Oedogonium, Nitella, Chara,* and several species of dinoflagellates would not grow in the fertilizer medium. The desmids, *Hyalotheca* and *Closterium,* grew well only if distilled water replaced spring water. The alga-bearing ciliate, *Paramecium bursaria,* was cultured successfully for many months, but opposite mating types would not conjugate