SCIENCE NEWS

Science Service, Washington, D. C.

INFANTILE PARALYSIS

CURE of infantile paralysis, or poliomyelitis as it is called technically, depends on early recognition of the disease, for the methods of treating it are most successful when applied in the first stages. Mothers generally attend to the illnesses of their children, and while they can not hope to make a diagnosis of this disease unaided, they can learn to suspect its presence so as to call for medical aid in time.

Unfortunately, neither the cause nor the method of transmission of the disease is known. Control methods depend on isolating the patient. Prevention also depends on keeping children and young people away from persons suspected or known to be suffering from the disease. In times of epidemics, it is wise to keep children away from strangers, also.

"The paralysis itself is due to the destruction of the nerve cells in the spinal cord which govern the movement of muscles," Dr. W. L. Aycock, of the Harvard Medical School, has explained. "When these nerve cells are destroyed, the muscle with which they are connected loses entirely its power to function. It is like a telephone which may be in perfect order itself but which can not function without a wire leading to it from the telephone exchange."

Consequently treatment for the disease must be begun before the nerve cells have been destroyed, if paralysis is to be avoided. Once it has occurred, it is too late to cure it, although patient treatment and care and exercise can do much for the affected muscles. Skilful treatment, if paralysis has occurred, is of great importance, because in growing children the pull of unparalyzed muscles against those which are paralyzed tends to produce serious deformity. The paralysis is practically always preceded by certain definite symptoms. It is during this preparalytic stage, before the nerves have been destroyed, that there is a chance of cure. Serum from the blood of persons who have passed through an attack is the one remedy at present available for treating the disease in the preparalytic stage. Doctors speak of this as convalescent serum.

The onset of poliomyelitis is usually abrupt, with fever, headache and stomach and intestinal upset. The child is drowsy and wants to be let alone. Usually he seems sicker and more prostrated than would be expected with the degree of fever, which is generally not over 102 degrees Fahrenheit. An anxious expression of the face, tremors and twitchings of the muscles and a sort of uncertainty in the movement of the arms and legs are characteristic of the early stages of the disease. The most suggestive sign is stiffness of the spinal column and neck. The child will hold his head and neck rigidly and often he can not sit up comfortably without propping himself on his arms.

Every stiff neck is by no means an indication of infantile paralysis, of course. The stiff neck of this disease is a rather special one. But if the mother finds such a symptom, she should at least suspect the disease and have the matter further investigated without delay.

The paralysis may set in anywhere from one to three days after the onset of the disease. The extent of it varies. When death occurs, it is from paralysis of the muscles used in breathing and not from the severity of the fever.

A NEW ANTI-FREEZE MIXTURE

WILL people get chronic or acute poisoning if wood alcohol is used generally as an anti-freeze mixture for automobile radiators? This is one of the questions which government scientists are trying to solve as a result of the proposal to introduce synthetic methanol as an anti-freeze mixture next winter.

Methanol, as wood alcohol is called by chemists, used to be made by distillation of wood. This made its cost high. By the new method, it is made by combining the deadly carbon monoxide with hydrogen, the raw materials being coal and water. This makes synthetic methanol very much cheaper than the product obtained by distillation. Whether it can be used safely in automobile radiators has yet to be determined.

When swallowed, wood alcohol is a poison which may cause blindness and death. Careless bootleggers have mistaken wood alcohol for the less deadly ethyl alcohol, with disastrous results to their clients. This use of the new anti-freeze is to be guarded against by giving it a distinctive color, it is planned.

However, the question remains whether the fumes could not get into the body either by absorption through the skin or by inhalation through nose and mouth, and thus cause disease and possibly death. How much of the substance can get into the body in these ways, and how much will cause poisoning, either chronic or acute, must be determined.

It may be that the new anti-freeze mixture can be used safely if certain regulations are followed and certain precautions taken, as in the case of the anti-knock gasolines. These contain a small amount of tetra-ethyl lead. When they were first introduced there was a question as to whether people generally would be in danger of lead poisoning from the exhaust, and whether men selling it and working in garages where it was sold were risking their health. Cases of lead poisoning in the plants where the anti-knock mixture was made heightened the public anxiety. But scientists found that the only real danger was in the manufacturing plants and that even there, as in other lead industries, certain health precautions, if followed, would safeguard the workers.

A possibility exists of certain people being more susceptible to methanol poisoning than others, and of certain people having the kind of skins that would absorb more of it than others. This also will be investigated, according to Dr. R. R. Sayers, of the U. S. Public Health

Service, who is in charge of the investigation. Chemists of the U. S. Bureau of Mines at Pittsburgh will make chemical and laboratory tests, working with animals. The U. S. Public Health Service is making field tests on men who are now exposed to synthetic methanol.

Ethyl alcohol, closely related to methanol, which is methyl alcohol, is largely used at present as an anti-freeze mixture in automobile radiators. Its chief disadvantage is that it evaporates quickly and must be constantly replaced. It is not poisonous like methanol, because man can develop a tolerance to it. Another popular anti-freeze is ethylene glycol, which is made synthetically from petroleum and has the advantages of both ethyl alcohol and of glycerine, also widely used. Ethylene glycol and glycerine are more expensive than ethyl alcohol, which in turn costs more than synthetic methanol. The latter is being made by three large companies who make over six million gallons a year.

THE PROTECTION OF TROPICAL FORESTS

PLANS for protecting the great tropical forests of the Americas from careless exploitation, such as has laid waste the forest sections of other parts of the world, were discussed at the meeting of the first Inter-American Conference on Agriculture, Forestry and Animal Industry.

Forest land in the twenty Latin-American republics is estimated to cover an area of 3,000,000 square miles, which is larger than the total area of continental United States exclusive of Alaska, according to William R. Barbour, forester of the Tropical Plant Research Foundation. So little research has been done in these forests that only vague guesses can be made as to the volume of standing timber in them. A safe estimate places it at at least six thousand billion board feet.

"Too little is known about the forests of tropical and subtropical countries," said W. T. Cox, consulting forest engineer of the Tropical Plant Research Foundation. He urged extensive forest exploration aided by airplane, so as to get not only botanical information of the numerous trees but also commercial classifications. The training of young men in forestry and the development of these vast forests along scientific principles were advised.

"In the two Americas constructive forestry is still in its beginning," said Dr. E. P. Meinecke, plant pathologist of the Bureau of Plant Industry of the U. S. Department of Agriculture. The nations of the two Americas have a common interest in building up their forests for the benefits of coming generations and to this goal the protection of the forests against disease is one of the most promising and essential conditions. The greatest menace from killing forest epidemics has come through the accidental introduction of forest diseases. The science of forest pathology, which would take care of these disease conditions of trees, must be organized on international lines in order to find its true place in modern forestry.

The danger of looking for temporary reward rather than for ultimate benefit in the cutting down of forests and development of the land for other purposes was described by Professor D. M. Matthews, of the University of Michigan School of Forestry and Conservation. The reckless waste of trees which results from using the land for other purposes is not the only evil. The removal of the forest cover may have a bad effect on the productive capacity of other permanent agricultural areas in the region, he pointed out. This is too frequently overlooked in the clearing of land.

Other speakers emphasized the need of studying the little-known woods of these forests with a view to their possible uses in future decades when both Latin-American countries and the United States will have to turn to these forests for most of their lumber.

MAGGOTS IN WOUNDS

SOMETHING more than a scavenger reaction is behind the successful healing of wounds by the new maggot treatment, its discoverer, Dr. William S. Baer, of the Johns Hopkins University, told the group of scientists gathered in Baltimore, Md., for postgraduate study of bone diseases and cancer of the bone.

A specific reaction between the serum of the body and the maggot itself probably causes the healing of wounds to which maggots are applied. Just what this reaction is has not yet been discovered, he said.

Dr. Baer told how his experiences as an army surgeon during the World War started him on the investigations leading to the new treatment. Two men were brought in who had been lying in the field for seven days without food. They suffered from abdominal wounds and from compound fracture of the thigh bone. The wounds were covered with maggots, the tiny larvae of flies. The men were hungry, but otherwise their condition was good.

In the hands of the best surgeons, the mortality for compound fracture of the thigh bone was 80 per cent., Dr. Baer knew. In other words, four fifths of the persons who suffered from that condition died. In the hands of the maggots, the mortality for those two men was nothing. Instead of the bad infections commonly found in such injuries, Dr. Baer found only a few harmless organisms.

For ten years he puzzled over these cases, particularly when treating children suffering from osteomyelitis. This disease of the bone is the result of an infection, is more common in children than in adults and is extremely difficult to cure. If it reaches the chronic stage, recovery is often delayed for years. Finally he tried the effect of maggots on some of these cases. In six weeks the children were entirely well. Dr. Baer has used this method on 300 patients during the last two years. All the children have recovered entirely. With adults the treatment has been successful in four fifths of the cases. Lack of success in the other one fifth Dr. Baer thought might be because adults do not stand the treatment well and it can not be given continuously.

At first it was thought that the success of the maggots in cleaning and healing wounds was due to scavenger action. The tiny larvae ate up the dead tissue about the wound and the bacteria died from lack of sustenance.

Now it is thought that something more than this is responsible for the success of the treatment.

HEPTANE, RARE RESIN PRODUCT

FROM healing wounds to measuring the knock of different gasolines seems a far cry, yet heptane, a resin product secured only from two species of pine, seems destined to serve these two widely differing purposes, C. L. Hill, of the U. S. Forest Service, has reported.

The two trees from which heptane can be derived are just as far apart on the commercial scale. One, the Jeffrey pine, is a valuable timber species, sometimes known to the mountain people as the apple pine because of the odor of apple or pineapple that is usually emitted by its bark. This tree is found in the higher mountains throughout the greater part of California. The second tree furnishing heptane is the Digger pine, which previously has been considered a species of little value, used primarily for fuel. It occurs throughout the foothills and lower levels of both the Sierra Nevada and Coast Range of California.

While the development of heptane from an industrial standpoint is new, the curative value of the resin from these two trees, when applied to cuts and wounds, was long ago discovered, and during the Civil War agents of the Union Armies went to far-off California to secure it. Of recent years, however, its medicinal use has dwindled, and it has been more or less classed with the herbs of our grandmothers' time.

According to Mr. Hill, it was about twenty years after the Civil War that chemists at the University of California discovered that the liquid obtained by distilling the resin of the Jeffrey and Digger pines was a hydrocarbon called normal heptane. This heptane, also commonly found in petroleum, is quite different from the terpenes which form turpentine and which were supposed to be produced by distilling the resin of any pine tree, so the announcement of its discovery caused quite a furore in the chemical world. It was many years before the findings of the California chemists were generally accepted among the chemical profession.

Even then, however, the production of heptane from pine trees had no definite commercial value. It has only recently been discovered that heptane, in connection with octane, the hydrocarbon next to it in the same chemical series, can be used for the laboratory measurement of the knock of different gasolines, and so determine the dosage of tetra-ethyl-lead that is necessary to neutralize that knock. Experiments are now in progress to perfect this method of measuring gasoline knock.

NEW USES FOUND FOR HELIUM

HELIUM, first discovered in the sun and later obtained at great expense in minute laboratory quantities, is now familiar to every one as the lifting gas for American airships. Soon, however, it may be even more common, for still other uses are rapidly being found for it. At the meeting of the American Chemical Society in Cincinnati, R. R. Bottoms and W. E. Snyder, of the Helium Company, Louisville, Ky., stated that "helium gas is now available in commercial quantities in the United States and there is sufficient supply to meet not only the needs of aeronautics, but for other uses as well."

The points that make helium valuable, they stated, are that it is inert chemically, not combining with any other element; it is very light; it is insoluble, conducts heat well and can be cooled to an extremely low temperature without liquefying. These properties, they say, make it valuable for use in metallurgy, for the preservation of food, for heating and cooling and as a circulating medium, instead of air, in drying systems. They also suggest that it can be used as an artificial atmosphere for deep-sea divers and caisson workers and for the treatment of diseases of the lung and blood. In such uses it would be employed as a substitute for ordinary air, the helium being mixed with oxygen and thus taking the place of the nitrogen in the atmosphere.

ITEMS

WITH an average of 798 pounds of fertilizer used on every acre of crop land during 1929, Florida leads the United States in the use of fertilizer, R. O. E. Davis, research chemist of the U. S. Bureau of Chemistry and Soils, told members of the American Chemical Society, at their recent meeting in Cincinnati. Next to Florida is New Jersey with 417 pounds per acre. On the whole, the states of the Atlantic seaboard use it much more extensively than those inland, though a great increase in its use has come since 1913 in the Pacific Coast states, and there is also a tendency to increased use in the West North Central states. Cotton uses on an average 108 pounds per acre, though 31 per cent. of all the fertilizer used is on this crop. On citrus fruits the rate is 1,163 pounds. Five principal crops consume about 82 per cent. of the fertilizer, though less than 25 per cent. of the acreage devoted to them is fertilized.

MORE solid carbon dioxide, commonly known as "dry ice," is now used than the liquid form of the gas, in which it was formerly marketed. D. H. Killefer, chemist of the Dry Ice Equipment Corp., New York City, told members of the American Chemical Society meeting at Cincinnati that nearly 30,000 tons of this former laboratory curiosity will be used during 1930. This is greater than the total amount of liquid carbon dioxide used in 1927, the latest year for which figures are available. It is used for refrigeration, because of its advantages over ice in being colder and in not melting, but changing directly from the solid form into the gas.

DEVELOPMENT of a large number of standard color samples, showing even gradation of all the three color variables and carefully calibrated by physical measurements, was urged at the meeting of the American Chemical Society at Cincinnati by I. H. Godlove, research chemist of the Munsell Color Company, Baltimore. He stated that something of this kind is needed to correlate the various color languages now in use. Such standards, he declared, would give freedom from personal vagaries, combined with a direct knowledge of "how a color looks."