Periodicities in solar variation: C. G. ABBOT. Summary was made of the observations of the Smithsonian Astrophysical Observatory since 1895, including references to various new instruments for scientific work. Among them is the periodometer which has been employed to discover and evaluate periodicities in solar variation and in the temperatures of Clanton, Alabama, Washington, D. C., and Williston, North Dakota. The variation of the sun since 1918 is well represented as the sum of 7 periodicities, respectively of 7, 8, 11, 21, 25, 45 and 68 months. The temperature departures of the 3 stations named are also closely represented as the sum of these periodicities supplemented by two or three others which seem to be of terrestrial rather than of solar origin. However, at each station the sum of the amplitudes of the periodicities apparently of solar origin exceeds by about twofold the sum of the amplitudes of the terrestrial periodicities. This indicates that temperature departures are largely governed by variations of the sun, and holds out a hope of long period forecasts possibly extending for several years in advance. Further investigation must ensue before this hope can be thoroughly tested.

The nature of the solar cycle: W. S. ADAMS and S. B. NICHOLSON. The physical appearance of the sun varies from day to day as the sunspots, faculae and prominences develop and disappear on its surface. These phenomena may be distributed irregularly around the sun so that the number of objects visible at any time depends on the rotation period of the sun which approximates to a month. Their average monthly frequency, therefore, is an indication of the actual solar activity. The solar activity measured by this method fluctuates irregularly in cycles ranging from six to fifteen months and shows variations up to one fourth its mean value. The solar cycle which is most nearly periodic and which has the largest amplitude is of about eleven years' duration. This period may vary between nine and fourteen years and the amplitude of the cycle by about 50 per cent. of its average value. Period and amplitude are apparently unrelated. It seems probable that both the quantity and quality of solar radiation vary during this cycle and many attempts have been made to correlate terrestrial phenomena with sun-spots. Definite correlations have been found with the variations of terrestrial magnetism and its related phenomena. There is evidence of a slight correlation between sun-spots and atmospheric temperature in certain regions on the earth and with other factors of weather and climate for limited regions and for limited time intervals. These correlations are so uncertain that, in the majority of cases at least, predictions based on them have very little weight.

Correlation of sedimentary and climatic records: ISAIAH BOWMAN. The earliest studies of banded sediments were made to obtain measures of geologic time—measures akin to those of Michelson on the speed of light in that the end in view was a more accurate yardstick. Later on, the interpretation of sediments passed into a more advanced stage in which there was accomplished the cross-dating of banded clays of late glacial origin. The most noteworthy work upon them was done by De Geer in Sweden and by Antevs in New England. The latter demonstrated a rate of retreat of the ice in the Connecticut Valley of about a mile in twenty-two years over a period several thousands of years long. By comparing the lake deposits in series along the edge of the ice front the measured rate of retreat of the ice was determined. But up to the present all such datings are relative. That is to say, no one has yet found the bottom of the oldest deposit nor the top of the youngest. Nor has there been established a correlation between the banded clays of New England and the oldest trees. The clays are on one side of the country and the oldest trees, the Sequoias, are on the opposite side and the differences in climatic habit are wide. Because the lakes of the Great Basin have expanded and contracted in response to climatic change, one naturally turns to that region for a possible correlation between lake history and tree history to see if identical periods of wetness and dryness can be distinguished. Unfortunately, from this standpoint, the lakes of the Great Basin are and have been mostly salt lakes, whereas the banded clays that lend themselves most readily to the dating of events in geological time are formed in fresh-water lakes. A neglected field of study has been the sedimentation process. Until that process is studied in detail and correlated with rainfall, temperature, cloudiness and stream discharge, there is no solid experimental basis for the interpretation of sediments now exposed on basin floors in sections that are accessible. The drought of the past three years has exposed lake floors that have been covered with water for many decades and that have been exposed to view probably not more than once or twice since white occupation of the West. This makes it a matter of urgent importance that the studies of the now dry lake beds should be pushed with all speed before they again become covered with water and the sedimentary record of their fluctuations is again difficult to sample.

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