



Bell and Howell.

## ANTARCTIC CAMERA

This specially designed moving picture camera is now in the Antarctic with the Ellsworth expedition where it will be used to make on only 800 feet of film a continuous photographic record of terrain passed over during a return, non-stop, 3000-mile flight across the continent and over the South Pole. From an altitude of about 3000 feet pictures will be snapped automatically every few seconds. The southern midnight sun will furnish light during the estimated 24-hour duration of the flight. Prof. H. W. Nichols, geologist of Field Museum, is shown holding the camera.

finding of these carriers he attributed to the commendable efforts of Dr. Herman Bundesen. Dr. Bundesen is health commissioner of Chicago, where the outbreak started. The healthy carriers undoubtedly have unconsciously spread the infection throughout the country, Dr. Spencer said.

"Efforts at prevention," he said, "must be concentrated upon the discovery and proper treatment of carriers among public food handlers.

"Much can be done, also, to curb home infections by the education of the public in personal cleanliness and the careful washing and disinfecting of the hands of all persons who prepare food for others."

*Science News Letter, November 25, 1933*

## METEOROLOGY

# 23-Year Sunspot Cycle Gives Key to Long Range Forecasting

## Encouraged by Predictions of Past Weather, Dr. Abbot Forecasts Scant Rain in Central India From 1942 to 1948

**S**UCCESSFUL long-range weather forecasting based on the mathematical study of the 23-year sunspot cycle was described before the meeting of the National Academy of Sciences in Cambridge, Mass., by Dr. Charles G. Abbot, secretary of the Smithsonian Institution.

During many years of study of variations in solar radiation, Dr. Abbot discovered a correlation between these variations and the number of sunspots, as the spot cycles wax and wane. The study was complicated and made highly difficult by the fact that there are a number of these cycles, of varying length, which overlap and often partially hide each other. Finally he perceived that all the periodicities in solar radiation are nearly submultiples of 276 months, or 23 years. These submultiples are obtained by dividing 276 by 3, 4, 6, 8, 11, 13, 15, 18, 25, 34 and 39. He thereupon conceived the idea that the tedious method of determining periodicities individually might be omitted, and their combined effect might be found by discussion of a 23-year cycle.

"This proved highly successful," said Dr. Abbot. "At Bismarck, N. D., the monthly mean departures from normal temperature for two periods, 1875 to 1898, and 1898 to 1921, gave features of great similarity. It was found, indeed, as was expected, knowing the irregularity of sun spots, that the principal features were subject to shiftings of several months due to changes of phase of constituent periodicities. This was allowed for by using slightly flexible scales of abscissae, alternately expansible and compressible in slight degree, when combining the two 23-year periods. When averaged with these slight adjustments and plotted as a prediction for the interval 1921-1933, the curve of forecast very closely represented the observed march of departures from normal temperature for those twelve years."

Dr. Abbot then represented in percentages of the monthly mean normal precipitation the observations at Bis-

marck, N. D., for the range 1875 to 1921, thus covering two 23-year cycles. Based thereon he made a similar forecast of percentage precipitation for 1921-1933, which proved to be in close accord, both as to magnitudes and features, with the observed values.

"The method is fortunately even more useful for forecasting precipitation than for temperature," Dr. Abbot continued. "Its inexactness is believed to be due to the difficulty of forecasting irregularities in the appearance of sun spots, and allowing for their effects upon the phases of the component periodicities of variation."

Encouraged by his success in "predicting" past weather, Dr. Abbot has ventured a forecast of weather in Central India for the years 1942 to 1948. Basing his opinion on a well-known, clear-cut cyclic correlation there, he states that subnormal precipitation is probable for that region during the six years mentioned. He states, however, that he feels it would be "premature to make extensive forecasts of this character. I hope to press forward the investigation."

*Science News Letter, November 25, 1933*

## PALEONTOLOGY

## Monkey-Like Fossils Found in California

**C**ALIFORNIA fossil beds of Eocene time, 55,000,000 years old, have yielded the remains of two hitherto unknown genera of lemuroid animals, creatures resembling monkeys but lower in the scale of life. The finds were described by Prof. Chester Stock of the California Institute of Technology before the National Academy of Sciences.

One of them represents the latest representative of the primate family known from America. No representatives of this lemuroid group had hitherto been described from California; all previously known specimens being from the Rocky Mountain region.

*Science News Letter, November 25, 1933*