MEDICINE

Protein Combats Shock

Solution of proteins may possibly prove to be a substitute for blood plasma in treating hemorrhage from war wounds.

➤ A POSSIBLE substitute or supplement for blood plasma in treating shock from hemorrhage in war wounds in case of shortages of plasma is announced by Dr. Robert Elman and Dr. Carl E. Lischer, of Washington University School of Medicine and Barnes Hospital, St. Louis (*Journal, American Medical Association,* Feb. 13).

The substitute would be a solution of hydrolyzed proteins, enzymatically digested, from either beef blood plasma or casein, the chief protein of milk. In laboratory experiments such solutions showed themselves as good as blood plasma for treatment of animals in shock from repeated hemorrhage.

The animals that got the protein solutions survived for a 50% longer time and could withstand 25% greater blood loss than untreated animals, and their blood pressures also stayed at higher levels.

Solutions made from pure crystals of all the essential amino acids also were definitely beneficial but not as markedly as the solutions of hydrolyzed proteins.

Caution is needed before the encouraging results of these experiments can be applied to treatment of human patients suffering surgical shock from hemorrhage, the scientists warn. They believe further study is justified because of the practical advantages such solutions offer.

While plasma and whole blood are "of vast importance in the treatment of shock," they point out, "it is probable that in wartime the number requiring such treatment might well exceed the available supplies of plasma and that in the armed forces many situations might arise in which blood donors were not available."

The injection of one quart of plasma requires bleeding four donors and considerable processing, not to mention the transport and storage space problems. Solutions of amino acids and hydrolyzed proteins, on the other hand, are as convenient to give, the scientists state, as sugar and salt solutions.

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***SEWING STEEL** — Electric stitches are being made in this stainless steel structure by fusing sheets of metal together wherever the worker applies the electrodes. Resulting connections are much stronger than would be rivets of the same size.*

ENGINEERING

Electricity Sews Metal

➤ STITCHING METAL? Why not? Airplanes and railroad cars and all sorts of things are being made that way out of stainless steel—even masts for ships.

Sewing is done with an electric thread but no needle pierces the metal. Instead, two pencil-like electrodes clamp the steel sheets between them. Suddenly a young lightning bolt is shot across them—clean through the metal. It all happens in a very small part of a second.

In that flash of time some of the metal in the path of the current comes to fusion heat. It so happens that the greatest heat is generated just where the sheets are faced together, and a little spot of one sheet becomes fused to another little spot of the other. Both sheets are then joined together by a stainless steel connection. In stainless steel it is a strong connection — much stronger than would be a rivet of the same size.

But the connection can't be seen. It is between the inside surfaces of the sheets. "How do we know they are joined, and how strongly?" This is answered by a simple little device called the recorder. This instrument actually measures the amount of current used—even if for so brief a flash—and also the time during which the current is applied. Both readings tell the exact amount of electric heat used, and the amount of the heat in turn tells how much metal has been brought to fusion —hence the size of the weld.

The value of each weld is also recorded on a piece of tape by the recorder. If any one weld fails to come up to specifications, a bell rings and shuts off the welding machine. The bell is sometimes known in the shop as the "raspberry". You can well imagine that the welder does not like to have the "raspberry" loudly advertising his failure.

Many women have been trained and employed by the Budd Company to do this new kind of stitching in the fabrication of airplane parts and structures.

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ENGINEERING

Rockets Help Heavily Loaded Planes Take Off

➤ POWERFUL rocket jet motors may be used soon as auxiliary power to assist heavily loaded bombers and cargo planes in the take-off. Cargo carried by a plane is limited to the weight with which it can get off the ground. Auxiliary assistance to help get it into the air would permit it to transport a much heavier load than is now possible.

Auxiliary power during the take-off has been often suggested and various sources of power have been tried. There is nothing new in the idea. The Wright brothers used a land catapult at Kitty Hawk. So far as is known, rocket power has not been used in America, but it is

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reported that it is being used with success in Germany.

The possible use of rocket power is discussed by Roy Healy, president of the American Rocket Society (*Aviation,* Jan.). He and his organization have carried out tests with rockets as a propelling power. He is of the opinion that a battery of powerful powder rocket charges attached to the belly of the fuselage, and exploded by electric ignition in consecutive order during the run-off, would accelerate the speed sufficiently to permit an overload of as much as 3,000 pounds.

A simple rocket power motor has been designed weighing less than 25 pounds which uses liquid oxygen and an oil fuel. Ignition is by electric spark. The motor will give a 1,000 pound thrust, declares Mr. Healy. It produces a jet velocity of discharge of over 6,500 feet per second.

Twenty such motors, discharging in pairs at intervals of one second, would give a constant thrust of 2,000 pounds to the plane for 10 seconds during the take-off.

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BOTANY

Coffee Is Ancient Drink

Caffein beverages have appealed to people in widely separated regions since prehistoric times. Shortage can be damaging to morale of public.

➤ COFFEE and other caffein-containing beverages are not the discoveries of modern, civilized men at all. These drinks with a harmless "kick" in them have been made and used since prehistoric times by primitive peoples fortunate enough to have caffein-yielding plants growing in their neighborhood.

The importance of the caffein beverages was discussed by Prof. P. C. Mangelsdorf of Harvard University, in the course of a lecture on economic plants as weapons of war, given before the American Academy of Arts and Sciences.

"These caffein beverages, although of no nutritional value, have become so important, especially coffee to Americans and tea to the British, that they are regarded as essential to the maintenance of morale," Prof. Mangelsdorf stated. "Military needs take precedence over civilian desires and rationing is a necsary consequence. A plant product which was once a luxury has become a necessity and a factor in the winning of the war."

Besides familiar coffee and tea, the list of caffein-yielding plants used by various peoples includes the yaupon or cassine of our own Southeast and the yerba mate of South America. Both of these are smoot-leaved species of holly. Then there are guarana, made from the fruit of a tropical shrub, and yoco, prepared from the bark of a tropical vine. Cocoa also contains caffein, though its most characteristic stimulant is the related compound, theobromin.

If the lack of coffee and tea can be damaging to morale, lack of other plant products can have even more devastating material results, the speaker pointed out. Germany, in desperate need for edible oils, was after the white oil of sunflowers as well as the black oil that comes out of the earth when her hordes drove into Russia—only now to be driven out of the sunflower fields as well as out of the Caucasian oil fields.

We ourselves have been hard hit by the Japs' seizure of the Philippines, whence we normally obtain the larger part of our coconut oil imports, used in soap as well as for food. We are meeting this lack by growing greatly increased acreages of soybeans and peanuts, both rich in good oils.

Almost too painful to be talked about is our loss of Far Eastern rubber and quinine sources. We have synthetic substitutes for both, but they are not complete substitutes, and we are driving hard to collect wild cinchona in the Andes, wild rubber all the way from the Amazon valley to northern Mexico, to meet our needs for natural plant products.

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INVENTION

Coffee Without Caffein Improved by New Process

➤ COFFEE without caffein, which many have come to like during recent years, can be better and more quickly manufactured by a new process in which organic solvents are eliminated and only hot water is used. The process is described in U. S. patent 2,309,092, issued by the Patent Office to N. E. Berry of Summit, N. J., and R. H. Walters of Rutherford, N. J., assignors to Generals Foods Corporation.

The decaffeinating process hitherto in use involved soaking the green coffee beans in trichlorethylene or similar organic solvent, which removes the caffein but leaves the other water-solvent substances on which coffee flavor depends. However, this process required long steaming or soaking, the solvent was hard to get out completely, and it carried off also the coffee's natural wax which then had to be separated from the caffein if the latter were to be recovered.

All these difficulties are obviated in the Berry-Rutherford process, which flows green coffee beans through the apparatus in one direction, against a counter-current of hot water to which has already been added all it will hold of the water-soluble flavoring substances, lacking only caffein. The result is that the caffein comes out of the beans, while the other substances remain in them. After drying, the decaffeinated beans are processed in the usual way.

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ZOOLOGY

Wild Mice Share in Credit For Destroying Insects

➤ WILD MICE are entitled to a share in the credit for destroying insects that has become almost a monopoly of songbirds, according to Dr. Albert R. Shadle of the University of Buffalo. Other small rodents, like chipmunks, ground squirrels, also figure as insect destroyers.

Insect-eating habits of these small rodents were studied at the Allegany School of Natural History, where one family of deer-mice were permitted to keep for five years a home they had made in a desk drawer.

They made a specialty of moths. Frequently a deer-mouse could be seen dashing across a screen to catch moths attracted by the lights within. Captured deer-mice in a cage quickly learned to accept moths from the hands of their captors. They liked caterpillars, too.

Dr. Shadle points out that small rodents, hunting among small branches, and the undersides of tree limbs, are likely to find many inactive moths that are overlooked by most birds, besides quantities of insects in the larval and pupal stages.

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