SCIENCE NEWS

Science Service, Washington, D. C.

SUN SPOTS

STORMY weather on earth, though it has laid whole states waste, is as nothing compared to what is happening on the face of the sun right now. If you will take a piece of well-smoked glass, or a couple of old photo films, and look at the sun, you will see a huge freckle near the middle of its face.

That freckle is an enormous sun-spot, representing a pair of fiery tornadoes that darken a strip of solar territory 100,000 or more miles long, and 50,000 miles wide at the widest part. Into that vast cloud half-a-dozen earths could be dropped at once, and still leave room for them to rattle around.

The spot has been studied and photographed, since its first appearance around the edge of the rotating sun about a week ago, by Mrs. L. T. Day, astronomer at the U. S. Naval Observatory. It first showed up on her photographic plates on October 5, and was due to disappear around the opposite side of the sun about October 18 or 19. If it lasts through another rotation of the sun, it should reappear about November 2.

There is some suggestion that this spot was "budding" a month ago, Mrs. Day said. There was a small spot in about the same position on the sun's face on September 16.

Sun-spots are an indication of intense activity on the sun, which is often reflected here on earth by magnetic storms. These storms are unobserved by human beings, because our senses have no way of perceiving magnetic changes. But they do affect us just the same, because they seriously interrupt telegraphic and radio communication, and are frequently accompanied by flaring auroral outbursts.

There was a magnetic storm at the time the smaller spot of mid-September crossed the sun's meridian or central line. Already, the present spot has signalled its coming, with minor upsets in communications on October 8 and 9.—FRANK THONE.

NEW COSMIC RAY STUDIES

TREMENDOUS bursts of atomic energy, caused when cosmic rays come down to earth, may scatter atomic débris over a room some 65 feet on a side, it is concluded in new cosmic ray studies announced in the current issue of *Nature*.

Physicists of the University of Manchester, Drs. L. Jánossy and A. C. B. Lovell, report studies in which they made cosmic ray bursts, or showers as they are called, take their own pictures in a cloud chamber. Only when cosmic ray particles set off "trigger" mechanisms placed over 15 feet apart were photographs of the tracks taken.

It is estimated that some of the bursts of atomic catastrophe contained 30,000 separate tracks. They conclude that the total energy of a single burst could be as high as 10,000,000,000,000,000 electron volts. This energy, of 10,000 trillion electron volts, far surpasses any efforts of man to create high energy with machines. The peak energy now obtained from atom-smashing machines like cyclotrons is less than 15,000,000 electron volts. Even the great cyclotron now being built for Professor E. O. Lawrence at the University of California will yield particles having energies of only 50,000,000 electron volts. At 10,000 trillion electron volts, the cosmic ray energy is something like a billion times greater.

SOUND REPRODUCTION

A NEW method of sound reproduction that combines the advantages of mechanical recording and optical reproduction for talking motion pictures has been developed by a Dutch inventor and laboratory scientists of the N. V. Philips Gloeilampenfabriken of Eindhoven, Holland, the European electrical equipment manufacturer, has been reported to the Society of Motion Picture Engineers of New York.

Invented by J. A. Miller, the new method uses a wedge-shaped cutting tool to remove varying portions of a black-coated film, leaving a transparent sound track suitable for reproduction in precisely the same manner as the more conventional photographically-recorded motion picture sound track.

Advantages claimed for the system include freedom from ground noise, a difficult problem with ordinary optically-recorded sound tracks; possibility of playing back the sound track immediately without further processing, a matter of advantage on the studio set; and freedom from fogging, another difficulty with which recording engineers must deal.

The special sound track used for making the record by the "mechanographic process," as this has been named, consists of an ordinary film base covered by a layer of gelatin 60 microns thick topped by an opaque black coating. The wedge, whose shape is so calculated as to give an amplification of 40 times, digs more or less deeply into the film in accordance with the frequency of the sound being recorded. But since the tool is wedge-shaped, it also cuts a wider or narrower furrow. The portions from which the black coating are removed are thus transparent, giving a black-and-white track a photoelectric cell and amplification equipment can convert into sound.

Freedom from ground noise comes from the fact that ordinary photographic grain does not occur and the opaque coating is solidly black. The record is ready for playing back within a quarter of a second; a motion picture director, therefore, can thus replay anything he wishes immediately to see how it sounds. If he doesn't like it, he can record that passage over again on the spot.

Mr. Miller hit upon the principle in 1931. He then asked the Philips laboratory for aid in developing the invention, now known as the Philips-Miller system, to practical usability.

THE NEW CARTRIDGE STATIC SUPPRESSOR

A SUPPRESSOR which banishes almost completely the menace of radio static to America's commercial airliners has been developed by engineers of United Air Lines.

Marking a major advance in aviation's war on static that has in the past made vital radio reports and navigation aids useless at times, the suppressor consists of a spring cartridge that fires a five-foot trailing wire out behind the ship. This wire, by providing a fine point from which static electricity charges that gather on the plane may be discharged, cuts out all but five per cent. of the static when it is used in combination with the antistatic loop antenna. This antenna has been standard equipment on American aircraft for about a year. The line's planes are being fitted with the device as they pass through the company's shops at Cheyenne, Wyo.

The unique part of the set-up is the spring cartridge which fires the wire out when it is required. Trailing antennas are not new in aviation, but all previous ones have used a small cloth sleeve that catches in the air stream to help pull them out. This wind sock, as it is called, unfortunately means that there is no fine point in the system from which the static electricity may be discharged.

Paradoxical as it may seem, aviation's advance is in some respects to blame for the necessity for such a device. Improved streamlining has eliminated the sharp points from to-day's airplanes. But the old ships which did have the sharp points didn't make the extensive use of radio that now characterizes aviation. The cartridge is fixed at one end of the horizontal stabilizer on the tail surface. It is "fired" by the pilot by throwing a switch when static gets bad enough to warrant its use. Throwing the switch shunts the entire load of the plane's battery into the trigger mechanism, burning out a fuse that sets the trigger off.

About $30,000 was spent in the development of the device. Among those playing a leading part in the work were Professor R. H. George, of Purdue University, and Herbert Hucke, then superintendent of the line's radio laboratory and now with the Civil Aeronautics Authority. It was flight tested on a Boeing 247D 10-passenger transport converted by the line into a flight research laboratory. The plane literally bristles with this antenna and nearly a dozen others of several different types. The cartridge is about six inches long and two inches in diameter.—LEONARD H. ENGEL.

AMEBIC DYSENTERY

THE lives and health of millions of people in this country are endangered by the germs of amebic dystentery, was reported recently at the Duke University medical symposium. Amebic dysentery was a matter of nation-wide concern when an epidemic of it, causing many deaths, afflicted visitors to the Chicago World's Fair and residents of the city in 1933.

According to a statement made by Dr. Charles Franklin Craig from 5 to 10 per cent. of the population of the country is infected with the germ or parasite of this disease. In some parts of the country from 30 to 40 per cent. of the population is infected with this germ, *Endamoeba histolytica*. Liver abscess, resulting from this infection, may affect from 300,000 to 600,000 persons in the United States, Drs. Alton Ochsner and Michael DeBakey say as a conservative estimate.

Since liver abscess represents only about half the complications of the condition that require surgical attention, it is estimated that from 500,000 to 1,000,000 persons may be affected by surgical complications of the infection. The figures do not, apparently, account for countless other persons who may have complications requiring medical treatment.

Appendicitis, massive hemorrhage, perforation of the intestines with resulting peritonitis, brain abscess, spleen abscess, lung affections and skin ulcers and abscesses are a few of the twelve conditions, including liver abscess, that are listed as complications from infection with this parasite.

The vast majority of these infections are not accompanied by symptoms of dysentery, Dr. Craig pointed out. Dysentery is characteristic of serious infection, but most infections have with *Endamoeba histolytica* milder symptoms which are generally mistaken for signs of some other condition. To avoid confusion, the infection should be called amebiasis and not amebic dysentery.

The infection is by no means limited to the tropics and while it is most prevalent in the southern states of our country, enough occurs in the North so that public health officials and physicians should be on the look-out for it and should plan control measures. Liver abscess following amebiasis occurs chiefly in adults and chiefly in men. The latter fact may be accounted for, it has been suggested, on the grounds that alcoholism, which predisposes to liver inflammation and injury occurs more often in men than women.

SULFANILAMIDE

SULFANILAMIDE, new chemical remedy that has already saved thousands of lives threatened by pneumonia, meningitis, childbed fever and streptococcus infections, is to be used next in a major offensive against blindness, especially among children. This developed at a conference in Washington of eye specialists with medical officers of the U. S. Bureau of Indian Affairs.

The particular form of blindness to be attacked by sulfanilamide is that which results from trachoma, the contagious eye disease that afflicts between 2,000 and 3,000 new victims each year in the United States. About 17 out of every 100 persons who get trachoma go blind. Quarantine regulations forbid the entry into the United States of any person suffering with trachoma, but cured cases are allowed to enter.

Dr. Fred Loe, of the Indian Bureau, stationed at Rosebud, S. D., reported that out of 140 trachoma patients treated with sulfanilamide, 114 were apparently cured. Other eye specialists have reported similar encouraging results, especially in acute stages of the disease. Dr. Loe says it is too early to call these cases "sure cures," because there may yet be relapses, but symptoms of the disease have disappeared in the patients treated and those not already permanently blinded can see again. One 47-year-old man reported he saw more than ever before during his entire life.

Encouraging results with sulfanilamide treatment have led to plans for its large-scale use among Indians, of whom some 30,000 suffer from the disease. As soon as arrange-

ments can be made, probably by November 1, sulfanilamide treatment will be started among all child victims of the disease at the Tung River, Mont., Indian Reservation. At one school of 130 pupils there, 84 cases of trachoma have been reported. Children with trachoma at other Indian schools will be given the treatment as soon thereafter as arrangements can be made. The schools at Chenawa, near Salem, Ore., and at Fort Defiance, Ariz., are slated for inclusion in the drive on trachoma with this new weapon.

Adults are not being neglected, but the drive is being started among children because they can be reached through the schools and given continuous treatment there, and also because there is some tendency for the condition to "burn itself out" in older patients.

Trachoma, recognized by Egyptian doctors centuries before the Christian era, is more wide-spread among Indians than whites in the United States. Navajo Indians are particularly afflicted with it. The condition starts with little soft lumps on the eyelids. Inflammation, discharge and a thick fleshy film growing over the eye follow. This film blocks vision, and the scars it leaves when it subsides may cause permanent blindness.

FOREST FIRES

FOREST fires like the great conflagration now raging on both sides of the U. S.-Canadian border near the head of Lake Superior, can kill men and animals long after the last red embers have died out and new green growth has begun to hide the wide black scars. How this delayed death can come to burned-over timber country is told in the forthcoming issue of the *Journal of Forestry*, by Hoyes Lloyd, superintendent of wildlife protection in the Canadian National Parks.

In past years, great forest fires of unknown origin devastated large areas in northern Ontario. When new growth came in, it was not the same kind of trees that had been burned, but a vegetation type representing an earlier stage in ecological succession. This is usual after forest fires.

The new vegetation, in its turn, supported an entirely different array of animal life; it was the home of deer instead of the caribou that had dominated the animal community of the burned forest. Some have said that the caribou migrated, but Mr. Lloyd believes that the animals that survived the fire simply failed to reproduce, and that the caribou just weren't anywhere any more.

On the caribou a population of Indians, estimated at 10,000, once depended for their principal food supply. These Indians were fairly prosperous, and it was profitable for the whites to operate trading posts among them. After the caribou vanished, however, starvation among the Indians became the rule rather than the exception. Their population dropped to a tenth of the original number and their prosperity vanished. The trading posts had to be closed.

The story is the same in other regions, Mr. Lloyd declares. Where "big woods" are burned, "little woods" take their place, and their game population is quite different. It is usually dominated by deer. But if the fire follows logging-off operations the burning is apt to be repeated several times, and the scanty vegetation that comes in is so little able to support animal life that the region becomes comparatively a biological desert.

ITEMS

To Dr. Francis A. Jenkins, associate professor of physics at the University of California goes the honor of making the first scientific use of the giant 225-ton atom smasher cyclotron here, it is announced. Designed to smash atoms and produce radioactive elements in quantities sufficient for biological experimentation, the new cyclotron is still four or five months away from first tests of its atom-smashing ability. But Dr. Jenkins employed its powerful electro magnets, now finished, to generate a strong magnetic field and make studies of the splitting of spectral lines by the field.

CIVIL engineers will build a suspension bridge span over two miles long if and when there is a demand for it, and enough automobiles to pay for its construction through tolls. Such a bridge would dwarf the present giant 4,200-foot span across the Golden Gate at San Francisco. This prediction was made at the Rochester meeting of the American Society of Civil Engineers by D. B. Steinman, consulting engineer of New York City.

ALUMINUM ore deposits that rank among the largest in the world are among the things that give Hungary outstanding importance in Europe's present state of military and economic turmoil. Professor Quentin D. Singewald, of the University of Rochester, describes these bauxite beds in the November issue of *Economic Geology*. Although the ore bodies were discovered in 1915, they were not worked until recently. Production was negligible before 1932, yet it reached nearly half a million tons in 1937, and is now pressing close upon the bauxite production in France, for some years the world's outstanding leader.

A SHORT-CIRCUITING operation to relieve chronic watery eyes was reported by Dr. William H. Stokes, of Omaha, Nebr., at the meeting in Washington of the American Academy of Ophthalmology and Otolaryngology. When infection or inflammation permanently blocks the tube through which the tears naturally leave the eye after bathing it, Dr. Stokes cuts a new opening from the tear sac into the nose. The operation is not new, but Dr. Stokes has improved it by placing the short-circuit higher than has been customary before. In this way he uses more of the normal lower end of the tear sac and upper end of the duct. The result is closer to nature's own tear drainage arrangement.

IN the German popular science journal, *Die Umschau*, Dr. Werner Hofmann, official food chemist of the Bakeries Institute in Berlin, tells of his efforts to find replacements for the fats now used in the baked-goods industries, and to reduce the total quantities used. Among the substitutes he mentions peanut oil, palm oil, soybean oil, even whale-oil. It was necessary to harden all of them by hydrogenation before passable results could be obtained. Soybean oil, from which great results were anticipated, proved especially disappointing. The oil has a persistent, strong, "beany" taste; also it tends to come out on the crust, making the products "greasy and messy."