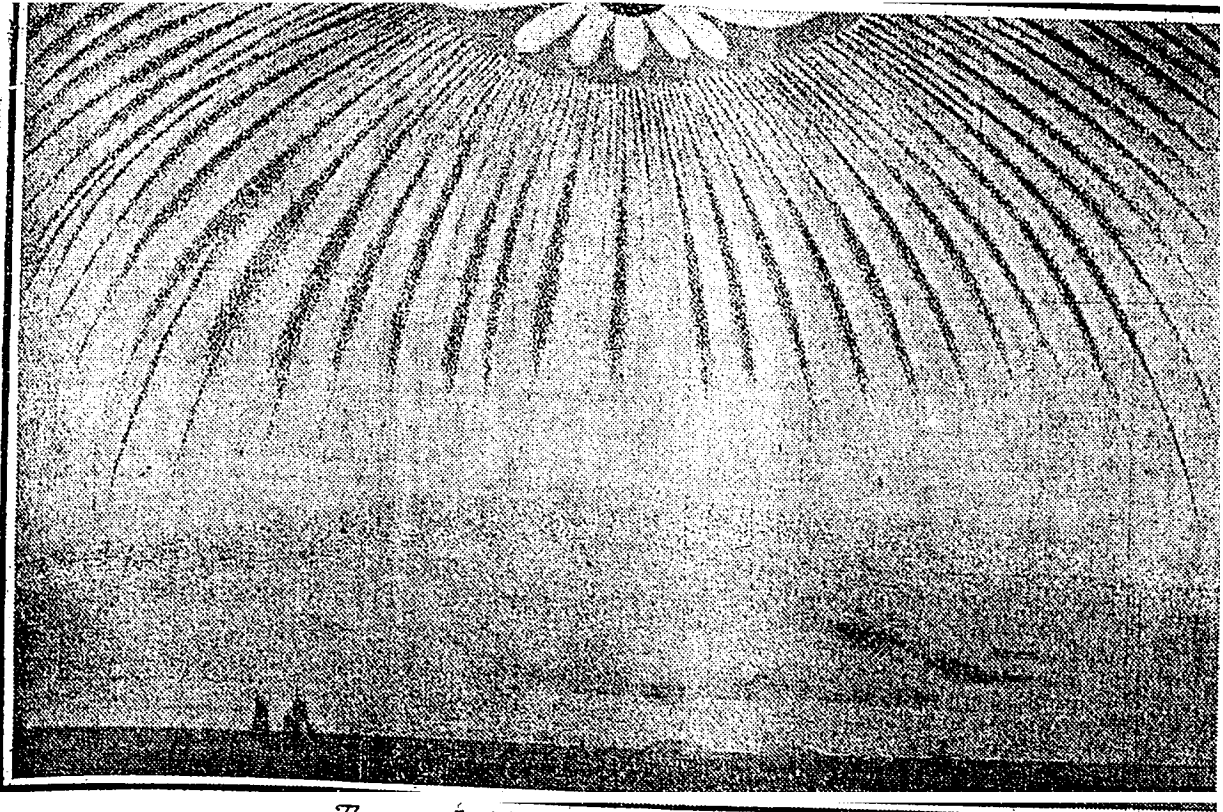
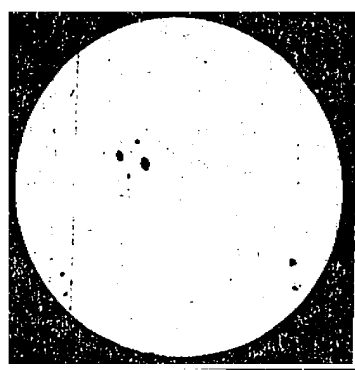
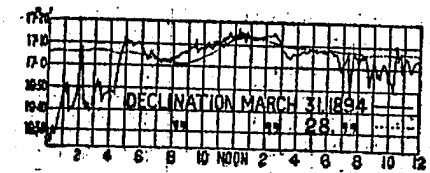


Electrical Disturbances Due to Spots on the Sun.

Volcanoes and Earthquakes Also Spring Into Action with the Passing of Dark Disks Across Old Sol's Face.



AURORA BOREALIS SEEN BY BOSSKOP IN LAPLAND IN 1838



SUN SPOTS AS SEEN ON NOV. 4

AURORA IN NORWAY Oct 16 1882

SPEAKING OF SPOTS ON the sun, perhaps you have made the thoughtless remark with several other millions of your fellows in the last week, "O, those spots? Well, they ain't keeping me awake nights! See?"

But if you are living in a place where earthquakes are likely to tumble things upside down, you aren't anxious to feel one, are you?

Or if you have a villa perched somewhere under the cone of a dead volcano, you wouldn't care to see a flood of red hot lava come streaming down upon it?

You would be scared if you thought a volcanic island might rise in a night in the track of a steamer on which you were a passenger, or on which you had friends, now wouldn't you?

Or if you were out deer hunting in the woods of the north and found your faithful compass needle dancing around and pointing almost any old way to or from camp, you'd be uneasy enough about getting back to supper and a bed, eh?

Sun Spots Cause Phenomena.

Therefore when a friend begins next time about the spots on the sun it's well enough to listen; for all of these phenomena, and perhaps a good many more that are undreamed of, are intimately associated with the existing spots on the sun; and already it is the theory of more than one savant that as our ancestors in the beginning of things were sun worshippers, so the tendencies of the present times in the light of science are to direct us back to that prehistoric form of worship.

As a result of these spots or of conditions allied to their existence in one way or another, there was the Mont Pelee disaster more than a year ago, and more recently Vesuvius has been scaring northern Italy; the Hawaiian Islands have been awakened to the unsettled condition of the Pacific's floor; and to the whirlpool effects of its surface waters; an earthquake in Persia has shaken some of the finest rugs in the world; Duluth, Minn., has been seeing a beautiful aurora borealis in the last week; on Nov. 2 the street railway power plant in Geneva, Switzerland, was tied up by the electric storm that swept the Alps country, and even the telegraph companies in the United States in the last few days have experienced some

almost unique difficulties in wire messages, while the wireless system has been completely hornswoggled.

Cross Sun in Twenty Days.

not done save when the spots are on the sun. You may say that the sun is 97,000,000 miles away, and repeat with Artemus War that the moon and the stars are all "up t their usual doins." But you will have t recall that the biggest of these spots on th sun is at least 10,000 miles across; that i requires about twenty days for such a spo to clear the face of the sun, and as a final, emphatic truth please remember that whei the sun gets such a black spot on his face i requires only eight minutes and sixteen sec onds for the effects to be seen by the tele scope and to be suggested by the antics of the magnetic needle and by the most worldl y type of the seismograph.

It is safe to say that the appearance of sun spots marks the throwing off of tremendous energy from the sun," said Prof. Philip B. Woodworth of Lewis Institute, president of the Chicago association of electrical engineers. "In the transmission of this energy in the direction of the earth it may be said that it takes the course of the electric waves which carry the wireless messages so recently discovered. Taking this course, it not only throws out the wireless system, but, broadly speaking, everything mundane is more or less affected by the magnetic storm which results. The magnetic needle is especially affected; here and there on the map telephone and electric lines operate well without the use of their batteries, or they may refuse to operate at all. And earthquakes, and volcanic eruptions, and displays of the aurora borealis may be expected for the present and for the next year, in all probability."

Recur Every Eleven Years

Prof. Woodworth referred to the eleven year periods at which these sun spots are due to appear on the face of that body and remarked upon the resulting phenomena in every case in recent years as being proof of their close relation to the appearance of these blackened areas, which are larger than a disk of our own planet.

Men and women of middle age will recall their impressions of one of the greatest of these sun spot periods, which, with the phenomena of the aurora borealis and the appearance of a great comet in 1859, suggested to the superstitious two years later that the two had presaged the coming of the civil war. In that year the aurora borealis was especially brilliant, presenting divers colors of the spectrum and seeming to break asunder from heavier masses of light to

travel across the northern sky, suggestive of the movements of armies. To the ignorant whites and blacks in the south it is believed to this day that these phenomena were forerunners of war.

According to these eleven year periods for the appearance of the sun spots and the accompanying earthly phenomena, these exhibitions since 1859 have been in 1870, in 1881, in 1892, and in the present year.

This does not mean that the phenomenon is to begin at a set relative period and cease in the same manner," said Prof. Woodworth. "Supposedly these spots are developed slowly and the outbreak of any of these phenomena may mark the tenth year in any one of these eleven year periods, and they may continue far into the twelfth year. For instance, Mont Pelee wrought devastation in 1902, and even with the phenomena of the present year we may have more of it in 1904."

Prof. Woodworth recalled the famous exhibitions in the western sky in the autumn of 1881, following the great earthquakes in Java and Sumatra. The twilights were extraordinarily long, the sky burning crimson, at times barred in appearance, and finally fading to a steady greenish white light before dark crept in.

Lights Frighten Whitechapel Club.

Scientists of the time concluded that these phenomenal lights in this western sky were due to the volcanic dust particles which had been thrown high into the ether, and upon which the light of the set sun was still reflected, long after it had dropped below the horizon.

As an incident of local notoriety, the sun spot period in 1892 had a seemingly suggestive bearing upon one of the most gruesome of gruesome actions credited to the old and discredited Whitechapel club. In those days Finley Pater "Dooley" Dunne was one of the coffin table members of the club. Early in April, 1892, a man on the west side shot himself through the head, turning his brain over by will to Dr. Harold N. Moyer, and specifying that after the brain had been removed the body should be cremated by the club.

But Dr. Moyer was out of town, and in reply to telegraphic news of his inheritance the doctor wired to the club that in using the revolver the testator had spoiled the specimen; but as far as the doctor was concerned the club might proceed with the cremation as if the brain clause had not been entered in the document. That night the club decided to proceed with the rites of cremation. There was a full attendance of the club—some of it exceedingly full—and, escorting the body to baggage car at the Randolph street station, he club and the corpse finally were dropped

Magnetic Storm Effect On Compass Needle

on the Indiana sands below Roby, where a funeral pyre had been built, and from which "Indian" Jaxon of the club made a wild speech, which in itself put several members of the club "to the bad." Then, when the incineration was completed and the gathering of the ashes was next in order, a sudden display of the aurora borealis, high in the sky and reflected in the lake, burst upon the already awed membership of the club! And for weeks after the club's return to Chicago the memory of the one time that it outdid itself remained with it with a persistency which no sun spot logic could dispute.

Aurora Borealis Electrical Phenomenon.

Once the aurora borealis was thought to be a reflection of the sunlight upon the ice fields of the arctic circle. Today, when a miniature aurora may be produced in a vacuum tube at the will of the electrical expert, it is declared to be an electrical phenomenon.

"To produce the light in miniature," said Prof. Woodworth, "the insertion of the positive and negative wires from a battery into each end of a Crookes tube is a first step. With air in the tube, however, no spark will pass from one pole to the other; to exhaust the air, on the other hand, is to cause a stream of light to flow from one pole to the other, this light taking on some of the colors that distinguish the aurora borealis."

Certainly it is safe to conclude today that the aurora borealis is an electrical phenomenon attendant upon the conveying of energy from the sun to the earth in electro-magnetic waves. As to its movements and its material relation to the earth and to the sun, perhaps nothing really is known. At the most it seems we can be certain that the magnetic storm is more likely to appear when the aurora are displayed, and in like manner that these northern lights are coincident nearly always with the appearance of spots on the sun. Thompson of England says of the aurora of Sept. 1, 1850, that they were observable over the entire globe and that there was a remarkable outburst of energy from the sun. Further, he says of the aurora that they are in greater frequency in periods of eleven and one-half years, which agrees with the cycles of maximum magnetic storms and of sun spots."

As showing the material effects of an electrical storm on the magnetic needle, an automatic diagram of the variations of the needle made at the Greenwich observatory on March 28 and 31, 1894, is interesting. Ordinarily there are variations of the needle according to the hour of the day, the greatest variation being recorded usually about 2 o'clock in the afternoon. This ordinary variation

for March 28 is recorded on the accompanying chart in a dotted line.

But the sun spot influences of 1892 are supposed to have been still active, and on March 31, 1894, the observatory was the center of a great magnetic storm which, according to the chart, swayed the needle east and west of north through one full degree, the line of its variations at times showing a dip and rise suggestive of church spires in outline.

Touching upon the general subject of electric phenomena at this time, there are some interesting small experiments which may be made in the household. A small compass will be necessary, or in some extraordinary conditions a fine needle may serve.

Household Experiments Interesting.

Take a pin in a house or flat where the doors are long in use and will take the iron pin upon which the hinge revolves, its application to the compass needle especially will show that the lower end of the pin is the north pole of a magnet, in that it will repel the needle point at the north and attract it at the south. This magnetizing of the pin, by the way, is caused by its having a vertical position and having been subjected to the friction of the hinge.

As another experiment, take up a small iron or steel bar, face north with it in your hand, point one end downward at the floor about a foot and a half in front of your toes, and strike the end of the bar sharply a number of times with a hammer or other piece of solid iron or steel. Then, to hold the lower end of this bar to the compass needle, it will be found that this end is the north pole of the magnetized bar and will repel it, while it will attract the other end of the needle. Reverse the bar, take the same position with it and strike the end again with the hammer and you will make this south pole the north pole. And quite as interesting as this, to drop the rod horizontally upon a floor or pavement, will demagnetize it altogether in an instant.

"The angle of 72 degrees at which this rod is held for the experiment," said Prof. Woodworth, "is the angle at which the compass needle naturally dips until it has been balanced to the plane of the dial. Thus the person who advises you to place your bed so that your head will point with the compass really tells you to sleep with your head down close to the floor with your feet in the air at an angle of 72 degrees."