

load of 1,700 miles. This may be extended to 2,500 miles by use of auxiliary fuel tanks.

Except for plywood doors and floor, the airplane is constructed entirely of stainless steel. The steel skin varies from .008-inch upward and is joined together by spot welding.

The airplane is built around a cargo compartment 25 feet long, 8 feet wide and 8 feet high. A cargo hatch opens at the rear, below the upswept tail. The hatch drops down to form a ramp over which the cargo may be loaded.

The cargo capacity is 10,400 pounds. The "Conestoga" will carry one ambulance truck or two jeeps. As a personnel

transport it may be fitted with 24 seats. For evacuating wounded from combat areas, the new plane will be used as a flying ambulance. For such use it will carry one ambulance and eight stretchers, or 24 stretchers alone.

Paratroops may be launched simultaneously through doors on both sides of the fuselage, while at the same time troop supplies may be dropped through the rear hatch.

Radically different in appearance, the bulbous nose of the "Conestoga" slopes down to a slimmer mid-section, which in turn sweeps up again aft to the towing rudder.

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by patients recovering from injury than by normal persons.

This state of positive nitrogen balance, however, is easily upset. Wheeling around in a wheel chair for the first time or a fatiguing procedure such as having a cast changed during early convalescence lead to increased nitrogen output and a more negative nitrogen balance.

At the height of the early period of negative nitrogen balance, feeding protein up to about three and one-half ounces (2,000 calories) daily does not overcome the difficulty, practically the entire nitrogen content of the protein food being excreted on the same day. The nitrogen from plasma transfused

MEDICINE

Sulfa Drug for TB

Fatty acid sulfabamide gives encouraging results in treatment of tuberculosis. It appears safe to use, but no claims of cure are warranted yet.

► "ENCOURAGING" results in treatment of tuberculosis with sulfabamide, a special kind of sulfa drug, were reported by Dr. Richard Gubner, of the Long Island College of Medicine and the Equitable Life Assurance Society of the U. S., at the Atlantic City, N. J., meeting of the American Society for Clinical Investigation.

No conclusions are as yet warranted as to the curative value of this sulfa drug, Dr. Gubner warned.

No harmful, or toxic, effects resulted even when almost an ounce was given within 16 hours, or when given over a protracted period. One patient received over 2,000 grams (about five pounds) during a 16-month period without harm.

In five cases with advanced bilateral pulmonary tuberculosis, daily doses were given for an average period of 10 months. No harmful effects of any sort were observed and the patients gained, on the average, 35 pounds. At the same time tuberculosis germs disappeared from the sputum of all five patients and X-ray pictures of their lungs showed resolution, or healing.

Encouraging results have also been obtained with other patients treated for a shorter time.

Sulfabamide differs greatly from other sulfa drugs now in use, Dr. Gubner pointed out. It has a fatty acid linked to it and is soluble in fatty materials. The waxy outer coat of the tuberculosis germ may act as a barrier to the penetration of other sulfa drugs,

Dr. Gubner explained, whereas a fatty-acid sulfa drug such as sulfabamide might get through this barrier to attack the germ.

The small dosage that can be used because the drug remains in the body for a long time is another of sulfabamide's properties which Dr. Gubner calls "ideal" for protracted treatment such as is necessary in tuberculosis.

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Diet for War Wounded

► A HIGH-CALORIE diet, with lots of meat and other protein food, is needed by the wounded fighting man during convalescence to help him gain weight and rebuild his tissues rapidly, it appears from studies reported by Dr. J. S. L. Browne, Dr. Victor Schenker and Dr. J. A. F. Stevenson, of McGill University and the Royal Victoria Hospital, Montreal, at the meeting.

After burns, fractures, wounds, operations and the like, the normal grown man goes into a state of negative nitrogen balance, that is, he loses more nitrogen from his body than he takes in in his food. This means he is using up his body tissues instead of rebuilding them.

This condition, which may last from five to 45 days, has been noted before. However, it is followed, the Montreal scientists discovered, by a period of positive nitrogen balance in which the nitrogen from food is more readily retained

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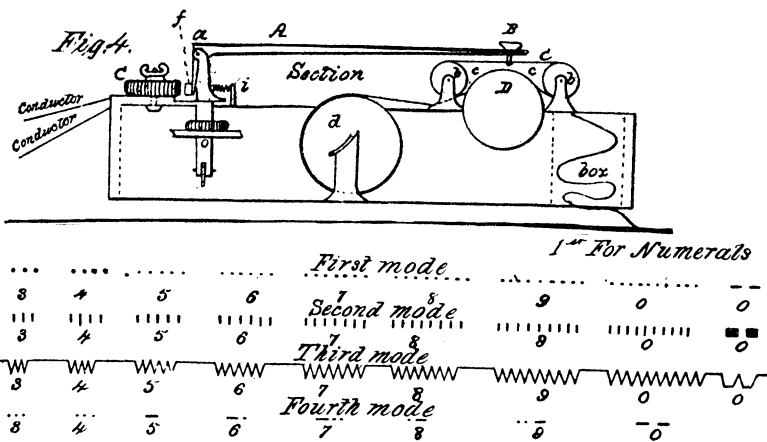
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100 YEARS AGO—This is a reproduction of the drawings of the Morse telegraph and code, accompanying the patent specifications for the invention, showing tape for recording messages.

into the veins, however, is not lost in this way.

A surgeon's civilian experience with patients recovering from operations apparently cannot always serve as a guide to handling convalescence of war wounded or other patients suffering accidental injury. Patients chronically ill

before an operation, the Montreal scientists found, are usually in negative nitrogen balance after operation but, unlike previously healthy men acutely injured, they can more readily be brought into positive balance by increasing the protein food in their diet.

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but to send it as exactly as possible and to get it into written form at the other end. For this purpose it was actually set up in a special kind of type at the sending instrument, and the jagged edges of the type run under the key so that the make-and-break of the current occurred with machine precision.

Most of the patent, dated June 20, 1840, is taken up with minute specifications for these outmoded accessories and for a now familiar recording device for the receiving instrument. The earliest telegraph instruments were provided with these devices, and the operators were themselves surprised to find that they soon learned the rhythmical dot-dash language so thoroughly that they translated as they listened, and the recording pen merely slowed up telegraphic communication.

Just before the end of the 1843 session, Congress acted favorably on a long-pending request for an appropriation of \$30,000 to build an experimental telegraph line from Washington to Baltimore. Work was begun immediately.

The telegraph industry dates its beginning from May 24, 1844, when the wires had been extended to Baltimore, and a message was flashed for the first time from one city to another.

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PHYSICS

Centennial of Telegraph

➤ TODAY the telegraph wires are eternally busy with orders for equipment and material. News of the birth of a son or word of a soldier's unexpected leave are sped on their way by telegraph. Hundreds of messages are sent simultaneously over one pair of wires.

But the first telegram ever sent between two cities was flashed in code between Washington and Baltimore just a hundred years ago. On May 24, 1844, Samuel F. B. Morse successfully sent the Biblical quotation, "What hath God wrought!" over the telegraph line strung from the chamber of the United States Supreme Court, then in the Capitol at Washington, to the Baltimore & Ohio Railroad station in Baltimore.

The idea of the electro-magnetic telegraph is believed to have been conceived while Morse was returning from Europe in 1832. In the dining salon of the packetship *Sully*, one evening, Dr. Charles T. Jackson of Boston was discussing new discoveries in electro-magnetism.

"If the presence of electricity can be made visible in any part of the circuit, I can see no reason why intelligence may not be transmitted instantaneously

by electricity," Morse is reported to have remarked at that time.

During the twelve years that followed, artist-inventor Morse struggled to perfect his invention and to secure for it a proper presentation to the public. By September, 1837, work had progressed far enough for him to feel he could conduct an experiment for his friends.

Around his room at New York University, 1,700 feet of copper wire were stretched, the sending instrument being attached to one end and the receiving mechanism to the other. The signals, made by making and breaking the circuit, flashed instantly from one instrument to the other.

The first test of the electro-magnetic telegraph awoke the interest of Alfred Vail of Morristown, N. J., himself an excellent amateur mechanic, who thereafter became associated with Morse in his undertaking. Vail convinced his father, owner of the Speedwell Iron Works, of the value of Morse's idea. Judge Vail advanced money for the project and made shop facilities available.

The chief problem to the inventor seems not to have been to get a code of dots and dashes over the electric circuit,

MEDICINE

Streptococci Germs May Make Diphtheria Worse

➤ THE CURRENT increase in cases of malignant diphtheria which has been disturbing medical and health authorities may be due to the fact that streptococci germs are entering the picture to make matters worse.

Evidence that certain streptococci act as reinforcing allies of diphtheria germs, in what scientists term synergism, to cause greater havoc than the diphtheria germs can cause by themselves, was presented by Miss Elaine Updyke and Dr. Martin Frobisher, Jr., of the Johns Hopkins School of Hygiene and Public Health at the New York meeting of the Society of American Bacteriologists.

Working with strains of streptococci and diphtheria bacilli from the same fatal case of malignant diphtheria, these scientists found that all the mice they tested survived half a cubic centimeter of diphtheria germs with one-tenth a cubic centimeter of streptococci.

When, however, the dose of streptococci was doubled without increasing the number of diphtheria germs, four of six mice died in from one to four days.