SCIENCE NEWS

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MEDICAL CARE OF THE FIGHTING FORCES OF THE UNITED STATES

SPLENDID provisions for the medical care of our armed forces have been made.

The medical corps of the Army and Navy have been trained and strengthened to meet the medical needs of our fighting forces in days to come. More than that, throughout the country, in universities, scientific research institutions, and research laboratories of commercial companies, a great organized effort is in process. Our medical officers are being equipped with the latest and most improved resources of medical science.

Discoveries made between the last war and this have lessened enormously the risks of fatalities and disablement from wounds. Treatment with sulfanilamide and other sulfonamide drugs has been shown to yield results which promise better than 50 per cent. reduction in mortality from wounds and wound infections compared with the last war.

At the present moment eight teams, each consisting of highly skilled surgeons and bacteriologists, are at work in hospitals in Boston, New York, Baltimore, New Orleans, Nashville, Detroit, and Akron, studying the best choice of these drugs, the best methods of their application, the best methods of supporting treatment. The cases which they study are derived from traffic accidents, accidents in industrial plants, chosen because of their similarity to those which are encountered in warfare. In eight other institutions, fundamental questions of infection and wound healing are being investigated by skilled laboratory personnel.

Another formidable menace to fighting men is the condition known as "shock." It may arise from wounds and loss of blood. Failure of the heart and circulation is its most prominent feature. It is treated by rest, heat, morphine and blood transfusions. In "shock," the blood vessels apparently lose their capacity of retaining the fluid of the blood within them, hence the necessity for an artificial replenishment of this fluid.

Salt solutions, injected into the blood vessels, leak out at once and are only momentarily effective. Whole human blood is effective but under field conditions is largely unobtainable. Stores of human blood plasma, either liquid or reduced to dry powder by special arts of desiccation, have been accumulated and are ready to be supplied to the armed forces in field, and the evacuation and general hospitals.

The most effective constituents of blood plasma in combatting shock are proteins. Of these the albumin is most important because it is present in largest amount and has the greatest capacity for holding the fluid in which it is dissolved within the blood vessels. The brilliant work of a group of investigators at Harvard has resulted in the development of methods by which the albumin of human blood plasma is separated in a state of high purity and high concentration and can, with a minimum of difficulty, be distributed to army surgeons.

Great work is being done by blood donor centers. Acquisition of supplies of human blood requires extensive organizations of citizens, physicians and technicians.

They make one think of the millions of gallons of beef blood which are being thrown away yearly in our slaughter houses. If beef albumin could be prepared in such form and so pure as to be harmless when injected into man, an unlimited supply of an essential therapeutic agent would be made available with infinite saving of money and human effort. Harvard investigators are now devoting intensive efforts toward this goal; the results thus far obtained give encouraging promise of success.

Airplane design has achieved incredible capacities for speed, altitude and maneuverability. These involve the subjection of our flying personnel to strains and stresses for which the human body seems never to have been designed.

Perhaps the most important task which confronts military medicine of today is that of learning how to equip the flyer with the means of protecting himself against the conditions to which the perfections of his plane subject him. He must be prepared to resist rapid changes of temperature, from tropical heat to most intense arctic cold; to rise quickly from sea level to heights five to seven miles up—heights at which the breathing of pure oxygen, unless under pressure, will not maintain life.

In dive-bombing, for example, he must be able to withstand the terrific strain of suddenly reversing the direction of flight at speeds of hundreds of miles an hour.

To such physical strains are added the mental and nervous tension of life and death combat in which his every sense must be alert.

Much has already been done in devising mechanical equipment to overcome these difficulties. More remains to be done. Guided by the studies of the Committee on Aviation Medicine, the Committee on Medical Research has arranged for the installation of elaborate equipment and the employment of physiologists, physicists and physicians in a dozen universities where these problems are being and will continue to be studied under conditions most favorable to success.

If victory in this war is to be achieved by air superiority, you may be certain that that superiority will depend upon the learning of the physiologist as well as upon the genius of the engineer.

These are only a few instances of the researches that our investigators are conducting. Search is under way for new and more effective means for the prevention and cure of malaria and other infectious diseases; of coping with possible gas poisonings; new drugs are being discovered and invented, some of which seem to give amazing promise. What will emerge from all this effort is not only increased capacity to fight this war but the acquisition of a body of scientific medical knowledge which can not fail to be of permanent value to us all.—A. N. RICHARDS, *Chairman of the Committee on Medical Research, Office of Scientific Research and Development.*

EGG PRODUCTION

EXPERIMENTAL attempts to increase egg production from German hens by feeding them female sex hormone are described in a nearly year-old copy of the German journal, *Die Umschau,* which has been received in Washington, after lying no one knows where, since several months before the entry of the United States into the war. They are reported by an experimenter named Lothar Zirngiebl, whose address and connections are not given.

Herr Zirngiebl states that he was interested in trying the hormone when a notable decline in egg production, on the part of German hens generally, set in during the spring of 1941. He claims that one group of 14 hens brought its daily production from only one or two from the entire penful up to as many as eleven eggs a day. The weight of individual eggs also showed a notable increase.

However, results of this experiment can not be taken as conclusive. Aside from the small number of hens included in the experiments, the circumstances precluded the close supervision necessary for good scientific work. The hens did not belong to the experimenter; he had to persuade a not-too-cooperative owner to let him use his birds. Furthermore, there was no control group: there should have been an equal number of hens fed and treated in exactly the same way except for the addition of the hormone to their feed, for comparison. Without such control animals, biological experiments are not usually considered reliable.

Finally, there is that matter of the general decline in egg production. It may have been statistical rather than biological. After the first World War, German country people would tell an American visitor, after they got to know him well enough: "The blockade? Well, it was hard on folks in the cities, but here on the land we didn't fare too badly. They sent food requisitioners around, but there were ways of evading them. For instance, we ate eggs as soon as they were laid, and then told them our hens had stopped laying."

Perhaps something of the kind is going on again. Not even the Gestapo can keep a nose in every nest.—FRANK THONE.

POWDERED VEGETABLES

THE convenient small cans of strained vegetables for babies may be out for the duration, but mothers will not be forced themselves to cook and strain the baby's vegetables. Dried, powdered vegetables can be safely substituted for infant feeding, according to Dr. Reuel A. Benson, professor of pediatrics at the New York Medical College.

Convenience is not the only result expected from Dr. Benson's findings. Babies and small children in war-devastated regions are particularly in need of vegetables in easily digested form. Many more of them will be able to get these foods, because from eight to ten pounds of fresh vegetables are reduced to one pound by dehydration, with consequent saving in shipping space. That even two-day-old infants can be safely given the powdered, dried vegetables when suitably diluted with water, is announced in a report appearing in the *Archives of Pediatrics.*

Babies under four months of age are usually not given vegetables, even strained ones, because of the difficulty at that young age of swallowing solid foods. Dr. Benson does not recommend routine use of the powdered vegetables for very young infants. The fact that eighty-four newborn infants were able to take the dehydrated vegetables from the second to tenth day of life without harm shows, however, that they may be safely given to older babies. The powdered, dried vegetables were also given to thirty-four older infants and thirty-six older children without any trouble. The drying process does not appreciably lessen the nourishing value of the vegetables except for loss of anti-scurvy vitamin C.

The dried vegetables may be given in more concentrated form to counteract constipation in infants and children. Powdered vegetables may also be useful for allergic children, since the process may alter the protein content somewhat as the protein in evaporated milk is altered so that it causes less sensitivity than fluid milk.

SYNTHETIC RUBBER PLANTS

BY making steam do two jobs instead of one in the new synthetic rubber plants, electric power will be created, enough not only to run the entire plant and neighboring works but with some to spare which will be added to the regular public utility lines to help supply other war industries. This is the message given by F. H. Stohr, of the Westinghouse Electric and Manufacturing Company, which is making the turbine generators for this purpose.

Steam is plentiful about plants making butadiene and styrene for Buna S rubber, for it is needed in the chemical processes. By passing it first through a turbine and then through the chemical vats, all the necessary chemical work is done and a large amount of power is created as a "by-product." This power is in excess of the plant's needs, so that instead of taking precious power from the public utility lines, the plants will actually deliver power to them.

Three generators are now building, one of 35,000 kilowatts, two of 40,000 kilowatts. They take steam at 750 to 850 pounds per square inch and deliver it to the chemical line at 175 pounds. These generators and others to be built will be installed in the first four large synthetic rubber plants in this country, scheduled for completion in 1943. The output of all the Buna S plants at the end of 1943 is expected to be at the rate of 360,000 tons a year. With other plants to be built, synthetic rubber production is expected to approach the 1,000,000 ton-a-year rate by the end of 1944.

OILS FROM FRUIT PITS AND STONES

REMEMBER how you saved prune pits during the first World War? It looks now as if fruit pits and stones are going to be put to use again, though in a different way and for another purpose. What they wanted, in 1917–18, was the shells, for gas mask charcoal. They have plenty of that now.

What's wanted in this new war are the kernels within the pits, for the oil they contain. Such special oils as sweet almond oil, formerly imported, are on the list of war-shortages now, and the oils from apricot, peach and

cherry kernels resemble this rather closely. Prune-kernel oil would do nicely, too, but not many prunes are pitted at the processing plants.

It is not likely that housekeepers, restaurant owners and mess officers will be asked to save fruit pits this time. It is easier and far less expensive to go to the concentrated, quantity sources, the canneries and fruit-drying plants, where fruit pits have long been a useless waste, fit only for burning under the boilers. In normal times, the expense of cracking the pits and extracting and refining the oils has been too great, but with the price of oils much higher it seems worth while to install the necessary machinery.

Another source of vegetable oil that is recommended for industrial attention is the avocado. This fatty fruit has been steadily gaining in favor during recent decades, but as yet there is no really good, paying outlet for the disposal of culls and damaged fruits. Avocado oil is very much like olive oil in quality and flavor. Incidentally, despite the large quantities of olives raised in the West, domestic olive oil has never supplied more than five per cent. of the American market.

So-called rice bran oil has also received comparatively little attention. If ways can be found to prevent it from turning rancid, according to chemists of the Department of Agriculture, it can be used as a substitute for the now scarce vitamin-rich sardine oil in animal feeds.

MENTAL HYGIENE

PREVENTION of crime and delinquency, successful treatment of "problem" and backward school children, and the early detection and prevention of serious mental disorders have resulted from the pioneer work of the Suffolk County Health Department of New York, in setting up a mental hygiene program for rural areas. An encouraging report of its first year's work is given by Dr. George M. Lott, director of the Suffolk County Mental Hygiene Division, the first of its kind to be organized by a county health department. Dr. Lott's report appears in Public Health Reports of the U. S. Public Health Service.

In its work of prevention, the Suffolk County Mental Hygiene Clinic serves as a sort of classroom for parents and teachers, and a conference room, as well as a clinic. When a problem child is referred to the clinic, for instance, his teachers, his family doctor, the school nurse, and any one else interested in his welfare may all meet together and plan a cooperative program of treatment.

This method is not only valuable to insure cooperation among the various people and agencies involved in a case, but it provides a program of education in the principles of mental health. Several cases of "delinquent" boys are reported by Dr. Lott where such prompt cooperation and treatment undoubtedly saved them from reform school or jail. The importance of re-educating parents is illustrated in several cases where a normally intelligent child was failing in school.

ITEMS

AERIAL spread of two dangerous diseases, rabbit fever (tularemia) and Rocky Mountain spotted fever, is now suspected as a result of a discovery by Charles R. Joyce, Iowa State College entomologist, and Gaines W. Eddy, now of the U. S. Bureau of Entomology and Plant Quarantine. It was found that the nymphs and larvae of the common rabbit tick appeared on 29 kinds of birds examined at the Tama Indian Reservation. Although rabbit ticks rarely attach to man, and are therefore not directly responsible for transmitting the diseases, it is believed they spread the diseases among rabbits. From this reservoir of infection the diseases may spread naturally to other species of ticks, such as those which carry spotted fever. On one brown thrasher the entomologists found 495 young rabbit ticks, and 2,111 were removed from 24 of these common song birds. Hosts for the young rabbit ticks were found to include also the catbird, indigo bunting, wrens, towhee, robin, and other species of ground-feeding birds.

X-RAY machines that will stand up to hours on end of hard use under the severe conditions of military service and be perfectly safe, are assured by rigorous tests carried out by the National Bureau of Standards. The requirements are so severe that most machines fail to make the grade the first time they are tested. Then they must be remodeled and often the new model fails also. Sometimes models have been sent back half-a-dozen times before a machine was produced that could meet the strenuous military requirements. These machines are used to test the physical fitness of inductees, to examine injuries at army hospitals, to test materials in shipyards, airplane factories and other plants producing war materials.

ONE part castor oil to one part ethyl cellulose is the composition of the new plastic recently announced by the Hercules Powder Company to replace rubber in many of its uses. The new material has not the bounce of natural rubber, but there are many things for which rubber has been used which do not require this bounce—washers, gaskets, gloves, galoshes, garden hose, etc. It is estimated that sixty thousand pounds of rubber have been used in these ways annually, simply because it was cheap and plentiful. For all of them the new plastic is just as good, and in some ways better.

LATEST note on how to make rubber last as long as possible comes in an announcement, in the *Journal* of the Canadian Medical Association, of a new formula for a lubricating jelly for surgeons' rubber gloves, catheters and other rubber supplies. The formula was worked out by Professor W. E. MacKenzie, assistant professor of pharmacy in the Ontario College of Pharmacy, at the request of the Canadian Hospital Council. It calls for starch, distilled water, sodium lactate and mercuric oxycyanide. The new jelly is needed not only because of the rubber shortage but because of the increasing shortage of gums and glycerine used previously in non-greasy lubricating jellies for rubber supplies. It can be made in any hospital pharmacy for about 50 cents a pound and can be sterilized under steam pressure. It does not deteriorate on storage, nor does it harm either rubber or human tissues. It contains an anti-bacterial substance.