

of the federation will be held at the Mount Royal Hotel at 8:00 P. M.

Saturday, April 11.—Scientific Sessions of the Societies.

Joint Session of the Federation. A detailed program will be mailed from the office of the secretary of the federation.

The headquarters are the Mount Royal Hotel, Peel Street. A special registration and information bureau will be located on the ninth floor, and also a railroad ticket office, where certificates can be validated and where tickets can be purchased. All members should register at the bureau as soon as possible after arrival and should deposit their railroad certificates for validation. The Mount Royal Hotel can probably accommodate all members who attend. It offers a flat rate of three dollars per person. Requests for reservations should be directed to the Mount Royal Hotel, Peel Street, Montreal. Information in regard to other hotels can be obtained from the secretary. On each day of the meetings table d'hôte luncheons will be served at the Mount Royal Hotel at a price of one dollar per person.

A reduced fare on the "Certificate Plan" of one and one half fares for round trip to and from Montreal will apply to members and associate members (and their dependent families) of the Federation of American Societies for Experimental Biology and affiliated societies, provided over 150 members present certificates.

The local committee in charge of arrangements consists of Drs. J. B. Collip, *chairman*; B. Babkin, N. Giblin, F. E. Lloyd, C. N. H. Long, J. C. Meakins, E. G. D. Murray, H. Oertel, R. L. Stehle, John Tait, D. L. Thomson, T. R. Waugh and D. R. Webster. Arrangements for demonstrations are in the hands of Dr. John Tait, physiology; Dr. D. L. Thomson, biochemistry; Dr. R. L. Stehle, pharmacology, and Dr. T. R. Waugh, pathology.

Any requests should be addressed to Dr. J. B. Collip, chairman of the Local Committee.

HOWARD B. LEWIS, *Secretary*,
University of Michigan,
Medical School,
Ann Arbor, Michigan

THE PASADENA MEETING OF THE AMERICAN ASSOCIATION AND THE ASSOCIATED SOCIETIES

PLANS for the first regular summer meeting of the American Association for the Advancement of Science, to be held at Pasadena, California, from Monday, June 15, to the following Saturday, are rapidly taking shape. The California Institute of Technology, Mount

Wilson Observatory and the Huntington Library and Art Gallery are hosts for this meeting and are cooperating with the Los Angeles Chamber of Commerce and the American Association for the Advancement of Science to make it exceptionally large and successful in every way. Arrangements for the meeting are in the hands of a local committee composed of Paul W. Merrill, *chairman*, Harold D. Babcock, *secretary*, John P. Buwalda, E. C. Watson, Linus Pauling and R. O. Schad.

A group of men of national and international reputation will deliver a series of six evening lectures during the meeting. The list of invited speakers includes outstanding authorities in their particular fields of research. It appears that all sections of the association will be represented in the program. Section B (Physics) and the American Physical Society are planning a four-day meeting. A program committee in charge of physics has already taken active steps and has supplied an impressive list of prominent European physicists who expect to be in California this summer.

Other national societies which are planning to meet with the association are: the Illuminating Engineering Society, the American Association of Economic Entomologists (Pacific Slope Branch), the American Chemical Society (Pacific Intersectional Division), the American Meteorological Society, the American Physical Society, the American Phytopathological Society (Pacific Division), the Astronomical Society of the Pacific, the Botanical Society of America (Pacific Section), the Ecological Society of America, the Society of American Bacteriologists, the Society for Experimental Biology and Medicine (Pacific Coast Branch), and the American Society of Plant Physiologists. The following local organizations are also planning to hold sessions: California State Veterinary Medical Association, the Cooper Ornithological Club (Northern Section and Southern Section), the Lorquin Entomological Society, the Pacific Coast Entomological Society, the San Francisco Aquarium Society and the Western Society of Naturalists.

It is hoped that the morning sessions only will be devoted to the reading of papers by the associated societies and sections and that the afternoons will be devoted to excursions to near-by points of interest. Low excursion rates from nearly all parts of the United States will be available.

SCIENTIFIC NOTES AND NEWS

THE annual meeting of the National Academy of Sciences will be held in the building of the academy in Washington from April 27 to 29 under the presidency of Professor T. H. Morgan, of the California Institute

of Technology. The four-year term of the officers expires at the meeting. Professor A. A. Michelson and Professor William H. Welch are the only living former presidents of the academy.

THE executive committee of the American Association for the Advancement of Science will meet in Washington on April 26. Business relating to the Pasadena and New Orleans meetings or other activities of the association should be communicated to the permanent secretary in the building of the Smithsonian Institution, Washington, D. C.

THE Franklin Medal for 1931 will be conferred on Sir James Hopwood Jeans, secretary of the Royal Society from 1919 to 1929, and on Dr. Willis R. Whitney, director of the Research Laboratory of the General Electric Company at Schenectady, New York. The medals will be presented at the institute's Medal Day exercises on May 20.

THE Astronomical Society of the Pacific has awarded its Catherine Wolfe Bruce Gold Medal "for distinguished services to astronomy" to Dr. Willem de Sitter, director of the Observatory at Leiden, Holland.

THE council of the British Institution of Electrical Engineers has made the tenth award of the Faraday Medal to Mr. Charles H. Merz, consulting engineer and senior partner of Merz and McLellan. The Faraday Medal is awarded not more frequently than once a year either for notable scientific or industrial achievement in electrical engineering or for conspicuous service rendered to the advancement of electrical science without restriction as regards nationality, country of residence, or membership of the institution.

THE Dalton Medal of the Manchester Literary and Philosophical Society has been awarded to Sir J. J. Thomson. The presentation will be made on the occasion of the delivery of the Dalton Lecture before the society on March 17.

SIR D'ARCY POWER, who has returned to England from lecturing in America, has been presented with a volume of selected writings from his own work in commemoration of his seventy-fifth birthday. The presentation was made at Sir D'Arcy's hospital, St. Bartholomew's, by Lord Moynihan, who described him as the most eminent medical historian of our day.

DR. P. COPANARIS, director of hygiene of the Republic of Greece, was tendered a banquet by the city of Savannah, Georgia, on February 3. Dr. Copanaris has been visiting health departments in America as the guest of the International Health Division of the Rockefeller Foundation.

Nature writes as follows: "The University of St. Andrews has sent its congratulations to Dr. W. W. Keen, of Philadelphia, one of its honorary graduates, on his attainment, on January 19, of the age of ninety-four years. It is twenty-three years since Dr. Keen

resigned the professorship of surgery at Jefferson Medical College. The honorary degree of LL.D. was conferred upon him by the University of St. Andrews in 1911, during the celebration of the five-hundredth anniversary of the foundation of the university. Dr. Keen's longevity and cheerful hardihood are matched by those of Emeritus Professor W. C. McIntosh, also of St. Andrews, who is ninety-two years of age and is still busy with scientific work."

At the recent meeting of the Georgia Academy of Sciences, Mr. R. D. Kneale, industrial engineer at Atlanta, Georgia, was elected *president*; Dr. Alfred W. Scott, head of the department of chemistry of the University of Georgia, *vice-president*; Dr. George H. Boyd, head of the department of zoology, University of Georgia, is *secretary-treasurer*. Dr. Karl K. Darrow, of the Bell Laboratories of the American Telephone and Telegraph Company, made the principal address. He spoke on "X-Rays and Electricity as Waves." The membership was raised from 60 to 70.

MR. ROBERT E. TALLY, vice-president and general manager of the United Verde Copper Company, has been elected president of the American Institute of Mining and Metallurgical Engineers at the recent New York City meeting. Mr. H. A. Guess, of the American Smelting and Refining Company, and Mr. Howard N. Eavenson, of Howard N. Eavenson and Associates, Pittsburgh, were elected vice-presidents.

At the annual meeting of the Royal Microscopical Society, held on January 21, Professor R. Ruggles Gates was elected president.

THE first president of the Social Science Research Council, Dr. Edwin B. Wilson, professor of vital statistics in Harvard University, after serving for a year and a half, has been succeeded by Dr. Robert S. Woodworth, professor of psychology in Columbia University, who is expected to serve for a similar term, and who will continue to carry a part of his university work.

DR. FRED JENNER HODGES, lecturer in radiology in the University of Wisconsin Medical School, has been appointed professor of roentgenology at the University of Michigan, to succeed the late Dr. Preston M. Hickey.

THE corporation of the Polytechnic Institute of Brooklyn has reappointed Professor Vladimir Karapetoff, of Cornell University, as visiting professor of electrical engineering for part-time service at the Polytechnic for the year 1931-1932 and has given permanent appointment as research professor of electrical engineering to Dr. Ernst Weber, of the Technische Hochschule of Charlottenburg-Berlin, who is at the Polytechnic Institute this year as visiting

professor of electrical engineering. Both Professor Karapetoff and Professor Weber will devote their efforts to the development of graduate evening study and the encouragement of research activities in the field of electricity.

MR. CONRAD L. WIRTH has been appointed assistant director of the National Park Service in charge of the branch of lands to succeed the late Mr. W. B. Lewis.

FOR the purpose of advising the British Minister of Health on the practical application of modern advances in the knowledge of nutrition, an advisory committee has been appointed comprising the following members: Professor Major Greenwood, *chairman*; Professor E. P. Cathcart, Sir F. Gowland Hopkins, Miss Jessie Lindsay, Professor E. Mellanby and Professor V. H. Mottram. The members will hold office until December 31, 1933, and will be eligible for reappointment. The secretary to the committee will be Mr. F. R. Hudson, of the Ministry of Health.

DR. R. R. WOOLEY, second-year fellow in astronomy at the California Institute of Technology, has been appointed to an Isaac Newton Scholarship in astronomy at the University of Cambridge, and will continue his studies there next year.

MR. STANLEY F. MORSE, consulting agricultural engineer of South Carolina and New York City, who is making a business trip and studying agricultural economic conditions in England, France, Spain and Italy, has completed an inspection and report of a 150,000-acre irrigation project in southern Spain.

DR. M. A. JOSLYN, research assistant in fruit products, University of California College of Agriculture, has been given leave of absence for six months to aid in the inauguration of a plant for the production of frozen orange juice in Florida.

A COURSE of lectures on Photographic Theory at the Institute of Applied Optics, Rochester, New York, is being given by Dr. C. E. K. Mees, Dr. K. C. D. Hickman, Dr. E. P. Wightman, Mr. J. I. Crabtree and Mr. L. A. Jones. The lectures are given on consecutive Fridays. They began on February 6. In addition to the lectures listed, a laboratory course has been arranged by Mr. Russell and Mr. Westwater, of the Kodak Park Laboratories.

DR. ARNOLD K. BALLS, lecturer in biochemistry at the University of Prague, lectured recently on "Recent Advances in Enzyme Chemistry" at Columbia University, the Rockefeller Institute, the University of Pennsylvania and the Pennsylvania State College.

PROFESSOR ALFRED C. REDFIELD, of the department of physiology of the Harvard Medical School, has accepted appointment to lecture in March at the

Belgian universities under the auspices of the C. R. B. Educational Foundation. Professor Redfield will lecture in French on "Some Aspects of the Problem of the Evolution of the Respiratory Function of the Blood," and in English on "The Equilibrium between Oxygen and Hemocyanin."

AT the request of M. Briand, the minister of foreign affairs, who desires to promote the international exchange of university professors, the French minister of public instruction requested the council of the Faculté de Paris to designate an eminent professor who would be invited to lecture at the University of Paris. Accordingly Professor Jadassohn, of Germany, delivered three lectures on dermatosyphilography.

THE forty-sixth meeting of the American Astronomical Society, on the invitation of Professor Harlan True Stetson, will be held at the Perkins Observatory, Ohio Wesleyan University, Delaware, Ohio, on September 7, 8 and 9.

THE annual meeting of the American Society of Zoologists for 1931 will be held in New Orleans, La., December 29 to 31, inclusive, in affiliation with the American Association for the Advancement of Science. Joint sessions with closely related societies will again be features of the meeting.

A SOIL FERTILITY CONFERENCE commemorating the fiftieth anniversary of the soil fertility plots at the Pennsylvania State College will be held on June 24, 25 and 26. The college and experiment station staff, assisted by eminent soil technologists of other institutions, will present a technical program based on many detailed studies of these old plots. There will be two half days devoted to technical papers, two half days to excursions over the plots, college farms and outlying soil fertility projects, and one half day to an open forum on soil fertility problems. Special inspection trips to the orchard and gardens will be arranged. Dr. W. H. Jordan, who laid out these old plots fifty years ago, will be the guest of honor and will give an address. An official program will be issued three months in advance of the conference. Invitations will also be sent to all the Land Grant Colleges, the U. S. Department of Agriculture and to other research agencies, including many prominent soil technologists in the United States, Canada and European countries. The conference will not be limited to invitation; a cordial welcome is extended to all those interested.

Industrial and Engineering Chemistry reports that the opening of the Oscar Johnson Institute in St. Louis in January has made available facilities for research in diseases of the eye, ear, nose and throat. The institute, founded in memory of the late Oscar

Johnson, shoe manufacturer, was completed at a cost of \$1,500,000, including equipment. The staff includes specialists in physics, physical chemistry and bio-chemistry, bacteriology and immunology, physiology, anatomy and pathology. The facilities of the institute will be at the disposal of any research worker who has a significant problem and the personal equipment to attack it. Research and teaching are endowed by the General Education Board. In addition, specific investigations of chronic and progressive deafness and an exhaustive program of trachoma research are being financed.

THE trustees of Battelle Memorial Institute, Columbus, Ohio, have announced the establishment at the institute of a research project sponsored by the Calumet & Hecla Consolidated Copper Company, of Calumet, Michigan. The purpose of this project is to make a fundamental study of arsenical and argenterous lake copper in respect to its properties and application to industrial uses. It has long been recognized that copper containing small amounts of arsenic and silver has definite well-defined advantages and recent developments have brought to mind the possibilities of further industrial applications. This research program is comprehensive in character and is in a most promising and fertile field. Mr. G. L. Craig has been added to the staff for work on this project, which is under the direct supervision of Dr. H. W. Russell and Mr. J. L. Gregg. Mr. Craig was formerly research fellow with the U. S. Bureau of Mines and more recently metallurgist for the Fairmont Aluminum Company.

DR. N. P. COLWELL, secretary of the Council on Medical Education and Hospitals of the American Medical Association, has notified President E. Everett Cortright, of the Junior College of Connecticut, that that institution has been placed on the list of approved colleges of arts and sciences for the two years of pre-medical education prescribed by the association.

THE correspondent of the London *Times* at Riga writes under date of February 8, "The Soviet Press is making a charge of counter-revolution against Professor Karpinsky, the president of the Academy of Science of Leningrad. The basis of the charge is that he objected to the expulsion of the Academicians Platonoff, Tarle, Likhacheff and Liubavsky. The academy summoned an extraordinary meeting last Monday for the purpose of obtaining an explanation from Professor Karpinsky, who is 85 years old. He made a speech in which he expressed regret that the academy had become the mere servant of a single party and a single doctrine, and had lost the measure of freedom and independence it had formerly enjoyed. Everywhere else, he said, the word 'Academy' signi-

fied a collection of men with all sorts of religions, individual views and individual opinions, but the academy in Leningrad had lost its status and had become a mere department of the Communist Party. He demanded the restoration of 'freedom of conscience and freedom of opinion' for academicians and the removal from its statutes of the recently introduced Paragraph 19, which had been 'forced on the academy by the Soviet government,' and under which Platonoff and the others were expelled for alleged political untrustworthiness. According to the published report of the proceedings Professor Karpinsky stood alone. The majority present were silent, but several new 'Red' academicians spoke, rebuking their president for his contemptuous attitude towards the Communist Party and disloyalty to the government. The Leningrad *Pravda* declares that at last Professor Karpinsky has unmasked his counter-revolutionary face, and stands revealed as an enemy of the proletariat, and the mouthpiece of reactionary forces."

PATENTS assigned to the Ohio State University which are the outgrowth of researches made by the university should be dedicated to the public of the state, according to an opinion of the Attorney-General, Gilbert Bettman. The summary of the opinion, given to George W. Rightmire, president of the university, follows: "Where the Ohio State University becomes possessed of a patent by assignment from the nominal patentee, which patent is the outgrowth of researches made by the Engineering Experiment Station of the university, the said university, through its proper officials, should dedicate said patent to the public of the State of Ohio."

A NEW national forest, the Hiawatha, with a gross area of 270,071 acres in the heart of the Upper Peninsula of Michigan, comes into being by proclamation of President Hoover. This brings the total number of national forests up to 150, and the forest becomes part of the vast area of over 160,000,000 acres administered by the Forest Service. The 179,719 acres within the boundaries of the Hiawatha which remain in private ownership are to be acquired by purchase as rapidly as agreements are reached with the owners and funds are made available by Congress. Practically the entire area is covered with forest growth. Little virgin timber of large size is left, since most of the land was cut-over or culled many years ago. Fires have also ravaged much of it, so that at present the stand over large areas is aspen. The aspen growth, however, will make a good protective cover for young white pine and Norway pine, to which the land is adapted. The area has considerable recreational value, but there is little land of value for farming within its

boundaries. The boundaries of the Hiawatha National Forest take in an area extending about 18 miles from north to south and 24 miles from east to west. Headquarters for the new forest, formerly known as the Mackinac purchase unit, will remain at Munising, Michigan. Under Forest Service administration, the Hiawatha National Forest will be protected and developed for its timber growing, recreational and other public forest values.

DURING the Pennsylvania Farm Show held recently at Harrisburg, the Pennsylvania Topographic and Geologic Survey displayed a series of exhibits designed primarily to illustrate the value and use of a survey of this type to the layman. A number of topographic maps showed various physiographic types found in the state. Other maps portrayed the geology, soils and mineral resources of Pennsylvania. A series of wall charts illustrated the state's position as a producer of mineral wealth. Upon tables were exhibits including examples of publications by the survey, minerals common to the state, common rocks and minerals often mistaken for valuable ores, and building stones. By means of specimens and photographs attention was called to the development of limestone caves, the exploitation of which for the tourist trade is a growing industry. Another series of specimens illustrated how fossils form and how they may be used in the search for mineral wealth. Throughout the five days that the Farm Show was open, one or more members of the survey was present to explain further the exhibits to those interested. Of the quarter million people who attended, it is estimated that not less than 10,000 persons inspected the survey's displays.

Nature reports that the Society for Cultural Relations with Soviet Russia is considering the possibility of organizing in Great Britain a tour of scientific institutes in Soviet Russia during July and August, 1931. It is proposed to arrange for parties of British scientific workers engaged in physical, biological and medical research to visit and meet Russian workers engaged in similar researches. V.O.K.S., the central institution in Moscow for organizing cultural relations with foreign countries, is prepared to do everything possible to help the tour, and Intourist, the Soviet organization for tourist parties, will consider giving specially reduced traveling charges. Scientific workers desirous of joining such a tour are invited to write to the secretary, Society for Cultural Relations with Russia, 1 Montague Street, London, W.C.1.

THE dean of the Medical Faculty of the University of Vienna, Austria, has notified the American ministry at Vienna that American citizens who file appli-

cation to become regular students in the medical department must have the degree of bachelor of science or bachelor of arts. In addition, prospective students must comply with the minimum American requirement; that is, twelve hours of chemistry, eight hours of biology and eight hours of physics. They must also take in Vienna a part of the examination in anatomy, histology and physiology.

THE Bureau of Standards reports that the supposed necessity for using large prisms and telescopes of large diameter when making accurate measurements on the index of refraction of optical glass has been investigated recently in the optical instruments section at the Bureau of Standards, and it was found that a 60 degree prism with edges measuring three eighths of an inch in length is sufficiently large for use with the most accurate apparatus now available. This work required a determination of the accuracy which is possible in pointing a telescope at a suitable target and also of the way in which this accuracy may vary as larger telescope lenses are used. Another matter depending on prism size is the error made in properly orienting the prism around a vertical axis when measuring its refractive properties. This difficulty is shown to be less important than has been generally supposed, and a satisfactory method of correcting for such small errors is suggested. It is concluded that large telescopes and special methods for correctly orienting the prism are unnecessary in the most accurate measurements of this kind. As a result, small prisms may be used with confidence when testing optical glass for those small but harmful variations in optical density which may be found within a sample intended for use in constructing an optical instrument of high precision.

THE Oxford University Exploration Club, in its annual report for 1929-30, as summarized in the *London Times*, states that the launching of the club in December, 1927, was due to the energy of two or three men who had a definite objective: they wished to organize an expedition to Greenland, which, through the active aid of various senior Oxford men, was carried through to a successful conclusion. Thus the club had an effective start, which has been followed up by further expeditions to British Guiana in 1929 and to Lapland in 1930. The undergraduate membership has increased to 26, most of whom are both willing and eager to work on an expedition. It is hoped that a continuous succession of undergraduate organizers will be maintained, in order that this enthusiasm may be directed towards definite objectives. At the same time there are a number of members every year who are unavoidably prevented by

schools or other difficulties from taking part in expeditions; also the possibilities of expeditions leaving England except in long vacation have so far been considered negligible. With this in view a group of members began in March to organize a hut scheme, in collaboration with the Oxford University Mountaineering Club; their object is to secure huts and bothies in various out-of-the-way places in the mountain groups and Great Britain and Ireland, which will serve as bases for walking and climbing. The first of these huts, under Craig-yr-ysfa, in Cwm Eigiau, has now been put into working order. With the annual report is given an account of the British Guiana expedition in 1929. The aim, it is stated, was not pri-

marily to explore unknown territory, but to penetrate into the canopy of the tropical rain-forest, which offered the prospect of discovering a zone of life practically untouched by science. Publication of results has already begun, but will not be complete for some years, owing to the large number of species involved and the little that is known about them. It seems certain that more new species have been secured than by any previous Oxford expedition. The contributions to the general ecology of the rain-forest, to knowledge of territory and related problems in bird-life, to insect mimicry, to life-histories of wasps and bees, and to the elucidation of the still obscure dominant species of trees are likely to be especially notable.

DISCUSSION

METEOR CRATER IS NOT A LIMESTONE SINK

IN SCIENCE, January 9, 1931, Mr. F. S. Dellenbaugh suggests that the great pit of Meteor Butte, in Arizona, is a sink formed by ground water solution in the Kaibab limestone. If this suggestion were addressed to geologists only, there would be no need for a reply. The geologic facts speak for themselves; they are not merely unfavorable to Mr. Dellenbaugh's idea—they disprove it conclusively. Inasmuch as his article reached an audience made up in large part of non-geologists, a brief statement of the geologic evidence is in order.

Mr. Dellenbaugh is correct in saying that the Kaibab limestone contains many sinks, which receive much of the surface drainage on the Kaibab Plateau. These sinks, however, and especially those of large size, are located on wide flats or on the floors of large shallow basins, where they receive considerable runoff. Solution of limestone is a slow process, and its accomplishment on a large scale requires a large quantity of water. It would be a wonder indeed to find in a semiarid country a sink, almost circular in plan and nearly a mile in diameter, occupying the entire top of a hill, where the only water available for solution consists of the scanty rain that falls directly on the area of the pit. For Meteor Butte is a hill, as its name implies. On all sides the ground slopes away from the very edge of the circular rim, and hence no outside drainage can enter the central depression. From this general consideration alone a geologist would be very skeptical of the sink hypothesis for this feature. The following points are sufficient to remove the hypothesis from further consideration.

(1) A limestone sink does not reach deeper than the base of the soluble formation in which it is formed. This is a fact of observation, and is also an elementary

deduction, since the material that once occupied the position of the sink had to be removed by solution. At Meteor Butte, however, the Kaibab limestone forms less than half the height of the walls. Beneath it is the Coconino sandstone, one of the most insoluble rock formations known, since it consists entirely of quartz grains cemented by silica. Any suggestion that this sandstone may have caved in owing to solution directly beneath it is ruled out, because the Coconino sandstone rests on red shales and sandstones many hundreds of feet in thickness.

(2) At the top of the great pit the slopes on all sides are littered with fragments of the Coconino sandstone. These fragments range in size from minute bits of broken sand grains to blocks of large size; and they are intimately mixed with similar debris derived from the Kaibab limestone. How were these pieces brought up from their normal position hundreds of feet below? Obviously by a great force that acted upward and was explosive in character, since it not only hurled the angular blocks in all directions but even smashed the individual sand grains to tiny bits. Examination of this pulverized quartz leads to the conviction that much more of the rock blown out to create the crater was blasted into dust, which mounted in a great cloud and drifted away to settle as a thin veneer on the wide surface of the plateau.

(3) Although the rock strata are practically horizontal beneath a wide surrounding area, in the walls of the crater these strata are tilted and otherwise disturbed. On the south side, where the wall is steepest, the beds dip directly into the wall, at a high angle. There is no haphazard arrangement, such as would be expected if the disturbance were due to slumping into a solution pit. The tilt is consistent in direction, and indicates that a powerful lifting force acted inside the pit, with concentrated action on the south side.