by Charles F. Wagner and Gilbert D. McCann, Westinghouse engineers, the device is essentially a motor and a slotted aluminum wheel filled with laminated permanent magnet steel, projecting like fins from each side of the wheel and rotating through two coils which carry the total surge current from the lightning stroke being measured.

As the small fins pass between the magnetic field of the coils they are magnetized in proportion to the amount of current that is carried by the lightning stroke in time intervals as brief as 40 millionths of a second.

The fulchronograph gives a schematic picture of the wave shape and surges in a single lightning stroke. This is compared with the wave shape and surges created by artificial lightning bolts in the laboratory, and can be used to improve the protection of exposed power circuits.

First lightning stroke actually measured by the new device was found to last one-sixtieth of a second and showed a maximum current of 21,000 amperes, or enough to light 40,000 ordinary light bulbs.

Science News Letter, July 29, 1939

MEDICINE

Sulfanilamide, Wonder Drug, Now Cures 33 Diseases

Only in the Battle Against Common Colds and Influenza Are the New Chemical Remedies Apparently Valueless

THIRTY-THREE different disease conditions may now be cured by the new chemical remedies of the Protonsil-sulfanilamide-sulfapyridine group. In addition, these chemicals may be effective in preventing some of the ailments. Only in the treatment of colds and influenza are they apparently valueless.

The whole story of these amazing, new chemical remedies, what they can do, how they should be used, and their dangers is told for the first time by Drs. Perrin H. Long and Eleanor A. Bliss, of the Johns Hopkins Medical School, in a book just published for medical scientists by Macmillan. Drs. Long and Bliss were among the first to use these wonder-working remedies in the United States.

There are now, according to this book, eight drugs in the sulfanilamide group. They are: sulfanilamide itself, known also by the trade names of Prontylin, Streptocide, Prontosil Album and Lysococcine; Prontosil, also called Prontosil Flavum; Neoprontosil or Prontosil Soluble; benzyl sulfanilamide, also called Septazine and Proseptasine; sulfanilyl sulfanilamide, with the trade name of Disulon; sulfanilyl dimethyl sulfanilamide, called Uliron and Uleron; sulfapyridine, with the trade names of M & B 693 and Dagenan; and another compound known only by its chemical name 4,4′diaminodiphenylsulfone.

Sickness caused by two kinds of streptococcus germs, by the gonococcus, the meningococcus, and the pneumococcus has been successfully treated by these remedies. Recoveries from undulant fever, chancroid, typhoid fever, urinary tract infections, gas gangrene, chronic ulcerative colitis, trachoma, malaria, and the skin diseases, pemphigus and lupus erythematosus, have also been reported following treatment with one or another of these chemicals. In malaria, typhoid fever and undulant fever, the value of the chemicals has not yet been conclusively proved. Not many cases have been treated. Some doctors report good results and others poor results in these conditions.

Sulfanilamide, now used successfully as a remedy for childbed fever and gas gangrene, may become even more of a life-saver through use as a preventive of these serious illnesses. Drs. Long and Bliss believe any patient who suffers an injury which might result in the development of gas gangrene should be given prophylactic doses of the drug as soon as possible. Sulfanilamide also shows some promise of helping in the fight against rheumatic fever, the childhood ailment which affects the heart and causes many deaths among young people.

"Probably the greatest single instance of the misuse of sulfanilamide is in the treatment of the common cold," Drs. Long and Bliss declare. They explain that since colds and influenza are due to viruses, not bacteria, "there is little reason to believe that sulfanilamide will be of any value in the treatment of these diseases, and we strongly advise against its use in these infections."

So far, all that is definitely known about how sulfanilamide achieves its cures is that this and related chemicals inhibit or check the growth of susceptible germs. A number of theories explaining the action of the chemicals in more detail have been proposed but, in the opinion of Drs. Long and Bliss, none of the theories adequately explains the action of the drugs.

Sulfanilamide and related compounds are not without danger. Stones in the kidneys are the most recently reported ill effect to follow one of these drugs, sulfapyridine. Few deaths, however, have followed the use of these drugs, except for the 76 or more which followed the tragic use of Elixir of Sulfanilamide Massengill. In these it was not the sulfanilamide but the deadly diethylene glycol, used as a solvent, which caused the fatalities. If proper precautions are taken in caring for patients receiving sulfanilamide or related drugs, serious ill effects will be noticed at their beginning, Drs. Long and Bliss state, and measures can be taken to lessen their severity and prevent a fatal outcome.

Science News Letter, July 29, 1939

ENGINEERING

Gas Turbines Practical In Generating Power

AN OLD DREAM of getting useful power from the direct expansion of burning gases without the bother of cylinders and pistons, fuel injection, and even cooling water is coming true practically. For over a century the turbine propelled by gas has been discussed; now it is coming into power-generating use.

Over a dozen gas turbines are now in actual use or being built here and in Europe. Power engineers are eyeing them with great interest and anticipation.

Just as steam in a steam turbine drives steel blades on a rotating shaft, delivering power without the reciprocating motion, so hot gas whirls the blades of the gas turbine.

It will not outmode immediately steam turbines, steam engines or Diesel and other internal combustion engines. But for special uses the gas turbine has great promise.

Because it needs no water for cooling (steam plants often need a thousand tons of cooling water per ton of coal burned) it is ideally fitted for operation away from rivers in arid areas, such as south-

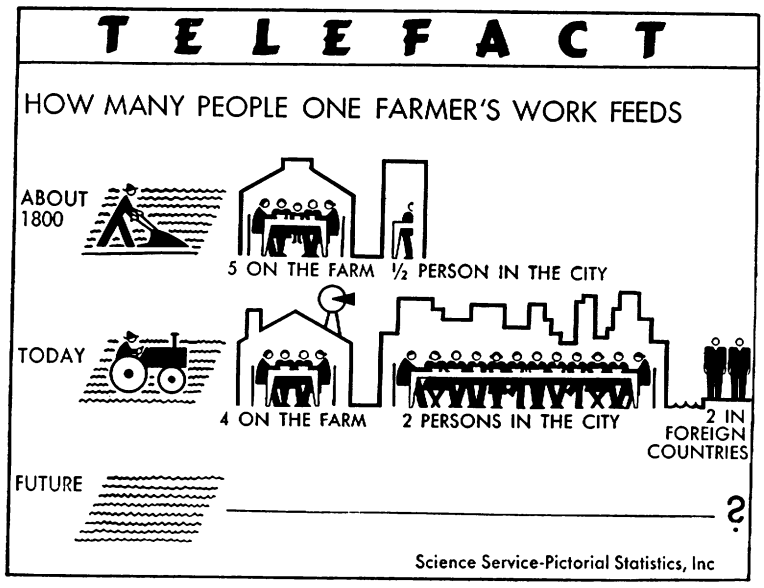
western oil fields where waste gas is plentiful and water scarce.

For Neuchatel, Switzerland, a large gas turbine is being built for emergency use. It will be installed in a rock tunnel where bombs cannot hit it. Its small size and use of air for cooling make this practical. A 2000 horsepower gas turbine locomotive only 60 feet long is being constructed for the Swiss Federal Railroad.

In this country gas turbines have been in use for over two years running on waste gases from oil refining with such success that more have been ordered for such use.

Dr. Adolph Meyer of Brown Boveri Co., Baden, Switzerland, has been the leader in gas turbine design and production, while Allis Chalmers Mfg Co., Milwaukee, is building them in America.

Science News Letter, July 29, 1939



PUBLIC HEALTH

Control of African Sleeping Sickness Promised

AFRICAN sleeping sickness, dreaded plague of tropical Africa, is rapidly being conquered by the chemical remedy, tryparsamide, and will probably soon be under "satisfactory control." This progress and the encouraging outlook for the future is reported (*Science,* July 14) by Dr. Louise Pearce, of the Rockefeller Institute for Medical Research at Princeton, N. J. Dr. Pearce was the first to show the beneficial effects of this drug on sleeping sickness cases in the Belgian Congo.

African sleeping sickness is caused by a germ called the trypanosome which is carried by the tsetse fly. It is a highly fatal disease, not to be confused with the encephalitis popularly called "sleeping sickness" in the United States and European countries.

The great value of tryparsamide over other drugs used to treat the ailment, Dr. Pearce points out, is that tryparsamide is effective as a cure in both early and late phases of the infection. Since it has been used in mass treatment the number of sleeping sickness cases has dropped markedly in various African colonies where efforts are being made to stamp out this age-old plague.

Other public health measures, directed against the tsetse fly and against uncontrolled movements and concentration of populations, are also playing a part in bringing the disease under control, but chief credit, Dr. Pearce indicates, belongs to the drug which cures patients and cuts down human sources of infection.

Science News Letter, July 29, 1939

BOTANY

Fleeting Chemical Discovered Necessary in Plant's Life

Finding That Wheat Seedlings Continue To Use CO_2 After Darkness Showed Intermediate Chemical Is at Work

DISCOVERY of a chemical that allows the green plant to inhale waste carbon dioxide out of the air was announced by the Smithsonian Institution.

This hitherto unsuspected substance is a go-between for carbon dioxide and chlorophyll, green coloring matter of plants. It seizes a molecule of carbon dioxide and delivers it to the chlorophyll. It is therefore one of the most important substances on earth as without it sunshine energy could not be trapped in vegetation.

Dr. E. D. McAlister, biophysicist of the Smithsonian Institution, was the discoverer during extremely delicate measuring of the amounts of carbon dioxide used by wheat seedlings. He found that plants continued to use carbon dioxide for a short interval after they had been plunged into darkness, which was contrary to conventional ideas about photosynthesis. He concluded that some intermediate chemical was playing an essential role.

The existence of the new chemical basic to life was thus demonstrated, but so fleeting is its existence that Dr. McAlister does not believe that it will ever be possible to isolate any of the stuff itself.

Chlorophyll, by the process called photosynthesis, enables the plant to use sun energy to manufacture out of water from the soil and carbon dioxide from the air the various hydrocarbons, such as cellulose, starch, etc., used by men and animals for food and other purposes. Coal and oil contain the sunshine of past ages trapped in this way. Our breathing and the burning of fire use oxygen and pour out carbon dioxide into the air, while photosynthesis manufactures oxygen for the air. Thus the new chemical believed essential to photosynthesis is one of the important links in the energy cycle of all life here on earth.

Science News Letter, July 29, 1939

●RADIO

Homer N. Calver, secretary of board of American Museum of Health, will be the guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Monday, August 7, 5:45 EDST, 4:45 EST, 3:45 CST, 2:45 MST, 1:45 PST. Listen in on your local station. Listen in each Monday.