SCIENCE NEWS

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THE REDUCTION OF HIGH BLOOD PRESSURE

HIGH blood pressure is reduced by substances produced in the liver, and extracted as a highly concentrated and potent compound by a Canadian physician, Dr. W. M. MacDonald, of St. Catharines, Ontario. Recently Dr. MacDonald discovered the value of a cruder form of the extract, and made a preliminary announcement of the fact. Since then he has been working on methods of purification and refinement, and made his report before a recent meeting of the Toronto Academy of Medicine.

The results which have been obtained in experimental animals with the liver extract and preliminary chemical analysis of the potent material have shown that the active principle is similar in character and action to certain ammonia-like substances already known to be capable of lowering the blood pressure. The great differences between the new material and the old lie in the size of the necessary dose and in the duration of the effects. To produce a given diminution of pressure, incomparably smaller quantities of the new material are needed than of histamine or choline, two of the most active of the older chemicals.

Further, the liver extracts produce effects which persist for several hours. All preparations which had been tried before Dr. MacDonald drew attention to liver extract had only a temporary effect and therefore gave little promise of furnishing a weapon for attacking the ailment in human beings.

Describing his earliest experiments on rabbits, Dr. MacDonald told of the injection of liver extract into the jugular vein of twenty-eight animals. At this stage, there was no clue as to the proper dose, and the treatment proved so drastic that the blood pressure of twenty-one of the rabbits was reduced to zero, and they died. Of the remainder five showed a long and decided fall and in the case of two there was no appreciable alteration. Still more significant results were obtained in the case of dogs and cats, where practically without exception a drop in blood pressure occurred when the extract was administered. Cats and dogs are being used for all the animal experiments at the present time.

Of vital importance from the point of view of the safety of the preparations was the statement by Dr. MacDonald that the lethal dose is definite and can be ascertained. "The effect appears to be in direct proportion to the weight of the animal and to the amount administered; the lethal dose can be definitely established."

In his experiments animals were given doses of proper strength at frequent intervals, in order to show whether there was any unfavorable cumulative action. No such ill results could be detected. Dr. MacDonald said that both the toxicity tests on laboratory animals and the effects of the extracts on the isolated heart, have not revealed any unfavorable action which would contradict their repeated injection into man. Repeated injections at intervals of several days have not brought out any anaphylactic-like reactions.

Dr. MacDonald stated that a yardstick has now been obtained by which to measure the potency of liver extracts. This is done by standardization against histamine, which can be prepared pure in the laboratory. Two methods have been perfected already, one of which consists in the comparison of liver extract and histamine by injection into an animal on which a blood pressure tracing is being made; the other method consists in making use of the power possessed by both extract and histamine to cause contractions in certain of the involuntary muscles.

THE USE OF GLANDULAR EXTRACT IN THE HEALING OF FRACTURES

BROKEN bones can be cured through the use of a new glandular extract that has already proved its usefulness in curing tetanus. This is the information coming from Japan where experiments have been in progress with the hormone of the parathyroids that was isolated last year by Professor J. B. Collip, of the University of Alberta, Edmonton, Canada.

Professor Collip obtained from the parathyroid glands a hormone or extract which, when injected or given by the mouth, causes the amounts both of calcium and phosphate in the blood serum to rise. The parathyroids are four very small glands in the neck which lie near the thyroid gland or are embedded in it. His discovery was applied successfully to the cure of tetany, a somewhat rare disease usually found in children, and characterized by peculiar spasms.

A much wider utility for it is foreshadowed by the work done subsequently by Dr. Ogawa, in the surgical clinic of the Japanese medical academy of Keijo. As bone is so largely composed of calcium phosphate, a hormone which raises the amount of this substance in the blood might be expected to assist in bone formation. Rats with broken legs were found to produce twice as much new bone when fed with parathyroid glands as when not so fed.

Bone consists largely of calcium phosphate, and after a fracture fresh quantities of this substance must be taken from the blood for the formation of new bone. The slowness of the healing process seems to be largely due to the very small amounts of calcium and phosphorus in the blood.

The publication of the results in the case of human beings is awaited with the greatest interest, for there is reason to believe that the administration of parathyroid extract would not only hasten the healing of fractures in the young, but might render it possible in old age.

THE DETERMINATION OF SEX

X-RAY treatment of the prospective father of a brood of animals before mating will influence the proportion of males and females among his offspring. If the mating

is made within a few days after the treatment there will be more males; if it is delayed for a week or two there will be more females. These results were obtained by A. S. Parkes, of the University of London, working on mice.

It has been known for many years that prolonged exposure to X-rays produces sterility, both in man and animals. But no diminution of the sex instincts follows in such cases. Mr. Parkes has now investigated the effects on breeding power of exposure to a soft ray, in doses insufficient to produce complete sterility. The experiments were conducted on mice, and, as there is reason to suppose that the sex of the offspring is determined by the male parent, only males are irradiated.

Three exposures of ten minutes each were given, and at determined periods thereafter the mice were mated with normal females. It was repeatedly found that from matings which had taken place within the first few days after exposure a large excess of male offspring were produced. Only two out of 11 litters conceived during the first three days after irradiation produced any excess of females.

Among the offspring conceived during the next week, however, females preponderated heavily. Seven litters were obtained, not one of which had an excess of males. The remaining births, conceived within from 25 to 58 days after irradiation, showed nothing very striking as regards the proportions of the sexes.

Seven hundred and thirty-five normal mice, bred under conditions similar to those in which the experimental matings were made, gave a male percentage of 51.6 in their offspring. Young conceived from irradiated male parents within four days of the date of the exposure gave a male percentage of 59.4, whereas among offspring conceived during the next fortnight after irradiation the percentage of males fell to the remarkably low figure of 33.6.

No satisfactory theory has yet been found to explain these curious results. Further experiments are expected to show to what extent they apply to other animals, and whether or not they will be worthy of the attention of the animal breeder.

"WOOL" FABRIC MADE FROM WOOD

A NEW yarn, with the warm soft feel of lamb's wool, is now being made from the waste product of the artificial silk industry. U. S. Department of Commerce officials hold out a great future for the new fabric, which is already being manufactured in the United States as well as being imported from Italy, where it started.

The new "wool" is shimmery and dyes in beautiful colors. Combined with real wool in making serge and other goods, it improves its appearance, as silk does. It is not as strong as sheep's wool, and like artificial silk, does not wash as well. This is not a serious drawback for its use in textiles, as only a part of the strength of materials is necessary in clothing.

Chemically, the new yarn is the same as artificial silk, or rayon, for it is either made from its scraps, or directly from cellulose or wood fiber by the identical process. In making of artificial silk, the viscose, or dissolved cellulose, is spun into a continuous thread like real silk from the cocoons of silk worms. The fibers used in the making of this artificial "wool" are short pieces from two to six inches in length, which are worked into yarn like sheep's wool.

The price of the fiber wool yarn will be from fifty cents to a dollar a pound, as compared with two dollars a pound for the real wool yarn, Department of Commerce officials say.

An Italian company is producing this new artificial wool yarn under a German patent and has placed it on the market where it is said to have been favorably received by textile makers. In England a wool-like product called "woolulose" is being manufactured directly from vegetable fiber by a process distinct from that used in making artificial silk.

The artificial fibers resembling wool and silk are the only textile materials that man has added to those provided directly by nature. His cotton grows on bushes, the silk worm spins his silk, the flax plant provides his linen and the sheep and other animals his wool.

But man has improved in one way on nature's textile materials, for these rayon fabrics are more transparent to the ultra-violet or short wavelengths of light which are so helpful in the cure of many diseases. The new fabrics, unlike the old ones, may enable the fully dressed man of a civilized age to get as close to the sun as the savage of the South Sea Island.

SAWDUST AS A FEED FOR DAIRY COWS

THE United States Forest Products Laboratory has been making some interesting experiments with sawdust as a feed for dairy cows. The outcome is doubtful. But down in the Coconino and Tusayan national forests in Arizona, Dr. G. A. Pearson, of the Southwestern Forest Experiment Station, has been making some very conclusive observations of the consumption of young forest trees by grazing livestock.

In a broad way Dr. Pearson's conclusions are that stock has eaten up possibly 200,000,000 board feet of potential timber in the last twenty years. This was under restricted grazing privileges. Dr. Pearson finds that there are about 200,000 acres of cut-over land in the two forests on which natural reproduction of trees has failed, wholly or in large part, primarily because of overgrazing. This area is increasing yearly as timber cutting progresses. Most of the damage is caused by sheep and cattle actually eating the pine seedlings. Sheep are the principal offenders, but where the cattle are too numerous they also develop a pine tooth.

Not only has livestock, grazing in the forests under permit, eaten the equivalent of 13,000 lumber houses during the last two decades, but within the last five years it has set back regeneration about twenty years. It appears that on the average it takes twenty years to obtain a satisfactory stand of seedlings in the Arizona pine forests. Seed crops are irregular, and good crops and wet seasons sometimes coincide only once in five years. In 1919, however, there was an exceptionally large yield of

seeds accompanied by the most favorable weather conditions. Millions of vigorous seedlings, even on old cut-over areas with few seed trees, sprang up. Unfortunately, heavier than normal grazing has been permitted of recent years, and 25 per cent. of the 1919 trees have been devoured by cattle and sheep, another 50 per cent. has been devastated and will be eradicated at the present rate of grazing within the next two or three years. Only a quarter of what may be the best seed crop in twenty years has a chance to live.

Grazing has caused great areas of forest land to lie idle for ten to twenty years, says Dr. Pearson. At a net growth of 100 board feet per acre a year, this means the loss of 150,000,000 to 200,000,000 board feet during that time, a loss that is now proceeding at the rate of not less than 15,000,000 a year.

Dr. Pearson calculates that at their present market prices as timber on the stump and forage, trees are worth fifteen times as much an acre for timber as for cattle feed. Converted into lumber on the one hand and into meat on the other, the lumber conversion brings into the community from four to ten times as much wealth as the meat-making process.

Besides reducing the amount of timber reproduction, grazing, Dr. Pearson finds, causes poor quality. To produce good saw timber the young trees must grow close together. Many of them die out in the struggle for light and nutriment, but those that remain are tall, straight and free from lower limbs, whereas without crowding they would have been squatty, crooked and covered with knot-making limbs. This scattered reproduction is often worse than none, because it is at once worthless and preventive of younger and better growth.

Dr. Pearson's investigations have been brought to the attention of the Senate Committee now considering a revision of the administration of public lands, to which the stockmen are appealing for more grazing concessions, and are believed to be contributory to more rigid regulation of grazing hereafter in the Coconino and Tusayan Forests.

RADIATOR CONTROL OF ENGINE OIL

LARGE savings in automobile engine oil can be made with proper operation of the auto radiator. This rather mysterious relation is explained by the National Bureau of Standards and a practical means of taking advantage of the bureau's research discoveries is now suggested.

If the radiator of an engine is too cold the water circulating around the cylinders makes some of the gasoline condense and mix with the lubricating oil. Soon the oil is so diluted that it must be thrown away. To prevent this difficulty the radiator water should be run as hot as possible without boiling; especially it is important to warm up the engine quickly when starting in cold weather.

But with alcohol in the radiator to prevent freezing during cold weather the driver is limited as to how hot he may run the cooling system without danger of losing his anti-freeze material. Every one knows how dangerous it is to boil out the alcohol during a warm spell in the winter, because in the cold wave which follows a freeze-up is likely to occur with the usual disastrous radiator leaks or cracked cylinder block. The latest proposal to get rid of these troubles is to use an anti-freeze material which boils at a higher temperature than water. Numerous such materials have been suggested and certain of these have been tried out with success by commercial fleets of trucks. The two most widely recommended materials are glycerine and ethylene glycol.

THE UTILIZATION OF SEWAGE GAS

CITIES of the future will have their gas works located near their plants for the disposal of sewage wastes, and scientific thrift will recover for fuel a useful gas now wasted into the air. Light and heat from the gas obtained as a by-product in the treatment of sewage is a practicable possibility, according to the report made by the Illinois State Water Survey to the Board of Natural Resources and Conservation of that state. Experiments conducted by the survey indicate that in a city of fifty thousand inhabitants the quantity of combustible gas given off each day by the sewage in the treatment tanks is more than ninety thousand cubic feet.

This gas contains 70 per cent. methane, the chief combustible constituent of natural gas, and has a heating value equivalent to 700 British thermal units per cubic foot, while the value of the common fuel gas is 550 to 600 units. The other constituents of the gas, carbon dioxide and nitrogen, are inert, and the gas itself has no more odor than ordinary fuel gas.

The gas is produced in the digestion process which the sewage liquor undergoes in the Imhoff treatment tanks, and formerly escaped into the air. It has been known for a number of years that this product will burn readily, but city officials and sewage plant operators have not heretofore realized the gross value of the gas that goes to waste each day.

The Illinois State Water Survey, with funds assigned by the Chemical Foundation, is experimenting with the collection and utilization of this gas and is developing a new type of treatment tank which is designed to give the maximum yield of gas.

ITEMS

DEATHS from tetanus may result from the use of bunion pads for shields or dressings after vaccination, is the warning issued by the U. S. Public Health Service, Washington, D. C. Fatalities from this cause have recently been reported from various parts of the country. Not only may the fresh felt pad be contaminated with the lockjaw germs, but the covering of the inoculated spot by any kind of shield will tend to keep the place wet and warm and therefore a favorable culture ground for the growth of microbes, especially the tetanus bacteria. Loose, cool, gauze dressings do not harm if properly cared for, but the best dressing is none at all, in the opinion of the service, for the dry scab that naturally and quickly forms is sufficient protection in most cases, and if the skin has been properly sterilized in advance there is no fear of foreign infection.