Happens in Sun Spots?" Dr. Henry Norris Russell, of Princeton University; December 18, "The System of the Stars," Dr. Joel Stebbins, of the University of Wisconsin; January 6, "The Size of the Universe," Dr. Willem de Sitter, of the University of Leyden; February 19, "The Stars about Us," Dr. Frederick H. Seares, of the Mount Wilson Observatory; March 18, "What Astronomy has Done for the World," Dr. Russell Tracy Crawford, of the University of California; April 15, "Mars," Dr. Mars F. Baumgardt, of the Southern California Academy of Sciences.

THE recently formed section of hydrology of the American Geophysical Union announces the organization of a committee on the hydrology of glaciers, composed of the following men: Dr. Stephen R. Capps, senior geologist, Alaska branch, U. S. Geological Survey; Dr. Harry Fielding Reid, professor emeritus of dynamic geology, Johns Hopkins University; G. L. Parker, district engineer, water resources branch, U. S. Geological Survey; Carl P. Richards, chairman of the research committee of the Mazamas, Portland, Oregon; R. H. Sargent, senior topographic engineer, Alaska branch, U. S. Geological Survey; Dr. Wallace R. Atwood, assistant, branch of research and education, National Park Service; François E. Matthes, senior geologist, section of glacial geology, U. S. Geological Survey, chairman. The functions of the committee correspond in general to those of the Glacier Commission appointed by the section of scientific hydrology of the International Geodetic and Geophysical Union in Europe and will consist principally in securing systematic records of the annual variations of American glaciers.

THE Botanical Society of New Orleans held its first meeting of the season of 1931–32 on October 20. Dr. Robert Glenk, curator of the Louisiana State Museum, presented a paper on "Some Facts about Perfume-yielding Plants," illustrating his discussion with slides and with a selected set of specimens of the raw materials representing the basic perfume types. The ensuing business meeting dealt principally with the program for the coming year and with plans for the coming New Orleans meeting of the American Association for the Advancement of Science.

THE will of the late Senator Dwight Whitney Morrow contains the following provisions: (e) To the trustees of Amherst College, a body corporate established by law in the Commonwealth of Massachusetts, two hundred thousand dollars ($200,000). Without limiting such trustees' discretion in their use of this absolute bequest, I here mention my preference that this bequest be added to the general endowment of the college, the income to be applied to the maintenance and, if possible, to the increase of professors' salaries at such college; (f) To the trustees of Smith College, a corporation established by law in the Commonwealth of Massachusetts, two hundred thousand dollars ($200,000), to be part of the endowment funds of such college; (g) To the Smithsonian Institution, city of Washington, D. C., one hundred thousand dollars ($100,000), to be part of its endowment funds; (h) To the trustees of Columbia University in the city of New York, fifty thousand dollars ($50,000), to constitute a fund, the income of which is to be applied, from time to time, to the uses and purposes of its School of Law; (i) To the Union Theological Seminary in the city of New York, fifty thousand dollars ($50,000), to be part of its endowment funds.

SEVEN members of the privately financed exploration and filming expedition to Colombia and Ecuador, known as the Latin-American Expedition, Inc., sailed on September 26 for Panama on the Grace liner *Santa Maria,* for seven months' intensive research, with Dr. Matthew W. Stirling, of the Smithsonian Institution, as chief of the scientific division. Dr. Stirling is to conduct an investigation at the headwaters of the Magdalena River of the ancient monoliths, which he believes may furnish a clue to the riddle of the migration of the early peoples in the Western Hemisphere. It is also planned to explore the Napo River in Ecuador and to study the habits of the Jivarro Indians, who are known as head hunters.

DISCUSSION

COURSES ON THE HISTORY OF PHYSICS IN AMERICAN COLLEGES AND UNIVERSITIES[1]

IN 1921 a survey was made of the instruction being given in the history of the sciences in American colleges and universities.[2] Information was gathered by means of questionnaires that had been sent to about four hundred institutions and it was found that there was considerable interest in the historical development of the various branches of science. There were numerous replies expressing the hope that there would be a further expansion of this field of study.

[1] Read before the Ohio Academy of Science, April 4, 1931.

[2] E. H. Johnson, "The Present Status of the History of Science in American Colleges and Universities." SCIENCE, n.s., LVI: pp. 585–595, December 16, 1921.

During the decade that now has elapsed, college curricula in general have undergone great changes, and there have appeared many publications dealing directly with the history of science. Hence it has seemed desirable to make a new survey. The present report—dealing only with instruction in the history of physics—is but a part of the yet unfinished study which is to include all of the various branches of science now being taught in American colleges.

This new investigation has been carried out along lines wholly different from those followed in the study of 1921. Only the regular college publications such as catalogues, special bulletins and course lists have been consulted. It was felt that this procedure, while imperfect, would eliminate many of the defects inherent in the questionnaire method.

To date the curricula of 320 of the colleges and universities in the United States have been examined. This number includes the majority of the stronger institutions regardless of the nature of their support, whether state, denominational, non-sectarian or private, also coeducational institutions and those for men or women only. They have a wide geographic distribution. Of this number, 51 are now offering courses on the history of physics as regular, credited units in the curriculum, and there is no indication that in any of these institutions this type of course is being given as anything but a serious and worthwhile study. A little more than half of these 51 institutions are east of the Mississippi River, while 70 per cent. are north of the latitude of that imaginary dividing line associated with the names of Mason and Dixon. Of the southern group, 30 per cent. are in California. In other words, the northern states and California offer four-fifths of the courses on the history of physics now available in the United States. Naturally, coeducational institutions predominate, making 72.5 per cent. of the total, while men's and women's colleges amount to 7.9 and 19.6 per cent., respectively.

Of the 51 institutions considered here, 39 are offering courses strictly limited to the history of physics, while the other 12 give a small part of the time to allied subjects or pedagogic procedures. 13 of the purely physics courses deal with selected, special topics, such as the development and influence of outstanding theories, *e.g.*, the wave theory of light or the rise of the 19th century ideas of the conservation of matter and energy. While the majority of courses include surveys of the growth of physical science from the earliest times, there are a few that deal with the developments of the past twenty-five or fifty years only, taking them up in such a connected, chronological order as to warrant classification as historical.

The forms of instruction differ widely. Probably few teachers of physics have learned much about the origins of their science until after they have passed through their own college training period. Only after becoming specialists have they found time to look back over the field they have entered. Consequently each will develop his own best method of approach in teaching the history of physics. It is not an easy subject to handle adequately, but the task has been lightened somewhat by the appearance during the past few years of several special textbooks, and the number of classic papers available has been increased by numerous reprints and the publication of photographic copies of the originals. In nearly all of the courses examined, the lecture method is prominent. Next come the use of a textbook, and in order of frequency, assigned reading of outside sources and class reports with discussions. In several intitutions classical experiments are repeated as class demonstrations, and in at least one university the students themselves are required to prepare and deliver part of the lectures.

The question of prerequisite subjects is of importance. In a few institutions no requirements are made, but in the majority of cases, one or even two years of college physics are required for admission to classes in the history of physics. Some of the better schools even go further than this, and admit only seniors or graduate students in physics.

It has not been possible to determine the mathematical prerequisites definitely, but a number of colleges do require the calculus. Of course this requirement would be met automatically by all students qualifying where advanced physics courses are demanded.

In practically every case the history of physics is given on the same basis as any other advanced physics elective, *i.e.*, during one or two semesters and receiving from two to four credits towards graduation.

Probably all physics teachers introduce many topics in their regular lecture discussion in their historic sequence. Some of the more recent college physics texts emphasize this historic form of presentation of subject-matter, because their authors feel that it has great appeal and cultural value for the general student, while it supplies a highly desirable background for the specialist.

Reference was made above to the indications of a growing interest in the history of science. German scholars have appreciated the value of this field of study for many years. Only recently has there been any very serious attention given to it in America. But now it is growing and attracting notice abroad. Recently I received a letter from a lecturer at the University of London asking about the general procedure in this country. It showed two things very

clearly: first, that English scholars have a genuine appreciation of the value of the study of the history of the physical sciences, and, second, a recognition of American activity in this same field. Present indications are that the study of this phase of the growth of civilization soon will win an important place in the curriculum of the American college.

E. H. JOHNSON

KENYON COLLEGE

A NEW ELM DISEASE

AFTER the identification of the Dutch elm disease in Ohio, during the summer of 1930, some 300 specimens of diseased elm trees were collected or received from correspondents, examined and the fungi in them isolated in cultures at the Dutch elm disease laboratory operated by the Ohio Agricultural Experiment Station and the division of forest pathology, Bureau of Plant Industry, at Wooster, Ohio. In these cultures it was found that a certain fungus was present in a little over ten per cent. of the cases. The past history and the condition at that time of several of the trees from which this fungus was isolated indicated that they were probably parasitized, some dying entirely during the summer of 1930 and others losing part of their tops. On the strength of these observations, soon after growth began this spring, fourteen young elms were inoculated with the fungus.

About a month after inoculation, symptoms of disease appeared on seven trees. Drooping and wilting of the leaves, preceded or accompanied in most cases by a distinct yellowing was first noted. In a short time most of the leaves dropped although some leaves turned brown and remained on the twigs for more than a month. The diseased twigs and branches died as well as the main trunk above the point of inoculation. A blackening of the bark, which in a few cases extended directly up the trunk from the point of inoculation, was noted on some trees. Apparently the disease made more rapid progress upward than downward, since the branches below the point of inoculation with a few exceptions remained healthy. The entire top of one tree, inoculated at the base, died.

A brown discoloration of the cambium and current growth of sapwood was evident when cross-sections of the diseased branches were examined. The staining in the inoculated trees was more uniform and somewhat more diffused than that found in trees affected with either the Dutch elm disease or Verticillium wilt. However, the discoloration in some cases resembled that of the two latter diseases markedly.

The fungus was reisolated from the inoculated diseased trees but not from inoculated trees which did not develop the disease, although attempts were made to do so. Check trees remained healthy.

On potato dextrose agar the fungus first appears from plantings of diseased wood as a white, cottony colony of aerial mycelium. Later it becomes light brown. But one type of spore has been noted in the cultures. They are hyaline, generally elliptic, although the shape is variable, and in most cases contain one or two oil drops. The average size of 50 spores was 1.9 x 4.5 microns. Occasionally a group of spores loosely bound together in a small head and borne on the end of a short conidiophore was found. For this reason the fungus is tentatively referred to Cephalosporium. No difficulty is experienced in distinguishing this fungus from *Graphium ulmi* Schwarz. Although the spores are about the same size, the type of growth of the colony, its color, and the relatively scant spore production differentiate it from the organism causing the Dutch elm disease.

The fungus was cultured from specimens sent to the Dutch Elm Laboratory from Iowa, Missouri, New York and Washington, D. C., as well as from various localities in Ohio. A more detailed study of the disease and the fungus is in progress.

CURTIS MAY

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THE GALL BLADDERS OF CHICKS IN A VITAMIN D DEFICIENT CONDITION[1]

SEVERAL times during the past few years we have noted in this laboratory that the gall bladders of chicks in a vitamin D deficient condition appeared to be larger than those of chicks of the same age but receiving an adequate supply of this vitamin.

Recently there was an opportunity to make quantitative observations of the gall bladders of two groups of chicks which had been on an experiment from hatching until nine weeks of age. Both groups received the same basal ration, which was deficient in vitamin D. For Group 1, 1 per cent. of cod-liver oil was incorporated in the ration, but Group 2 subsisted on the basal ration only. When the chicks were killed at nine weeks of age leg weakness was quite marked in the latter group, whereas the former was normal. The average weight of the gall bladders of Group 1 (ample vitamin D) was 0.57 gm (P.E. $\pm$ 0.04) and that of those of Group 2, 1.27 gm (P.E. $\pm$ 0.12). When the probable error of the difference between the two means is calculated and compared with the difference, a high degree of significance is obtained. Although accurate measurement of the volume of bile from the two sets of bladders was not feasible, the volume in the case of the deficient chicks was markedly larger than that of the normal chicks. It is significant that although the average

[1] Journal Series paper of the New Jersey Agricultural Experiment Station.