

the hypothesis that corpuscular emission of some sort emanates from sunspot centers and has been remarkably successful in computing the actual forms of auroral streamers on the basis of the behavior of charged particles coming from the sun and entering the upper atmosphere along paths distorted by the magnetic field of the earth.

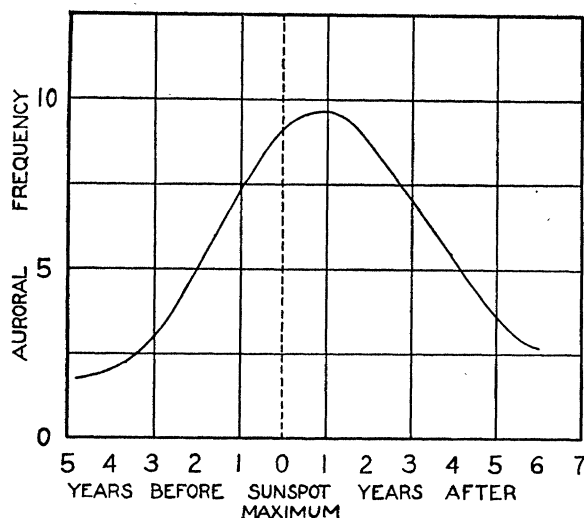


FIG. 2

If aurorae are caused in accordance with the corpuscular hypothesis then it might be expected that the polar lights would be most conspicuous when large sunspots pass near the sun-earth line or are seen close to the center of the sun's disk. The fact that sunspots occur at decreasing solar latitudes as the sunspot cycle progresses suggests that as the more active spots approach more nearly the solar equator they will more frequently cause brilliant aurorae. It should be possible on the basis of more complete data of the last few years to analyze the occurrences of aurorae with respect to the positions of sunspots near the central zone.

By the time spots begin to appear within 5° of the sun's equator, the numbers of sunspots have so appreciably waned as to diminish very considerably the presumable cause for auroral phenomena. Even on the hypothesis of flares of ultra-violet associated with chromospheric eruptions in the vicinity of sunspots, one would expect the latitude effect to be important in the production of aurorae. In either case, therefore, we have a possible qualitative explanation for the maximum in auroral frequency occurring after the actual maximum of sunspot numbers has been passed.

Since it is evident that an increased emission of ultra-violet radiation from the sun and possibly also the emission of particles in the vicinity of sunspots are directly associated with increased ionization of the earth's upper atmosphere, the phenomena of radio transmission may be expected to show variations with solar activity. Field strength measurements of a Chicago broadcasting station made at our suburban laboratory have shown a decrease from a value of more than 300 microvolts per meter at the sunspot minimum of 1933 and 1934 to a value of about 100 microvolts per meter during 1938. Sunspot numbers for the same interval rose from an average of 5 to an average of around 120. Critical frequencies for penetrating the E layer as published by the Bureau of Standards³ have shown likewise a consistent parallel with the last four-year rise in solar activity, the value rising from 3.05 megacycles in 1934 to 3.75 megacycles in 1938.

Well-known changes in the intensity of the earth's magnetic field following closely changes in sunspots have been recognized for over 100 years. It is now obvious that probably the major contributing factor in the geomagnetic fluctuations is to be found in the ionization changes in the upper atmosphere. Developments in radio technique, therefore, offer new tools for exploration in unlocking the relationship between solar activity and terrestrial, atmospheric and magnetic phenomena.

SCIENTIFIC EVENTS

A DISCUSSION OF FRANKLIN AND HIS TIMES

A DISCUSSION of Franklin and his times entitled "Meet Doctor Franklin" is being held under the auspices of the Franklin Institute with the cooperation of the American Philosophical Society and the Historical Society of Pennsylvania.

The conferences are being held on Fridays at 5:15 P.M., beginning on October 20 and ending on April 19. The program follows:

Opening address, Dr. Carl Van Doren, author and editor, New York City.

"The Philosophical Revolutionist," Bernhard Knollenberg, librarian, Yale University.

"Dr. Franklin: Friend of the Indians," Dr. Julian P. Boyd, librarian and editor, Historical Society of Pennsylvania.

"The Colonies and the Mother Country," Dr. Verner W. Crane, professor of American history, University of Michigan.

"The Diplomat," Dr. Frank Monaghan, assistant professor of American history, Yale University.

"Self-Portraiture: The Autobiography," Dr. Max Farrand, director, Huntington Library, San Marino, Calif.

"Looking Westward," Professor Gilbert Chinard, professor of French, Princeton University.

"Molding the Constitution," George Wharton Pepper, member of the Franklin Institute, Philadelphia.

"The Printer at Work," Dr. Lawrence C. Wroth, librarian, John Carter Brown Library, Providence, R. I.

"The Student of Life," Dr. Robert E. Spiller, professor of English, Swarthmore College.
 "Adventure in Agriculture," Dr. Carl R. Woodward, secretary of Rutgers University.
 "Dr. Franklin as the English Saw Him," Dr. Conyers Read, professor of English history, University of Pennsylvania.
 "Dr. Franklin and Science," Dr. R. A. Millikan, physicist, California Institute of Technology.
 Closing address, Dr. Carl Van Doren.

THE EIGHTH AMERICAN SCIENTIFIC CONGRESS

THE eighth American Scientific Congress will be held in Washington, D. C., from May 10 to 18, 1940, under the auspices of the government of the United States of America.

Pursuant to a special act of the Congress of the United States, invitations on behalf of the President have been extended to the governments of the American Republics who are members of the Pan American Union to participate in the forthcoming meeting. Scientific institutions and organizations are also cordially invited to send representatives.

On April 14, 1940, the Pan American Union will celebrate the fiftieth anniversary of its founding. Although the eighth American Scientific Congress will convene a few weeks subsequent to the anniversary date, the congress will be one of the important phases of that celebration. It is hoped that the presence in Washington of many distinguished investigators from all the American republics as participants in this congress will serve as one of the many tributes to the Pan American Union on the occasion of celebrating the completion of a half century of invaluable service in the fostering of good-will and better understanding among the republics of the Western Hemisphere.

This series of inter-American meetings, serving as a medium for the exchange of scientific information of particular interest and importance to the governments and peoples of the Americas, has enjoyed a long and distinguished history, dating from the first Latin American Scientific Congress held at Buenos Aires in April, 1898.

The Honorable Cordell Hull, Secretary of State of the United States, has requested the following government officials and scientific men to serve upon an organizing committee, which is collaborating with the Department of State in formulating definite plans for the congress:

The Honorable Sumner Welles, Under Secretary of State, *chairman*.
 Dr. Warren Kelchner, acting chief, Division of International Conferences, Department of State, *vice-chairman*.
 Dr. Alexander Wetmore, assistant secretary of the Smithsonian Institution, *secretary*.

Dr. C. G. Abbot, secretary of the Smithsonian Institution.
 Dr. Isaiah Bowman, president, The Johns Hopkins University.
 Dr. Vannevar Bush, president, Carnegie Institution of Washington.
 Dr. Ben M. Cherrington, chief, Division of Cultural Relations, Department of State.
 Laurence Duggan, chief, Division of the American Republics, Department of State.
 Dr. Ross G. Harrison, chairman, National Research Council.
 Dr. Waldo G. Leland, secretary, American Council of Learned Societies.
 Archibald MacLeish, librarian of Congress.
 Dr. Thomas Parran, Jr., surgeon general, United States Public Health Service.
 Dr. Stuart A. Rice, chairman of the Central Statistical Board.
 Dr. Leo S. Rowe, director general, Pan American Union.
 Dr. James Brown Scott, trustee and secretary, Carnegie Endowment for International Peace.

Dr. Wetmore has been designated also as secretary general of the congress.

The congress will be divided into the following sections, each to be in charge of a chairman, assisted by a vice-chairman, secretary and section committee:

- I. Anthropological Sciences.
- II. Biological Sciences.
- III. Geological Sciences.
- IV. Agriculture and Conservation.
- V. Public Health and Medicine.
- VI. Physical and Chemical Sciences.
- VII. Statistics.
- VIII. History and Geography.
- IX. International Law, Public Law and Jurisprudence.
- X. Economics and Sociology.
- XI. Education.

The chairman of the respective sections will be selected at an early date, after which the detailed agenda of each section will be announced. The official languages of the congress will be English, Spanish, Portuguese and French.

The Department of State and the organizing committee are preparing an entertainment program which will include visits to places of scientific and general interest in Washington and its environs.

AWARDS OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

THE American Society of Mechanical Engineers will hold its fifty-ninth annual meeting at the Hotel Bellevue-Stratford, Philadelphia, from December 4 to 8. A list of the 1939 honors and awards to be presented on December 6 to members and junior members of the society has been made public. They are:

The Melville Medal, presented annually for an original paper or thesis of exceptional merit presented before the society, to L. M. Goldsmith.