

## ASTRONOMY

# New Cycle of Sunspots May Begin in Next Few Months

**Solar Disc is Least Spotted Since 1923, Last Minimum Period of Famous Ten-and-a-Quarter Year Cycle**

**T**HE SPOTTEDNESS of the sun is at a low ebb. The old cycle of sunspots has nearly run its course. Any day now Mt. Wilson Observatory astronomers would not be greatly surprised to see on the sun's face the first of a new family of spots, the leader in a new cycle of spots to last nearly eleven years.

The sun continued to be nearly inactive in July and August, with only five spots all belonging to the waning cycle. In August the number of groups was lowest since 1923, when the last minimum in sunspots occurred. In September there was a slight increase in the number of spots but this was due, Dr. Seth B. Nicholson, Mt. Wilson astronomer, suggests, to a secondary and short-period fluctuation in the sun's spottedness, not to the beginning of another of the long cycles such as have been traced for centuries past in astronomical records and in natural phenomena such as tree rings.

## Few Spots This Year

Dr. Nicholson explained that the low level of solar activity may continue for several months and may even extend into 1934. The time between sunspot minima has been about 10¼ years and if the waning cycle is of that length, the exact time of minimum should be this month or next. The astronomers can not generally tell just when is the real turning point until some months after it occurs.

Sunspots are gigantic disturbances in the luminous layer or photosphere of the sun. The dark central part or umbra of spots varies in diameter from 500 miles to some 50,000 miles. The earth could be lost in the swirl of the larger spots. Sometimes the larger sunspots can be seen with the unaided eyes when the sun is dimmed in setting or when a shade glass is used in viewing it.

The German astronomer, Schwabe, in 1843 first discovered that the number of spots varies greatly in different years and shows an approximately regular periodicity of about eleven years.

Dr. George E. Hale, now director emeritus of Mt. Wilson Observatory, discovered that when the sunspots appear in pairs the leading spot is opposite in magnetic polarity to the following spot. The spots in the northern hemisphere of the sun are also opposite in sign to the analogous spots in the southern hemisphere. He also found that the sun is a giant magnet much like the earth in this respect.

## SOCIOLOGY

# Biologist Finds Multiplicity Of "Castes" Even in America

**H**UMAN SOCIETY has evolved many more different castes than have ant and termite societies. To Americans steeped in the idea that "all men are created free and equal," this may seem to be a statement more applicable to India or some other foreign land than to the U. S. A.

Nevertheless such is the finding of Prof. Raymond Pearl of the Johns Hopkins University, a leading biologist, who has prepared a new classification and code of occupations for use in analyses of social and economic conditions.

## Forces Affecting Population

In research in human biology, Prof. Pearl and his associates study such important factors as the death rate, the birth rate, and differential fertility. The new occupational classification which he discusses in *Human Biology* will permit a more thorough and penetrating analysis of the effect of social and economic forces as they influence our population. It is the first step in a systematic plan of research on population "castes" that is being undertaken in the Department of Biology of the Johns Hopkins School of Hygiene and Public Health at Baltimore.

At the beginning of a new sunspot cycle, the spots appear in high latitudes and the magnetic polarity characteristic of each hemisphere is reversed, and in this way astronomers now know that a new cycle is about to begin. Dr. Nicholson explains that the appearance of a new cycle spot will not mean that the exact time of sunspot minimum has arrived as the first spots of a new cycle often appear a month or two before the minimum.

Nearly every sort of earthly phenomena, from war, birthrates, and crop failures to magnetic storms and auroras, have been linked to sunspots by scientific enthusiasts. There is good observational evidence that sunspots and changes in the magnetism of the earth are related. The sunspot minimum now about due will have no real major effect on earthly conditions, astronomers contend.

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This new classification puts all occupations into three broad classes as follows: I. Owners, managers officials and professional men; II. Skilled and semi-professional workers; III. Laborers—unskilled and semi-skilled. The primary purpose is to contrast, for research purposes, two classes of persons, namely those in class I and those in class III. Class I persons are, on the whole, situated at or near the top of things in the existing social organization. Those in class III are at or near the bottom in the same social organization. This leaves the second class who are neither very near the top nor the bottom, who if they sometimes think themselves worse off than those in class I are plainly and admittedly better off than those in class III.

A tabulation of the male population of New York State on this new classification shows that approximately 21 per cent. of the gainfully employed males in New York fall in class I, and 29 per cent. in class III, leaving 50 per cent. in the intermediate class II.

In commenting on this new classification to a representative of Science Service, Prof. Pearl said: "While we hear a good deal of rather vague talk

and writing about social organization, there is need for more precise statistical description and analysis of the actually existing organization of society. Human society has actually evolved a great many more of what amount to differentiated castes than have ant or termite societies. But we know practically nothing about what proportion of our human workers castes are either optimal or necessary."

*Science News Letter, October 28, 1933*

## ZOOLOGY

## National Park Animals In Condition For Winter

**A**S THE TOURIST season ends in the national parks of the West, a general check-up shows that the wild animals given protection therein generally are facing the winter in good condition, after a favorable summer. One or two situations, however, are causing concern.

The superintendent of Yellowstone National Park has informed the national parks office in Washington that the forage available for the northern herd of Yellowstone elk is not adequate and that a serious situation may arise should the coming winter be a severe one. Contributing causes are a series of dry years that have resulted in a poor forage crop, and over-grazing caused by heavy concentration of elk just inside the northern park line at Gardiner, Mont., and in the Lamar River district of the park at the junction of the Lamar and Yellowstone rivers. As a matter of fact, both the northern and southern elk herds have increased to the point where there is a serious problem of furnishing sufficient winter feed.

Commenting on this situation, Dr. Harold C. Bryant, whose supervision of research and educational activities in the national parks includes wild-life problems, states that national park authorities are determined upon a policy of reducing the amount of artificial feeding, with particular reference to cottonseed cake. It is their purpose to get the elk, particularly the northern herd, back on a self-reliant basis so as to present typical wild elk herds to visitors and not animals semi-domesticated through feeding. This they hope to achieve through the acquisition of additional natural feeding grounds and the control in numbers that will result from normal winter kill when artificial feeding is stopped.

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## MINING ENGINEERING

# Mining Sulfur Under Water Hailed as Chemical Advance

**T**HE SUCCESSFUL mining of sulfur under water has just been reported as one of the outstanding chemical achievements of the year. This comes as welcome news in the face of information that many ideal deposits of sulfur are on the way to exhaustion. Credit for the practical application of the so-called Frasch process invented a number of years ago to vast deposits of sulfur under lakes and swamps in Louisiana goes to Lawrence O'Donnell, chemical engineer, and his associates.

### Unexpected Yields

Bravely begun during the depression, the project had to overcome economic as well as chemical engineering problems. The yields of sulfur have far exceeded the expectations of the engineers in charge of development and operation. Whereas a plant was built with the expectation of turning out perhaps 300 long tons per day it has reached a production of 1,400 tons and regularly produces 1,200.

The mining is carried out by sinking a shaft 700 feet below the bottom of a lake where a stratum of sulfur 200 feet thick lies. Pipes leading to the plant on the shore are sunk and the sulfur, liquefied by superheated water, is forced out by means of compressed air. To date 200,000 tons of sulfur of 99.92 per cent. purity have been taken from the wells.

Lake Peigneur, where the mining is being carried out, contains half a dozen small islands formed by the pressure of plugs of salt originating five miles down in the earth. The great pressure there causes the salt to become plastic and it forces its way through faults and fissures to a point below where the sulfur is found. Hence salt is likewise very profitably mined in this locality. In fact it is these "salt domes" that force the sulfur nearer the surface of the earth. Oil is also found in the capping rock and on the sides of the domes. The Gulf states are of course noted for their oil deposits.

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"DREADNAUGHT" DINOSAUR BROUGHT HOME CANNED

Broken into 20,000 pieces, so that it had to be packed in containers ranging in size from soup cans to five-gallon buckets, the skeleton of a "Dreadnaught" dinosaur, more elegantly known as *Paleoscincus*, is now at the American Museum of Natural History, being assembled like an immense jigsaw puzzle by Barnum Brown and his associates. *Paleoscincus*, as this restoration sketch shows, was built on the general basic specifications of a modern horned toad, but with vastly larger dimensions: length, 18 feet; breadth, 6 feet; height, 5 feet.