

MEDICINE

Life-Giving Dye

Sulfanilamide, Formerly Thrown Away as Waste, Is Effective Against Germs of Fourteen Diseases

By JANE STAFFORD

See Front Cover

FOURTEEN major victories over disease within three years—that is the amazing record of a new chemical in today's warfare against germs. And the end is certainly not yet in sight, for fresh victories are reported in almost every issue of medical journals the world over.

The victories have been won with a chemical that was shoveled around a large German dye works for years before anyone suspected its possibilities as a life-saver for thousands of desperately sick patients. It is sulfanilamide.

This chemical was first introduced as Prontosil, a patented, ink-red dye also available in the form of flat white pills. Before many months, it turned out that the curative value of Prontosil was due to one of its chemical constituents, sulfanilamide. The chemists, however, have not stopped at this point. While physicians are using the relatively simpler sulfanilamide with impressive and spectacular success in treatment of many ails, research goes on in the laboratories in the hope of finding a super-sulfanilamide.

Characteristics to be desired in the super-sulfanilamide are greater safety (sulfanilamide is not entirely without danger) and wider usefulness—that is, the ability to conquer still more germ diseases.

First Childbed Fever

First disease to go down before the onslaught of sulfanilamide—actually they used Prontosil in the first cases—is the childbirth horror, puerperal fever. This dreaded sickness that used so often to make motherhood a death sentence is due to infection. Various germs may cause the condition but fully one-half the cases, and those the ones most often ending in death, are due to infection with a germ called the Beta hemolytic streptococcus.

Sulfanilamide is a peculiarly effective weapon against members of the streptococcus family. A German scientist, Dr. G. Domagk, discovered this when he tried Prontosil for treatment of strep-

tococcus infections in mice. The report of his results started a team of British medical scientists, under the direction of Dr. Leonard Colebrook, to investigate the chemical's possibilities as a remedy for childbed fever due to streptococcus infections.

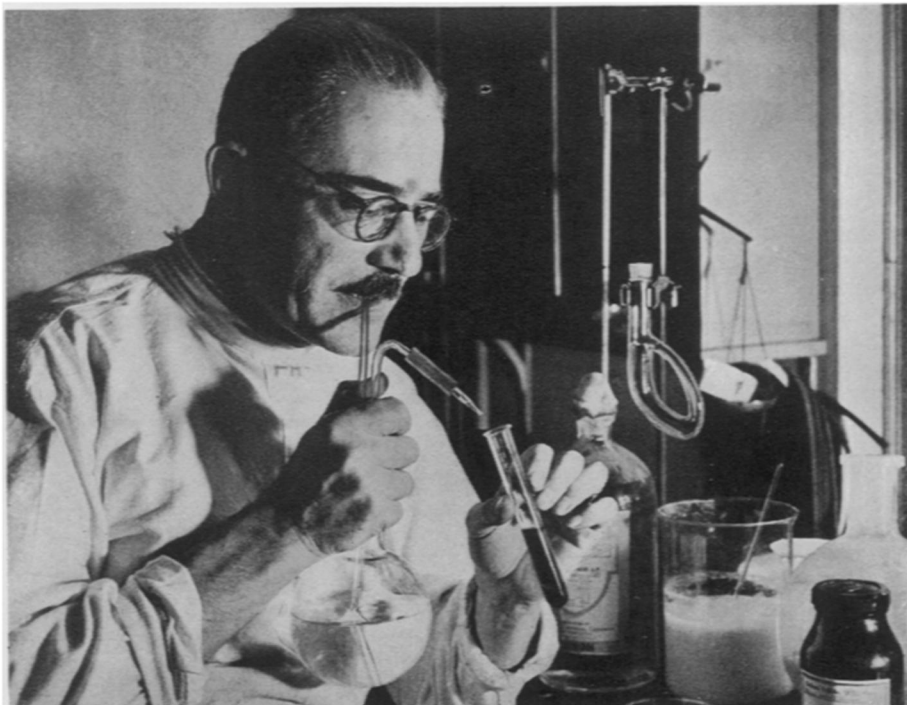
Even though 75 years had passed since Oliver Wendell Holmes, the doctor-poet, and Ignaz Philipp Semmelweis showed that this ailment was due to unclean instruments, dressings and hands of doctors and nurses, too many mothers were still, in 1936, dying of the ailment. The toll was 1,200 mothers' lives every year in England and Wales, and about 4,000 in the United States. Fully five times that number of mothers were suffering serious illness because of this streptococcus infection.

Before Prontosil, there was no sure way of saving these thousands of mothers who got the infection and died in

spite of all aseptic precautions. The first year Prontosil was used under Dr. Colebrook's direction in Queen Charlotte's Hospital, London, very nearly four out of five previously doomed mothers were saved.

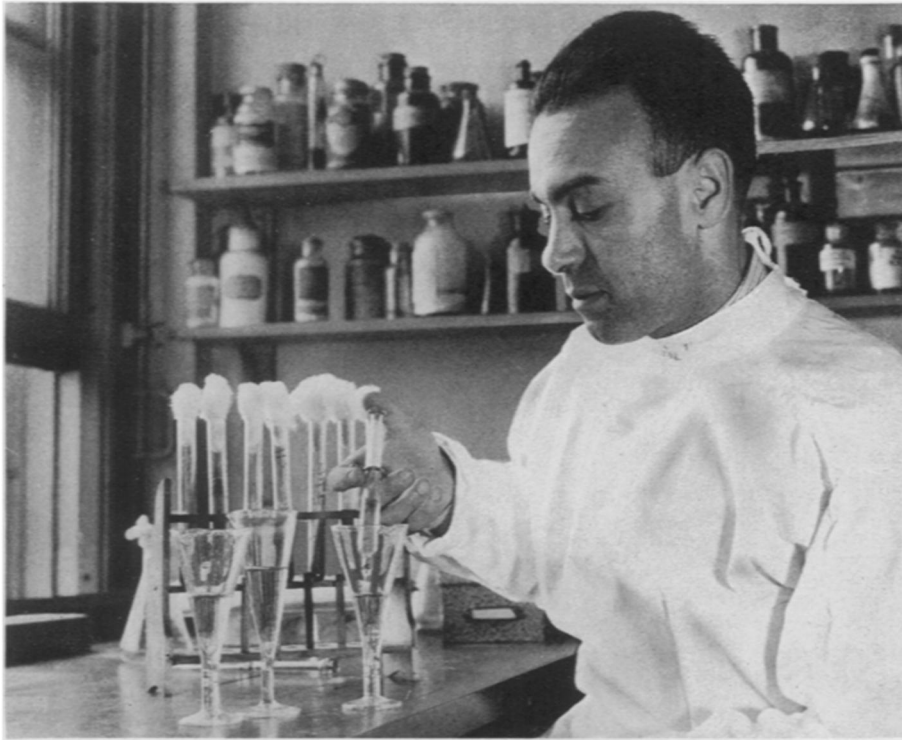
An American doctor, Dr. Perrin Long of the Johns Hopkins Hospital and Medical School in Baltimore, was visiting in England just at the time Dr. Colebrook and associates at Queen Charlotte's were having their first spectacular success with Prontosil. Dr. Long promptly procured some of the drug, brought it back to the United States, and after first testing it on mice, started using it on human patients. Dr. Long, however, did not use it first for childbed fever. He used it to treat patients suffering with erysipelas. This is another streptococcus infection. Like childbed fever, it too has yielded to the onslaught of Prontosil or sulfanilamide.

The streptococcus family is large and menacing. These germs cause septic sore throat, an often fatal infection. They cause septicemia, or blood poisoning.



DR. HUGO BAUER

This is the chemist half of the Rosenthal-Bauer research team shown here testing one of the new substances he is making. He is one of many scientists looking for a super-sulfanilamide that will cure even more diseases and be safer to use.



DR. SANFORD M. ROSENTHAL

The culture of streptococcus germs he is preparing, he will use to infect a set of test mice. Half the mice will be treated with sulfanilamide, the others will not. Streptococcus germs cause many human ills, including blood poisoning and septic sore throat.

They cause scarlet fever. And they cause the most deadly variety of meningitis. Before sulfanilamide, 99 out of every 100 unfortunate persons who got this streptococcus meningitis died. Now, with sulfanilamide, doctors can save half or more of these patients.

Meningitis

Meningitis is an inflammation of the membranes that cover the brain. Most frequently, it is due to infection with another kind of germ, the meningococcus. Before the discovery of sulfanilamide, scientists had developed antimeningitis serums which were fairly successful in treating meningococcal meningitis. Sulfanilamide used with the serum, scientists have reported, gives even better results than the serum alone.

There are many other berry-shaped coccus germs besides the streptococci and the meningococci. Gonorrhoea, widespread venereal disease, is caused by a germ called the gonococcus. Reports of sulfanilamide's victories over other coccus infections led a number of physicians to try it in gonococcus infections. Sulfanilamide scored again. Not 100 per cent., but reports from New York City have put its success at as high as 75 per cent. in acute cases and almost 100 per

cent. in those cases that are chronic.

Pneumonia is another coccus-caused ailment. The germs of this disease are called the pneumococci, and there are 32 varieties or types of them. Against one of these pneumonia germs, Type III pneumococci, sulfanilamide has scored another victory.

Besides all these ailments, sulfanilamide has been used successfully to treat cases of gas gangrene; kidney infections; the fourth venereal disease, lymphogranuloma inguinale; undulant fever; choriomeningitis, a disease of mice; and, latest to be reported, brain abscess.

Sulfanilamide Successes

Sulfanilamide and drugs derived from it have scored notable successes against 14 diseases:

Puerperal fever; erysipelas; streptococcus meningitis; septic sore throat; septicemia; scarlet fever; gonorrhoea; pneumonia; gas gangrene; kidney infections; lymphogranuloma inguinale; undulant fever; choriomeningitis (a disease of mice); and brain abscess.

The drug is not 100 per cent. effective in treating all these diseases but it has achieved notable success in curing many of them—far above that of other methods.

Fourth Venereal Disease

The success of sulfanilamide treatment in the fourth venereal disease and the mouse ailment, choriomeningitis, are of special interest because these two conditions are caused by an entirely different class of germ, filterable viruses. Filterable viruses are the cause of such ailments as influenza and infantile paralysis, for which no cure or preventive has yet been established in spite of much effort. It is no secret that the chemists who are trying to develop a supersulfanilamide hope they will be lucky enough to find one that can overcome such virus-caused ailments.

Just how sulfanilamide acts in the body to rout deadly germs and save the patient's life is not clearly known. It does not, according to the best evidence now available, actually kill the germs themselves. The general belief is that it weakens them, perhaps by chemical erosion of their outer covering, so that they are more susceptible to the attack of the body's natural defenders, the leucocytes.

Dangerous, Too

The story of sulfanilamide and its conquests is not complete without the chapter on its potential danger. It has caused alarming symptoms in some patients. One eminent authority believes that it is entirely safe, but like every other physician who has studied it, he warns that the patient who is taking sulfanilamide must be carefully watched for the first sign of danger. This is best done by having the patient in the hospital where blood tests can be made regularly and alert nurses can see and report the first untoward symptom.

Unhappiest chapter in the sulfanilamide story pertains to the tragic deaths of nearly 100 persons who were given a so-called Elixir of Sulfanilamide. Actually these deaths were not due to sulfanilamide itself, but to an ingredient in the elixir, diethylene glycol.

Science News Letter, December 3, 1938

Every civilization on record has owed more to borrowing than to inventions of its own members, declares a Columbia University anthropologist, Dr. Ralph Linton.

The average girl is more self-sufficient than the average boy, says one geneticist.

Cooking outdoors on the house roofs was a common custom in ancient Egypt.