MEDICINE

# Influenza Protection

**Three out of four saved from influenza by vaccine made from virus grown on fertile hen eggs. It is effective against types A and B "flu."**

By JANE STAFFORD

➤ TODAY, 27 years after the great influenza pandemic at the close of the first World War, medicine can do something about this disease.

To the old, never too popular advice —"Avoid crowds, keep yourself well fed and well rested to escape influenza"—can now be added, "See your doctor for a shot of vaccine that gives 75% protection against two types of the disease."

For the often-killing pneumonia and other infections that followed influenza in many of the 1918-19 cases, your doctor today can say, "It's only pneumonia," or "Only a strep infection," and get you on your feet again in a short time with a course of sulfa drug or penicillin treatment.

The vaccine, getting its first big test in the 1945-46 epidemic, might not have done any good in 1918 even if it had been developed. It is made from and effective against two types of influenza virus, A and B. What type caused the 1918 pandemic is not known. At that time some scientists thought the cause was a virus but others believed it was one of a number of slightly larger germs, bacteria, among them one called Hemophilus influenzae.

### "Types" Discovered

More than a decade ago, however, Drs. W. Smith, C. H. Andrewes and P. Laidlaw, of the English National Institute for Medical Research, discovered influenza A virus, one of the two against which a protective vaccine is now available. In 1940 two American scientists, Drs. T. P. Magill and Thomas Francis, Jr., independently discovered type B influenza virus, the other one against which the protective vaccine is effective.

Types A and B influenza viruses are believed to be the ones that cause epidemics of influenza such as have occurred every few years since 1918. Other types probably exist but have not yet been identified. Type A is thought to have caused the epidemics in the odd-numbered years since 1933. Type B occurred in the two even-numbered years, 1936 and 1940. It got off its even-year cycle, however, causing a number of outbreaks in Army camps in the spring of 1945 and a sizable nation-wide epidemic in the winter of 1945-46.

Efforts to develop a vaccine against influenza have been continuing ever since the discovery of the A virus in 1933. In that same year, Prof. E. W. Goodpasture and associates, Drs. G. J. Buddingh and A. M. Woodruff, of Vanderbilt University, announced they had successfully vaccinated 11 persons against smallpox with a vaccine made from smallpox virus grown on fertile hen eggs.

### "Daddy" Vaccine

You may wonder what smallpox has to do with influenza. The smallpox vaccine, however, was in a way the Daddy of the new vaccines against influenza, typhus fever, yellow fever and Rocky Mountain spotted fever. Typhus, 'flu, yellow fever, and smallpox are caused by germs of the virus class.

Rocky Mountain spotted fever is caused by rickettsia, a different type of disease germ but one which is closer to the viruses than to the bacteria such as streptococci, staphylococci and diphtheria bacilli. Viruses, unlike the larger bactria, cannot be cultivated outside of living susceptible cells. This makes the study of them and development of vaccines to protect against them much more difficult, since it requires the use of living animals instead of chemical culture media.

When Dr. Laidlaw and associates succeeded in isolating influenza A virus, they immediately started to try to develop a vaccine from it. First they injected ferrets with influenza virus from human patients. Then virus-containing material from the ferrets was injected into horses. Blood serum from these hyperimmunized horses was then used as a vaccine for tests on laboratory mice. The vaccine did succeed in protecting the mice against influenza virus.

The discovery that viruses could be grown on the chick embryo in fertile hen eggs gave scientists a powerful weapon for the war on virus diseases. As early as 1939 Prof. Goodpasture predicted that a vaccine for influenza and solution of other virus disease problems would come from this discovery. In fact, an Australian scientist, Dr. F. M. Burnet, had already taken the first steps in that direction.

He had cultivated influenza virus on successive chick embryos until it lost its disease-producing power to such an extent that it did not cause sickness when dropped into the nose. At the same time, it increased the level of the body's own flu-fighting forces, called antibodies, in about one-half of those tested.

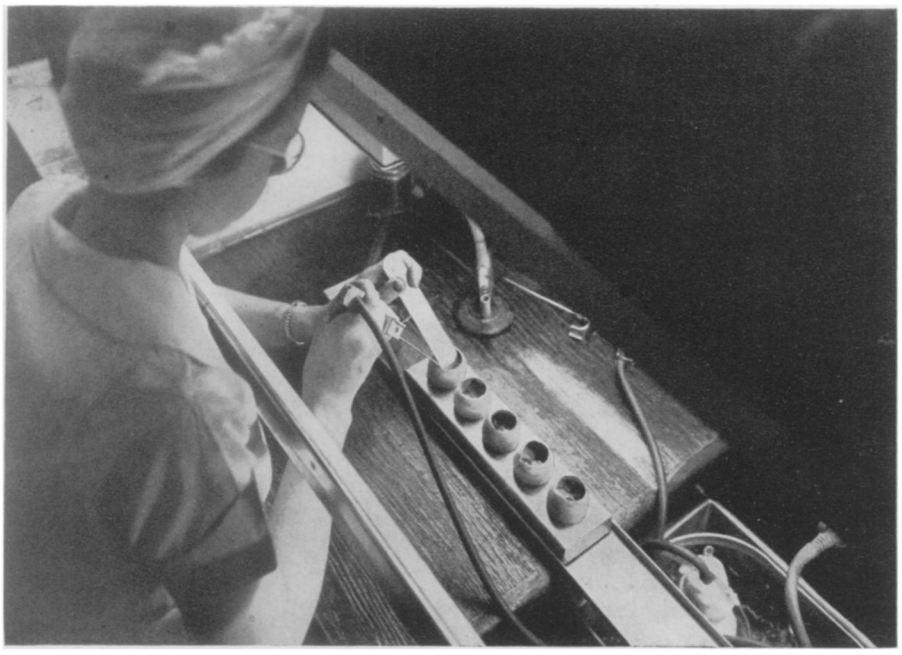
Efforts to develop a satisfactory influenza vaccine, continued by many scientists over the years since 1933, culminated, in 1943, with trials by the Army's Commission on Influenza of a concentrated inactivated vaccine prepared from the virus of influenza types A and B.

About 12,500 men in nine groups of Army Specialized Training Program units stationed in different parts of the United States were the human guinea pigs for this trial. Half the men in each group were vaccinated, the other half remaining unvaccinated for comparison. When influenza broke out that year, the Army had a good opportunity to evaluate the protective value of the new vaccine. Whereas 2.22% of the vaccinated came down with 'flu, almost three times as many, 7.11%, of the unvaccinated had influenza. The vaccine was therefore judged to be 75% effective, and to reduce the severity of the illness in those who were not completely protected.

### Vaccination Ordered

Memories of the frightful influenza toll in Army camps during the 1918 pandemic haunted the Army's medical department all through World War II. When outbreaks of influenza began occurring in Army camps in the spring of 1945, suggesting that a big epidemic might be brewing for the following fall and winter, it was decided to take no chances on an unprotected Army. Orders were given for vaccination of all Army personnel in October and November.

The results of this mass vaccination procedure may show whether all of us will be justified in getting vaccinated against 'flu each fall.



***FLU FIGHTER—Here a laboratory technician removes the virus-laden fluids from partially incubated chick eggs by suction in the laboratories of Pitman-Moore Co. This firm and Sharp and Dohme, Lederle, Squibb, Lilly and Parke-Davis manufactured vaccine for the Army and are now producing it for civilian use.***

Disinfecting the air in public buildings and even homes with ultraviolet light or with invisible mists of germ-killing chemicals may be added to vaccination as a means of protection against influenza. While going to the doctor for a "shot" of vaccine would be simpler, the air disinfection method has the advantage of giving protection against other diseases than influenza.

Still needed in the almost Thirty Years War against influenza is a chemical remedy like the sulfa drugs or an antibiotic like penicillin for treatment of patients. If the virus of the 1918 pandemic is ever again loosed on the world, the present vaccine probably would not be effective. The vaccine is specific for only two known influenza viruses. Sulfa drugs and penicillin and streptomycin, on the other hand, are effective against various strains or types of streptococci. A remedy effective in one influenza virus type might therefore be expected to remedy infection with any type of 'flu virus.

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ELECTRONICS

# Aerial Counterspies

## Special electronically equipped aircraft known as Ferrets hunted out enemy secret radar installations for Allied jamming or destruction.

➤ SPECIAL AIRCRAFT, known as "Ferrets", packed full of electronic equipment, served during the war as aerial counterspies in ferreting out the enemy's most closely guarded radar secrets. Details of their equipment and activities were revealed by Headquarters, Air Technical Service Command.

Flying over enemy territory, these special radar countermeasures laboratories sought out enemy radar stations and analyzed their signals to determine what radar devices could later be used to make them ineffective by jamming. In other cases, the sites of the enemy radar were located and later the installations were bombed out of existence. If enemy stations were difficult to reach, information was obtained relative to their blind spots, so that Allied craft could approach enemy territory with lessened danger of detection.

The Ferret carried equipment which not only received and recorded enemy radar signals but analyzed them for rate, size and shape of pulse, determined their frequency, and established the geographic location of the radar. Some 15 different electronic devices were carried by them, included with their special equipment that weighed about a ton.

Twenty-three Ferrets were in use at the end of the war. The first saw duty in January, 1943, when it flew a mission in the Aleutians to locate Japanese radars and determine the zone of their coverage. Only one was located, and it was found that certain areas were protected from its beams. It was in these areas that future aerial raids made approaches to the islands, surprising the Japs every time.

Two other Ferrets, outfitted in the spring of 1943, were used in the Mediterranean area in preparation for the Sicilian invasion in July. Enemy radars were located and effectively jammed by countermeasures devices. This was the first time that jamming was used in a major military operation. The production of Ferrets followed rapidly the successes of these two and they played an important role in both the European and the Pacific war zones.

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PHYSICS

## Electrical Computer Solves Equations

➤ AN ELECTRICAL method of solving some mathematical equations that is four to seven times faster than conventional methods was announced to the American Physical Society in Los Angeles by Dr. Clifford E. Berry of the Consolidated Engineering Corporation of Pasadena, Calif.

The new computer used for solving linear simultaneous equations consists of an electrical circuit containing pairs of potentiometers. As those who have studied advanced mathematics know, the usual method of solving such equations involve a laborious cut-and-try method of assuming values and solving for one unknown and then for others. In the electrical method of solving the equations, different voltages are used to perform the necessary operations, and the computer used does not introduce significant errors.

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