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WHITE BLOOD CELLS

ALCOHOLIC ingredients for a cocktail that may give white blood cells a "lift" sufficient to fight off invading disease germs have been isolated from bone marrow, was announced by Dr. Harry N. Holmes, of Oberlin College, president-elect of the American Chemical Society, at the St. Louis meeting.

The two ingredients are batyl and chimyl alcohols. Until Dr. Holmes and associates, Dr. Ruth E. Corbet, Dr. Walton B. Geiger, Dr. Wyvona B. Alexander and Nathan Kornblum, isolated them in pure form from bone marrow, these alcohols were not known to exist except in marine animal life. These alcohols were obtained from the part of bone marrow which is effective in counteracting the serious disease, agranulocytosis.

"Agranulocytosis, or leucopenia, is a disease in which the patient lacks the ability to increase rapidly the number of white cells, or phagocytes, during the onset of an infectious disease," Dr. Holmes explained. "These phagocytes fight infection, so nature tries to increase them when menaced with danger. During an acute attack of appendicitis the normal white blood count of about 8,000 may be doubled for the attack on the invaders." Preliminary tests on rabbits with the two alcohols from bone marrow show that they have a definite influence on the formation of white blood cells and may be useful in strengthening the defenses of the body.

Dr. Holmes said that "Dr. Roy Kracke, of the Medical School of Emory University, a few years ago showed that use of certain types of sedatives weakened the emergency mechanism of the human body by which white cells are increased during infection and often lowered the normal white blood count. This looked like fifth column work in the blood. Agranulocytic victims might be swept away by an infection that normal persons could readily combat with their plentiful phagocytes. Such cases are not common but plenty of people have a low white blood count from one reason or another and they might welcome a bone marrow stimulant. Many people have certain unpleasant reactions to sulfanilamide and medicines of that type. Among these reactions is a drop in the number of phagocytes in the blood. Patients treated too long by x-rays also show a very low white blood count and need help.

"Since the phagocytes are made and matured in the yellow bone marrow it is evident that some chemical substance found there is responsible for this necessay manufacture of white cells for the blood. Bone marrow itself is not an article of commerce, so if the medical profession is to have the use of aids in increasing the white blood count during emergencies, it is obvious that pure chemicals must be isolated from marrow, tested on animals, their chemical structure determined and their synthesis accomplished."—JANE STAFFORD.

THE TREATMENT OF INFLUENZAL MENINGITIS

SAVING of 30 out of 43 child lives doomed otherwise to almost certain death from influenzal meningitis was achieved by a treatment reported by Dr. Michael Heidelberger and Dr. Hattie E. Alexander, of Columbia University Medical School, and Dr. William E. Bunney, Dr. Tillman D. Gerlough and Dr. John W. Palmer, of E. R. Squibb and Sons, New Brunswick, N. J., at the St. Louis meeting. It was pointed out that chemical methods used in preparing the antiserum for this treatment can be applied to health improvement for national defense. Experience with these methods has already led to production of a triple vaccine against typhoid fever, tetanus (lockjaw) and diphtheria, which has shown protective value in animal tests. If trials on human beings confirm these findings, it will be possible, with a single "shot in the arm," to give a soldier, or a civilian population in times of disaster, protection against these three serious diseases.

Influenzal meningitis, for which the treatment was said to be the most successful yet developed, is not due to the virus that causes influenza, but to another kind of germ, called *Haemophilus influenzae*, type B. The disease attacks small children chiefly and is rare both in adults and in children over eight years of age. It is highly fatal. Before the new treatment was instituted, the mortality rate at the Babies' Hospital, New York City, was a hundred per cent.

Antiserum, such as was used in the treatment described, is made by injecting the germ of a disease into the veins of a horse or, more recently, of a rabbit. The animal responds by the production of a specific chemical substance in the blood, which is called an antibody.

The active agents in the antisera used for treatment are now known to be circulating proteins modified under the stimulus of the bacterial vaccine or other agent used in producing serum in animals. Analytical chemical micro-methods for picking out these active curative agents from the other inert matter of the serum and actually weighing the amount present, instead of depending on vague relative methods, have not only resulted in a great extension of knowledge regarding the creative antibodies, but have supplied a valuable means of checking the value of alternative methods of immunization and so producing stronger and more efficient antisera and deciding which species of animal produces the best sera.

When these sera are available, the same methods aid in purification and separation of the antibodies, so that the reactions and inconveniences resulting from their use may be minimized. If the antibodies have not been damaged in purification the same analytical methods provide a quicker, cheaper and more humane index of potency than, for instance, the testing of antibodies in mice.

These methods were used to prepare the rabbit antisera and purified rabbit antibody which, used along with sulfanilamide, turned the one hundred per cent. influenzal meningitis death rate into an approximately seventy per cent. recovery rate.

THE COST OF SMOKE

ACTUAL cost each year to people in the United States on account of smoke is $2,500,000,000, and in addition there is the incalculable cost to health, according to a

report to the society by W. L. Jones and Dr. F. E. Vandeveer. Dr. Vandeveer is connected with the American Gas Association Testing Laboratories at Cleveland, while Mr. Jones is with the St. Louis County Gas Company. The wastage of coal, gas and oil fuels, due to the incomplete combustion which causes smoke, amounts to $200,000,000. In addition, the extra cleaning of buildings, and laundering or dry cleaning of wearing apparel and house furnishings, and their shortened life, account for the remainder of the total.

"Probably the worst aspect of smoke is its effect on health," according to the authors. "While this relationship is difficult to evaluate, correlation of smoke and high incidence of pneumonia seems to have been clearly established. Much evidence exists that death rates from pneumonia and other respiratory ailments are greater in smoky industrial centers than in small urban communities. The effect of smoke in depriving people of sunlight is another broad aspect of the smoke problem, and one which probably has an important bearing on health."

Wider use of gas as a fuel to overcome smoke troubles, because it can be burned more efficiently and completely than some other fuels, was advocated.

A process that will remove the smoke-forming tar from coal at temperatures of 700 and 800 degrees Fahrenheit, considerably lower than those required in the expensive plants used for making blast furnace coke, was described by C. E. Lesher, president of the Pittsburgh Coal Carbonization Company. At these temperatures, he said, the coal is heated just enough to melt it and to drive off the tar vapors.

When the coal is melted, he said, it becomes plastic. Even though it was originally a powder, it then is sticky, and forms into a soft mass at the same time that the vapors and a part of the gas are given off. This is done in a revolving steel drum. The mass is broken into small pieces, rolled into balls, which quickly harden into dense uniform pieces of low-temperature coke. He pointed out that "This kind of coke has important advantages as a domestic fuel because of its reactivity, which means that it is easy to ignite, and, when it has been ignited, it does not go out in either the fireplace, the stove, or the furnace. It is reactive and easy to ignite because there is sufficient volatile matter left in the product to make it burn readily."

Tar products valuable for making light, strong plastics, which may prove useful for airplane and automobile bodies and free aluminum and other metals for defense needs, can be obtained in the process of making low-temperature coke, said Caleb Davies, Jr., vice-president of the company. More tar is made when the coal is heated to these lower temperatures, and it is different, he said. Also, it can be made more cheaply than in the high-temperature coke ovens. "These new tars obtained from low-temperature carbonization are offering to the chemical industry more abundant supplies of some of the very valuable coal tar by-products, most important of which are probably the tar acids. These tar acids are the higher phenols or cresylic acids that are one of the important raw materials in the rapidly growing plastics industry. Where mechanical strength and lightness of material is required in the plastic, as in the future automobile body or airplane fuselage, the plastic from coal tar phenols is, so far as is known, the most important raw material."

He said that the coal tar industry takes 300,000,000 gallons of tar every year, from which it makes road surfacing materials, creosote distillates for wood preserving, roofing pitch, and a long list of specialties used in the chemical industry.—JAMES STOKLEY.

UNDERGROUND GAS AND OIL FIELDS

BY freezing gases sucked out of samples of soils, to detect hydrocarbons present in the proportion of a few parts in a billion, it is possible to locate accurately underground deposits of oil and gas. Speaking before the American Chemical Society, Leo Horvitz, of "Subterrex by Geophysics and Geochemistry," Houston, Texas, described these new methods. Geophysical prospecting, in use for the past twenty years, he said, can detect salt domes and other subterranean structures which are often associated with oil and gas, but the geochemical process detects the presence of the petroleum itself. "The principle upon which these methods are based," he explained, "is that minute quantities of hydrocarbons migrate from oil and gas deposits to the surface of the earth and that the formations encountered retain some of these leading hydrocarbons."

Soil samples are collected from a 12-foot depth over the area to be studied. They are heated under reduced air pressure. This drives out the gases, which are passed through traps cooled to very low temperatures. For instance, at 204 degrees below zero Fahrenheit, pentane and the heavier hydrocarbons are frozen, but the lighter ones get through. Then the gases are subjected to temperatures as low as 278 degrees below zero Fahrenheit and the ethane, butane and propane will be frozen out. Then a still lower temperature, 300 degrees below zero Fahrenheit, will freeze out the methane. In this way, the concentration of the gases, in parts per billion by weight, are determined, and plotted on a map of the region.

"Considerable investigation," said Mr. Horwitz, "indicates that the hydrocarbons leak principally from the edges of the deposit rather than from the center. As a result, it has been found that the significant hydrocarbon distribution pattern is that in which a zone of low hydrocarbon values is surrounded by a band of higher concentrations. This area of low concentration usually coincides closely with the areal extent of the oil field. The order of magnitude of the values in the band of higher concentrations is usually above 10 parts per billion and the average of these high values is usually more than three times that of the values in the low zone.

"A second geochemical technique has developed which involves the analysis of formation cuttings collected during the drilling of wells. By measuring the contents of hydrocarbons and other constituents in these samples, it it possible to predict in advance of the drill whether a petroleum accumulation will be encountered. In the case of a dry well, the values are very small throughout, while, in the case of a producing well, the hydrocarbons show

increasing values as the deposit is approached. From a study of the relative distribution of the various types of hydrocarbons present, it is possible to predict whether the accumulation will consist of gas or oil.''

This method has already assisted in the discovery of several new oil and gas fields and has aided in determining the probable limits of production in other newly discovered fields.—JAMES STOKLEY.

ITEMS

STUDY of the inheritance of physical defects and tendency to diseases in human beings will be undertaken at the University of Michigan, as the result of the establishment of a department of human heredity in the laboratory of vertebrate genetics, and of a heredity clinic to be housed in the hospital of the university. The new department and clinic will be closely associated with the medical school. Although one or two clinics of this kind have been established in Europe, none has hitherto been established in this country. Among the subjects selected for special attention are hereditary dental abnormalities, body proportions and growth, speech defects and deafness.

A GREAT iron meteorite weighing nearly a ton, found by a plowboy in a Georgia field, has been brought to the Smithsonian Institution for study and display in the U. S. National Museum. It is the second largest object of its kind ever found east of the Mississippi. The meteorite, which was buried about two feet deep in the red soil of a cotton field, was struck by the blade of the plow. Since the soil of this particular part of Georgia is almost entirely free from rocks, the boy's curiosity led him to dig down to the obstruction. He managed to break off a small piece, which was eventually sent to the Smithsonian Institution for identification. A visit to the locality by E. P. Henderson, of the staff, and C. W. Cooke, of the U. S. Geological Survey, followed, and arrangements were made for the transfer of the meteorite to Washington.

DESTRUCTION, scattering and isolation, brought by war to the principal scientific collections of the Old World, enhance the importance of similar collections in American museums and universities. The 17 million specimens in the natural history collections of the Smithsonian Institution, comprising everything from pressed wildflowers to human skulls, take on increased significance as scholars become unable to travel abroad in normal fashion. When a new species of plant or animal is discovered, a representative specimen is deposited—usually the first specimen collected—in one of the larger museums. This is known as the type specimen. It is used for comparison with other specimens collected later, to make absolutely certain of their identity. Many of the type specimens in Old World collections have already been destroyed; others have been removed and hidden in safe places. But even where they have thus escaped destruction, they are not at present available for study. Furthermore, practically all important collections in continental Europe are out of reach of Americans and British, as the collections in Britain and America are unavailable to continental scholars.