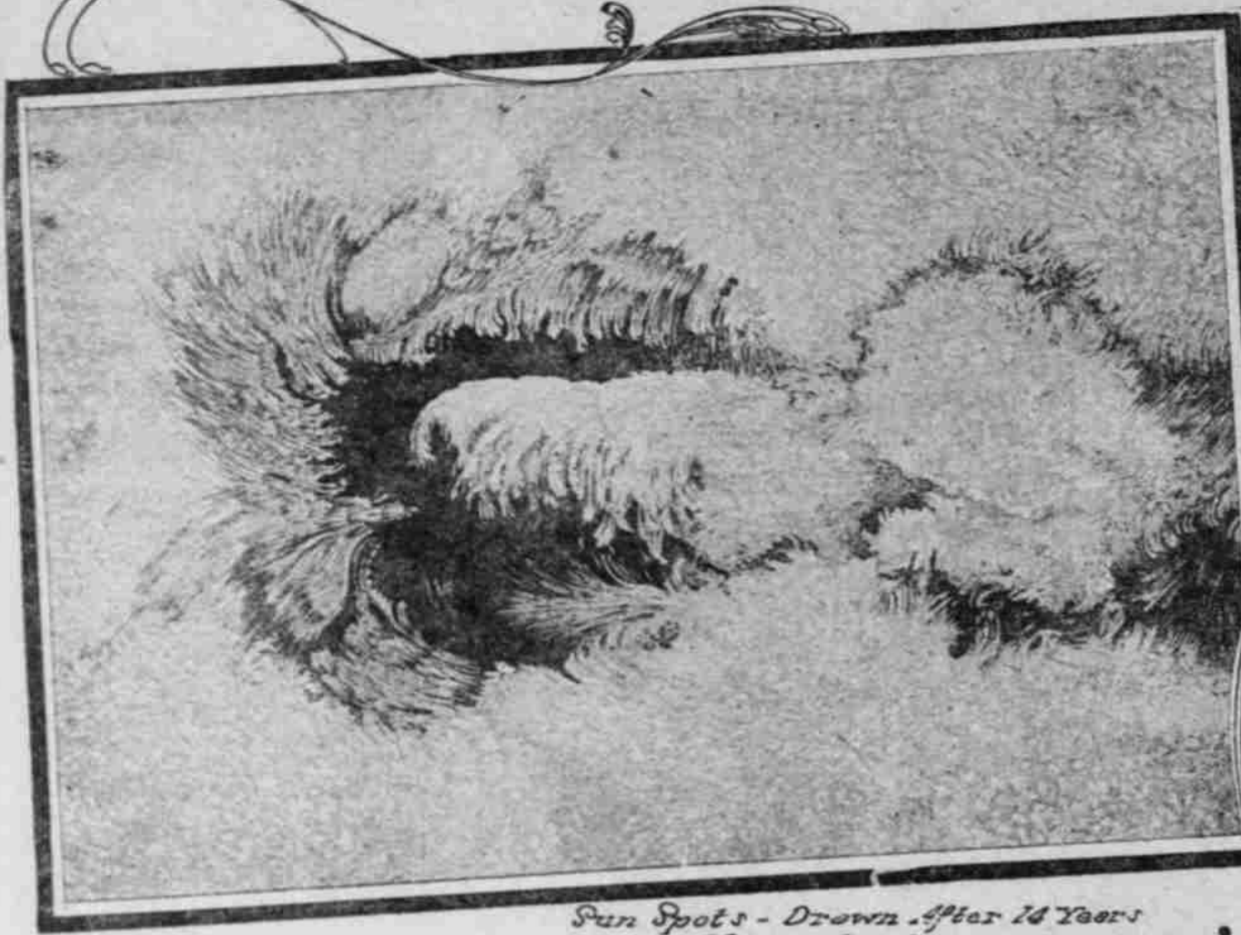
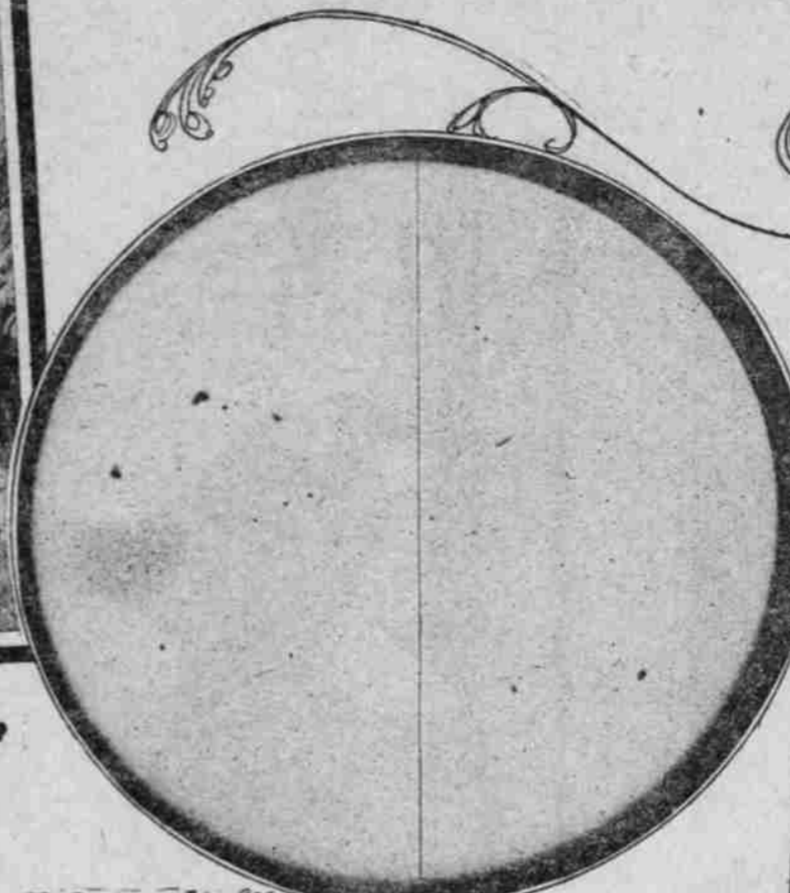


SCIENCE PROBES UNPARALLELED DISASTERS OF 1912 CAUSE OF DIRE TRAGEDIES SOUGHT BY EXPERTS.

Is the Climate of the World Changing?—Winters Becoming More Severe in Wide Area Each Year—
Extreme Cold Weather in the South, While Alaska and Arctic Regions Basking in Springtime Sun—
Floods Increasing Since 1900. According to Figures of Geological Survey—Great Drift of Icebergs
Much Earlier Than Usual—Scientists Discuss Reasons for Changing Conditions.



Sun Spots - Drawn after 16 Years Observations.

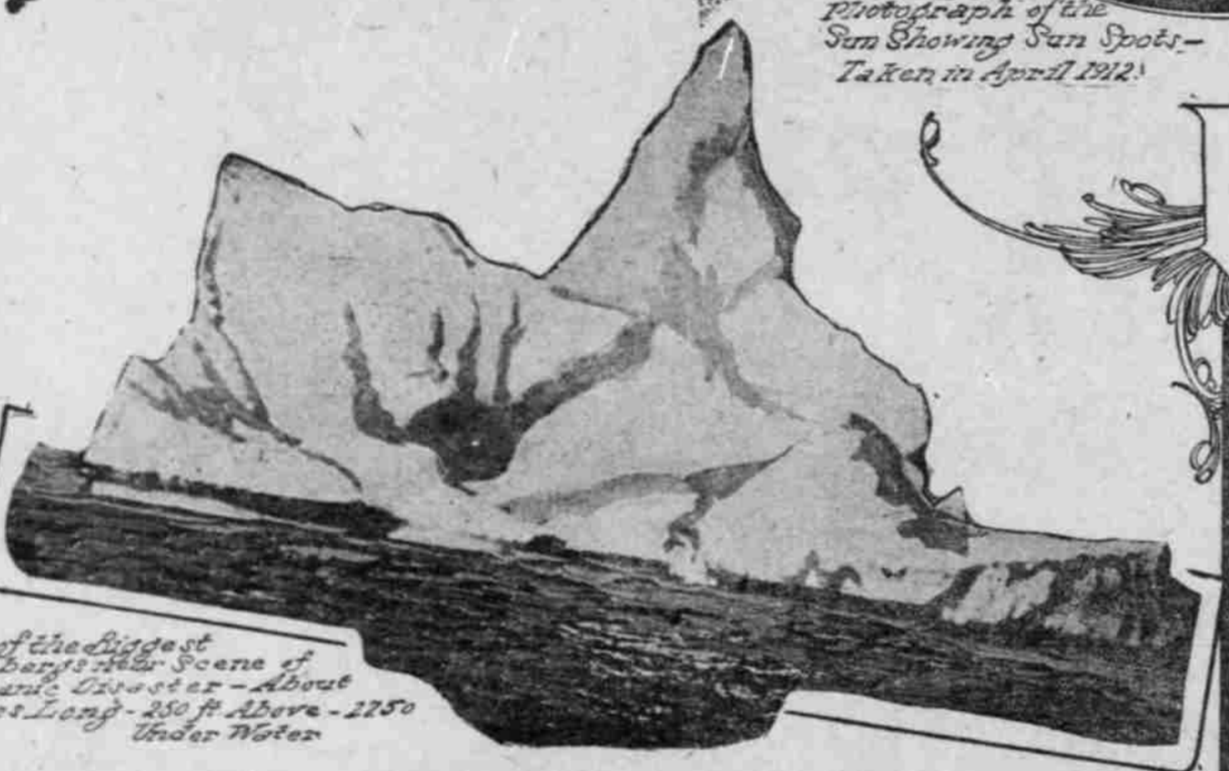


Photograph of the Sun Showing Sun Spots—Taken in April 1912.



Prof. H.C. Frankenkfield

One of the biggest icebergs ever seen of Titanic size—about 250 ft. long—250 ft. above—225 ft. under water.



Prof. Edward H. Bowle © 1912 by Edmonston

SO many peculiar and unusual changes have occurred on the earth's surface of late, involving great damage to property and vast loss of life, that the question naturally arises, What is the cause of these unprecedented disasters?

Are the winters becoming more severe? Is the climate of the world changing, with the extreme cold weather in the South last winter, while Alaska and the arctic regions were basking in a springtime sun? Are floods increasing? Is it becoming warmer in the polar regions, thus causing a greater drift of icebergs much earlier in the year than usual? Can the sun spots have anything to do with the unusual coincidence of unparalleled disasters?

Last winter was the most severe ever known in the greater part of the United States. This fact is established by thousands of complaints received by the Postoffice Department from its rural mail carriers in all sections of the country, together with statements of scientists who have made study of the subject. And just about the time when the cold was most severe in the States, it was reported from Alaska that they were having the warmest winter ever reported in the history of that territory. This peculiar fact of itself would stand out as altogether unusual. Some scientists claimed the switching of the warm Japan current was the reason for the warm weather in Alaska, but upon investigation this explanation was not found to be sufficient. And here is where the writer was first initiated into the mystery of the sun spots.

Every one is familiar with the recent extraordinary disastrous floods of the Mississippi River, resulting in millions of dollars of damage to property and the loss of thousands of lives. The explanation given for the cause of floods is that the Missouri, the Ohio, and the Mississippi Rivers were all in flood simultaneously—something that has never happened before in the century-long history of this Father of Waters. Then, to go back still further, it is said the floods ordinarily are due to the unprecedented fall of snow in the States through which these rivers flow, and that this great quantity of snow could not sink into the ground because of its frozen condition, but when the thaw came in the spring all of it melted about the same time and flowed into the rivers. When the scientists were asked what caused this great fall of snow they admitted they were up against it, that there was no known reason except it might be traced directly to the influence upon the earth's surface of other celestial bodies. This naturally brought up the question of the sun spots.

What is a sun spot?

What was the cause for such a great field of ice coming down from the arctic region so early in the year, and could this fact be traced to weather conditions in the arctic circle? All scientists said there must have been an unusually warm winter at the North Pole, and this warm weather covered the entire arctic circle. Such

a winter would naturally loosen thousands of miles of ice and eventually cause peaks to break loose from the vast ice fields of the North to seek their special mission of destruction as icebergs much earlier than usual. To get at the basic facts, the question was asked, What caused this warm weather in the arctic circle. Here again the scientists admitted it was a hard problem, and that the reason must be sought among the celestial bodies. This answer in turn ended with the usual reference to sun spots.

What is a sun spot? A good popular definition, divested of all technicalities, is a hole in the sun. Scientists describe these holes in the sun as having the appearance of an enormous crater of a volcano. This crater, or hole, is of such magnitude that the whole earth could be picked up and dropped into it without causing any commotion on the surface of the sun. Every one knows that the diameter of the earth is about 8000 miles. The diameter of one of these sun spots is about 250,000 miles. From this may be gathered something of their magnitude.

Some years sun spots are more numerous than in others. In fact, at times the surface of the sun appears entirely clear of spots. The sun spot maximum, as it is called, occurred about the first of this year, 1912. The minimum was during the Summer of 1903. The period of sun spot cycles is about 11 years. As we see the sun it rotates from east to west, but in reality it is rotating from west to east. Now, when a spot appears on the eastern edge and is brought forward by the rotation of the sun it becomes clearer and very often changes are seen to take place from day to day. Sometimes a spot is seen to rotate as if there were some kind of cyclonic or volcanic action going on. As the spot progresses across the surface of the sun, it usually breaks up into smaller spots until it finally disappears altogether.

The Sun Spots' Share.

It is generally known that the sun is an incandescent gaseous body rotating in space and at the same time also rotating upon its axis with a motion very similar to that of the earth. Revolution and rotation generate terrific currents upon the sun's surface, and it is also said to be the cause of the intense heat of the sun. All scientists agree there are constant upheavals and cyclonic motions going on similar to those on the earth's surface. As the hot matter is projected out into the upper layers of the sun's atmosphere, cooling off takes place, and this cooled material falling back on the sun's surface shows up as dark spots when seen through the telescope. This is the explanation of a sun spot, based on the records of 14 years' observations at the United States Naval Observatory near Washington, and these records in turn are based upon actual photographs of the sun taken every clear day during the year.

Now for the effect of the sun spots upon our earth. The spots seem to affect terrestrial conditions according to the time of the sun spot cycle. For instance, at the minimum period (1903) we get more even weather conditions on earth, but at the maximum period

(1912) magnetic conditions on earth are greatly changed. Suppose a sun spot is crossing the sun's surface during the maximum time, it is clear intensifies or electrifies conditions on the sun's surface. This, in turn, reacts upon the earth and causes cold waves and the most terrific thunder storms. There is little question but what the sun affects the earth magnetically, as there have been many cases traced directly to the Atlantic Ocean, with Edward H. Bowle is Uncle Sam's weather expert at Washington, under the direction of Professor Willis L. Moore. He made a day-to-day study of the peculiar weather combinations of last winter, and his explanation of these coincidences is full of interest. But in line with other scientists, Mr. Bowle acknowledges there must have been other causes at work, and reaches the conclusion that these other causes must be the magnetic influence of celestial bodies upon the surface of the earth.

Mr. Bowle Mystified.

"Most folks would say that the early coming down of the icebergs was due to the cold winter, but the contrary is the case," said Mr. Bowle. "Last winter in the arctic regions has been open and the icebergs started out earlier than usual because of this fact. They had a warm winter in Alaska, and it is only natural to assume that this warm weather extended over the Arctic Ocean and the region of Greenland. This, in turn, caused an early run of ice and was undoubtedly the cause of icebergs appearing off Newfoundland so early this year. It is impossible to conceive of any other cause. If there had been a cold winter the ice would have been thick and strong, and would have started out later than usual.

"Why there was such warm weather in the north and cold in the south, I must admit I don't know. During the winter months of January, February and March we had very stormy weather over the Atlantic Ocean, with exceedingly low barometric pressure, which is always a condition indicating cold weather in the United States east of the Rocky Mountains. What the storm brought about is not clear, but the air currents starting from the American continent flow out to the Atlantic Ocean and from there to the northwest and the Arctic Circle, and back again to the continent, thus bringing the cold air down to southern latitudes. The cold air in the British Northwest has been brought further south this year than ever before. This was because there was a deficit in the air mass over the Atlantic Ocean, and high barometer over Canada and the Northwest existed during nearly the whole of last winter, and this is something unusual. What brings this about, I don't know. Here, again, we must look for causes away from the earth's surface. The international charts or maps we have been using for the past five years have never shown such conditions for such prolonged periods of time. It is altogether unprecedented.

"I don't believe there is anything in

the story about the Japan current being the cause of warm weather in the Arctic and cold weather in the south. The Arctic regions will have just as cold winters hereafter as before. The great shifting of the winds last year may have had something to do with it. The winds over the Pacific Ocean extended farther inland and carried the warm air of the Pacific to the Coast States. This is an explanation for the warm weather in Alaska during January and February. But to get at the root of the matter and answer the question, What caused this great shifting of winds, you will have to look for that among the celestial bodies which undoubtedly exert a great influence on the climate of Mother Earth."

The Cause of Floods.

Professor H. C. Frankenkfield is Uncle Sam's flood expert of the Weather Bureau. He gave an interesting lecture regarding the floods in the Mississippi Valley, and the cause of the unusual conditions.

"The first great Mississippi River flood of which there is a record occurred in 1784, and it is said to have been the greatest flood in the history of the Middle Mississippi Valley," said the expert. "Unfortunately the records are somewhat clouded, and the present data of the flood of 1844 are now accepted as the high-water records for the Lower Mississippi and Middle Mississippi Valleys. This was remembered as the greatest of all floods until the changing conditions of the last 30 years have resulted in other floods that have much diminished its fame.

"The flood of the present year did not differ much from its predecessors, except that it set in about a month later than usual, January and February were cold. There was a fair supply of snow on the ground at the end of February, with a further increase during the first half of March. The first southwestern storm passed over the Gulf States and the Ohio Valley on March 11 and 12. At this time the lower Ohio and lower Mississippi Rivers were at high stages on account of an Ohio River rise in the earlier part of the month. On March 14 and 15, and again on March 20 and 21, southwestern storms again moved over the Gulf States and the Ohio Valley, attended by moderately heavy rains, but not by very high temperatures. On March 23 and 24 there was another, but this was attended by abnormally high temperatures and excessive rains, with a fall of snow over Missouri and Kansas that was almost unprecedented for the season. On March 28 and 29 there was another southwest storm, accompanied by high temperatures and heavy rains, and still another on April 1 and 2. The precipitation was from two to four inches in excess of the normal amount over the lower Missouri, the Ohio and the middle and lower Mississippi watersheds, and owing to the frozen soil, a much larger percentage than usual of the total amount must have run into the rivers, carrying with it the water from the melted snows, which over the Ohio watershed must have amounted to at least an additional half-inch. The Ohio River began to rise immediately after the passing of the first storm on March 11 and 12.

"Again it must be remembered that this flood of 1912 came from the Ohio



Flood Scene on West Virginia Near Marion, Arkansas.

River and its tributaries. It is true that the lower Missouri and the upper Mississippi contributed somewhat, but the great bulk of the water came from the Ohio. The Arkansas River was in moderate flood only, while the Red River was not at all high. It is also true that there is no record of a flood in the lower Mississippi River caused by simultaneous floods in all of the large tributaries. As a rule, whenever the eastern tributaries were in great flood, the western ones failed, and vice versa, but the possibility of a combined flood is always present, and, if such a flood should come the stages of 1912 would be exceeded."

Floods Increasing for 11 Years.

M. O. Leighton is another of Uncle Sam's flood experts in the Geological Survey. He has made many years' study of flood conditions in the United States, and according to his statement, floods have been increasing for 11 years. In speaking of the flood problem, Mr. Leighton said:

"You ask me if floods increasing in the United States? Yes. Present conditions are admittedly most unusual, floods of both the Ohio and Missouri rivers swelling the already heavy flow of the Mississippi itself, and this has created what will probably pass down in history as the worst flood of the Mississippi since the settlement of the country.

"Precipitation—either snow or rain—must ultimately take two courses, either along the surface of the ground directly into water courses or into the ground by percolation, with subsequent discharge into the rivers by seepage. The water which percolates which is not absorbed into the ground and which therefore must flow along the earth's surface.

"To go back a little. There are five classes of agencies or conditions affecting the flow of streams. The first is climate, under which are comprised rainfall, evaporation, temperature, wind and humidity. Although these are exceedingly variable from day to day and from season to season, the observations that have been recorded indicate that a period of years embraces all conditions, so that the mean of them may be considered fairly constant. There is very little evidence, except in

special areas, that reveals any progressive and permanent change in climatic conditions. The second agency is topography, and the third geology, both of which may be considered absolutely stable. The fourth is surface vegetation, which includes forest-covered and cultivated land. The fifth consists of artificial agencies, such as storage reservoirs and drainage, which produce rapid and marked effects on river discharge.

"When the physical condition on the drainage areas are summed up, the one great change that has been produced in the vegetative conditions is the reduction of forest area. On some of these drainage areas it has occurred by slow progression and on others more rapidly. It is certain that in some areas this forest cutting has caused barren conditions because the land was of such a character that after it was relieved of forest protection it eroded easily and its productive portions were quickly swept into water courses.

"Summarizing, it may be stated with confidence that the increase in flood tendency shown so unmistakably is due in a large measure to the denudation of forest areas."

An interesting fact in connection with this subject is that the climate of the world was originally equable all over the surface of the earth, and differed very little between the equator and the poles. The glacial period from which we are just now emerging is the only exception, and represents a very small part of the earth's history, probably about 10 per cent. We are beings took up their habitation a warmer or more equable climate. The glacial era commenced 500,000 years ago. Some authorities estimate the end of that period, the time when ice disappeared altogether from the eastern part of the United States, and human beings took up their habitation as late as 30,000 years ago.

Glaciers are retreating at a fast rate in Alaska right now. Very often places can be found in the Arctic Circle, from which the glaciers have receded within a very short time, and vegetation has not yet had time to cover the spaces formerly occupied by ice. Scientists say that in the last few years there

has been a decided increase in the rate at which the glaciers are disappearing. Now, to return to that interesting subject—sun spots. For nearly 200 years the scientific world has been familiar with spots on the sun, discovered almost simultaneously by Galileo, Fabricius and Scheiner. Galileo is credited with the first discovery by telescope of sun spots, in October, 1610. Fabricius followed closely after in December of the same year, and only a few months later, in March, 1611, Scheiner made the same discovery. All were original discoverers, as each worked in entire ignorance of the labors of the others. As Fabricius was the first to publish his discovery in June, 1611, the discovery is credited to him, although the other two are entitled to equal honor.

As large sun spots are visible to the naked eye, many were no doubt seen before the invention of the telescope. The records of the Chinese afford evidence of such observations. These spots are often of enormous extent, covering sometimes millions and even billions of square miles, one having been measured showing an area of 25,000,000,000 miles. They generally appear as small points, and enlarge rapidly until they attain their maximum, and after a comparatively short period, ranging from a few days to several months, fill up and disappear. They are mostly confined to the part of the sun's surface corresponding to our torrid zone, or rather to two zones, one on each side of the equator. These zones of maximum sun spots, hot out each way, so that very few are found within 10 degrees of the equator or 30 degrees north and south of it. These spots are dark at the bottom and partially light at the edge, extending to the depth of thousands of miles. The upland or plane in which these volcano-like openings appear is called the sun's photosphere—that is, the incandescent surface which sends forth light and heat. But immediately below this photosphere is another stratum composed of the same substance, but at a lower temperature, and still lower is the nucleus or body of the sun. The spots are variable in size and direction. (Copyright, 1912, by William L. Alderfer.)