at the Johns Hopkins University on December 3. His subject was "Recent Studies in Cosmic Rays."

DR. CLINTON J. DAVISSON, of the Bell Telephone Laboratories in New York, spoke before the Physics Colloquium at Brown University on November 18 on "Electron Optics."

WALTER HOGE MACINTIRE, of the department of chemistry at the Agricultural Experiment Station, University of Tennessee, gave the fifth Harvey W. Wiley memorial address of the Association of Official Agricultural Chemists at the annual meeting on November 11 in Washington. Dr. Wiley was a founder and the first president of the association.

PROFESSOR HEINRICH RIES, of Cornell University, gave a series of three lectures on clays and clay products before the department of geology of Columbia University on November 11, 12 and 13.

F. J. SIEVERS, of the Massachusetts State College, in his capacity as director of the Herman Frasch Foundation for Research in Agricultural Chemistry recently addressed the members of the honor society Gamma Sigma Delta at the University of Missouri on "Changes Necessary in Research to Meet Changed Conditions in Economics."

THE second lecture in the Smith-Reed-Russell series for this year at the School of Medicine of the George Washington University, was held on November 26. The speaker was Dr. Siegfried J. Thannhauser, of Freiburg, Germany, and the Boston Dispensary. The subject of his address was "Cholesterol, its Chemical, Physiological and Clinical Aspects."

DR. W. C. CURTIS, president of the Union of American Biological Societies, writes that a meeting of the council will be called at 3:00 P. M., Sunday, December 29, in the Jefferson Hotel, St. Louis. This meeting will consider: (1) The current problem of *Biological Abstracts;* (2) the future of the Union; (3) reports of officers and other business. It is earnestly requested that each member-society arrange for its members of the council to be in attendance, or arrange for attendance of one or more substitutes for such council members who can report to the society at its next business meeting. Any biologist who is vitally interested in the future of the *Abstracts* and who may be in St. Louis on December 29 is invited to attend the meeting and participate in the discussion, although not a member of the council or an appointed substitute.

AT the meeting of the American Academy of Tropical Medicine in St. Louis on November 20 and 21, the following officers were elected: Dr. Richard P. Strong, of the Harvard Medical School, *president;* Dr. Wilbur A. Sawyer, director of the International Health Board of the Rockefeller Foundation, *vice-president;* Dr. Ernest Carroll Faust, of the Tulane University School of Medicine, *secretary;* Dr. W. W. Cort, of the School of Hygiene and Public Health, the Johns Hopkins University, was reelected *treasurer.* Dr. William H. Taliaferro, of the University of Chicago, and Dr. Thomas T. Mackie, of the School of Medicine of Cornell University, were elected members of the council. Initiated by the academy, the American Foundation for Tropical Medicine held its organization meeting, electing as president Dr. Isaiah Bowman, president of the Johns Hopkins University, and as executive secretary Dr. Earl B. McKinley, dean of the School of Medicine of the George Washington University. The foundation will be incorporated in the District of Columbia and will hold its next meeting late in January when a formal program will be adopted for 1936.

IT is announced that the *Journal of Industrial Hygiene,* edited at the Harvard School of Public Health, Boston, will take in 1936 the name *Journal of Industrial Hygiene and Toxicology.* It will resume its former publishing schedule of ten issues a year instead of six and the content of original papers will be increased about 50 per cent.

DISCUSSION

CONFIRMATION OF COSMIC PHENOMENON

Two types of confirmation have appeared for the phenomenon I described on page 351 of the October 11 issue of SCIENCE. The first was the occurrence on October 24 of a general fadeout of very high radio frequencies. On October 10 began a great increase in sun-spot activity, accompanied by a general improvement in radio transmission on the higher frequencies. Amateurs and others found that they received excellent daytime signals on much higher frequencies than usual. By October 21 to 23 the upper limit of frequency had reached the highest value ever observed by the National Bureau of Standards. Then, for a single day, October 24, this was completely reversed. The upper limit of frequency on this one day dropped to half its value on the preceding days, and on October 25 and succeeding days returned to the high previous values. This was accompanied also by a remarkable change in the virtual height of the F_2 layer of the ionosphere; this height shot up to 460 km on October 24 from a height of about 250 km on the preceding and following days. These changes were the most

pronounced ever observed by the bureau. October 24 was a day of considerable magnetic disturbance.

Magnetic disturbances, sun-spot activity and poor high-frequency radio transmission have hitherto been considered to go together in general, but with many puzzling exceptions. The present results may help to unscramble the relation, and the following hypothesis is offered. High-frequency radio transmission improves as general sun-spot activity increases (probably because of increased ultraviolet radiation), but some particular, relatively sudden eruptions on the sun have the reverse effect (impairing high-frequency radio transmission on the illuminated side of the globe) and also give rise to terrestrial magnetic disturbances. It appears that the relation between the sudden solar and radio disturbances is a simple one. The wide-spread daytime radio effect is approximately synchronous with the solar eruption, depending directly on the changed ionization produced in the ionosphere by the solar emanation. The magnetic disturbance, however, is a derived effect resulting from the currents flowing in the ionosphere as the charges therein redistribute themselves. Magnetic disturbances therefore appear an uncertain length of time after the causative solar disturbance, and it would be difficult to identify cause and effect. Such identification is possible, however, for the radio disturbances.

This is borne out by the second type of confirmation of the phenomenon, *viz.*, reports of optical observation of changes on the sun which occurred at the same times as the radio fadeout reported. In response to a request from Dr. Lyman J. Briggs, director of the National Bureau of Standards, to Dr. George E. Hale, Mt. Wilson Observatory, and through the courtesy of Dr. S. B. Nicholson, in charge of the Mt. Wilson solar observations, I have received a report made by R. S. Richardson of that institution. This report indicates that the spectrohelioscope showed sudden marked changes in form and intensity of a hydrogen flocculus within a few minutes of the time of each of the radio fadeouts of July 6 and August 30, and also showed a similar phenomenon on October 24. (No observations were made at the times of the March and May fadeouts.) Mr. Richardson's report says the August 30 and October 24 eruptions were unusual. Data are not available as to whether wide-spread radio fadeouts occurred at the times of other notable solar flocculi eruptions.

The synchronous radio fadeouts and visible solar eruptions, lasting only a few minutes, appear to be some sort of climax of a process occurring over a period of hours. The October 24 radio observations revealed the disturbed condition over such a longer period rather than the climactic sudden type of fadeout. It should be noted, by the way, that the direct correlation of solar and radio effects with which we are here concerned are daytime phenomena, *i.e.*, on the side of the globe illuminated by the sun. Night-time radio phenomena are far more variable and may be expected to correlate more particularly with terrestrial magnetic phenomena.

It is by no means proved, but it may be that solar flocculi eruptions (visible or not) are the usual cause of wide-spread daytime impairment of high-frequency radio transmission and also of at least some terrestrial magnetic disturbances. Even if only a small proportion of the effective eruptions should have a visible stage, certainly further study of such visible effects and comparison with ionosphere data obtained by radio means will be of value in the further elucidation of the causes of magnetic disturbances. The National Bureau of Standards and the Carnegie Institution are carrying on a limited program of continuous determination of ionosphere data by radio means, and are setting up equipment to do this in more thorough fashion. This gives new emphasis to Dr. Hale's proposals for continuous spectrohelioscopic observations.

J. H. DELLINGER

CHIEF, RADIO SECTION
NATIONAL BUREAU OF STANDARDS

MIGRATION OF GRAY SQUIRRELS

AT the present time considerable amount of speculation is passing through the minds of the zoological world in an endeavor to solve the migration of gray squirrels. It is reported that a horde of these animals are migrating from New England to New York covering an area of 100 miles wide. Recently a number of dead squirrels were picked up on the shore of Gilboa aqueduct. Between Albany and the Rip Van Winkle Bridge 2,000 remains were found along the west shore of the Hudson River.

This migration is not the result of campers invading their habitat or being attacked by parasites, as some writers have postulated. The slaughter of hawks, owls and foxes under the guise of conservation has made it possible for the red squirrels to multiply to the extent of breaking up the balance of nature, thus creating living conditions which would lead to extermination if migration did not take place.

It is not generally known that a large percentage of gray squirrels are emasculated annually by the pugnacious reds. In years past the writer has shot and trapped alive a large number of gray squirrels and close observation showed 98 per cent. mutilation. The technique used by the red squirrel is simple but most efficacious. Contact is made by leaping from a limb of a tree, a distance of fifteen feet or more, making a perfect landing on the back of the unsuspecting gray engaged in digging seeds. With a quick body twist