SCIENCE NEWS

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A PLANT FOR POWER ALCOHOL

THE first American plant for the production of alcohol from low-grade farm produce, for use in producing an alcohol-gasoline blend motor fuel, was formally honored at the meeting of the Atchison, Kans., Chamber of Commerce.

The plant will produce 10,000 gallons of anhydrous alcohol daily from 4,000 bushels of corn. Thirty-two tons of protein cattle feed will be a by-product. Other farm products, such as low-grade oats, barley, wheat and potatoes, can also be utilized for alcohol production. The material employed at any given time will depend on the crop conditions.

The ethyl alcohol produced by the operators, the Bailor Manufacturing Company, will sell for 25 cents a gallon and the final blend of alcohol and gasoline sells for the same price as a premium straight gasoline of comparable octane rating. Standard approved denaturants will be used to make the alcohol unusable for beverage purposes.

Speakers at the meeting included scientific men from the chemical, agricultural and medical field. Dr. Arnold Osterberg, of the Mayo Clinic, Rochester, Minn., discussed the hazards of health caused by the carbon monoxide content of automobile exhausts burning straight gasolines. The much lower carbon monoxide content of the exhaust from an alcohol-gasoline blend fuel is a medical point in its favor. Dr. William Hale, consulting chemist of Washington, D. C., predicted that the establishment of the new plant in Atchison marks the dawn of the alcohol era in motor fuels. Dr. Leo Christensen, biological chemist in charge of the Atchison plant, described the benefits to the farmer from the use of alcohol as a gasoline blend. A 10 per cent. alcohol-gasoline fuel, said Dr. Christensen, has all the advantages of ordinary straight gasoline in a purely technical sense, and in addition, on the economic side, it has the merit of providing the farm with a new, untouched market for low-grade farm products which are now so nearly valueless that it is almost unprofitable to remove them from the fields. And the poorer a given crop may be for food purposes, he pointed out, the greater is the yield of alcohol from it.

RIGHT- AND LEFT-HANDEDNESS

DR. SAMUEL T. ORTON, of Columbia University, who recently gave the first of the 1936 Salmon Memorial Lectures at the New York Academy of Medicine, pointed out that right- or left-handedness of a child gives a key to which is the master half of the brain controlling the development of the all-important language abilities.

Although either side of the brain is capable of assuming charge of the language abilities in an individual, only one side actually engages in this task. The other side is either useless or at least unused. And the active side of the brain is always the side opposite to the individual's master hand.

The whole control of speech, reading and writing, and hence practically all communication of an individual with his fellow men is concentrated in this one side of the brain.

The baby at birth starts life with no superiority of either hand or, as far as can be determined, of either side of the brain. He does have an hereditary tendency toward the development of superiority of one or the other side.

Dr. Orton stated that "the brain centers which control the language faculty are not open to the influence of training, but the handedness of an individual is." Usually the training is toward use of the right hand because most adults are right-handed, and also because of a prejudice against left-handedness as revealed in such words as "sinister," and the French "gauche."

Dr. Orton has found only three cases where right-handed children were trained to use the left hand. "In one, the mother herself became confused in facing the child across the table as to which was the child's right hand, and consistently taught the youngster to use the left, under the impression that she was training the child as a right-hander. The other two cases were those of boys trained on the left side by their fathers in the effort to make baseball pitchers of them. Both efforts failed."

Dr. Orton indicated that failure of either side of the brain to assume dominance may lead to language difficulties in the children. He said: "The existence of a series of intergrades between right- and left-side preferences in handedness, eyedness and footedness implies that comparable intergrading may exist between the two hemispheres of the brain in those areas which control language, thus giving rise to developmental disorders. The striking concurrence of left-handedness, of motor intergrading and of various types of language disorders in certain family stocks, strongly supports this assumption."

EFFECT OF THE LOSS OF AUDITORY EQUIPMENT

NATURE, in building the hearing apparatus, used a safety ratio which would meet the requirements of modern engineering standards, Dr. W. J. Brogden, of the University of Illinois, told the Midwestern Psychological Association meeting at Northwestern University.

A loss of 50 per cent. of an animal's auditory equipment reduces his hearing sensitivity by only 2 or 3 per cent. He was reporting an investigation on the hearing of cats conducted in cooperation with Dr. Edward Girden, of Brooklyn College; Dr. Fred A. Mettler, of the University of Georgia School of Medicine, and Dr. Elmer Culler, of the University of Illinois.

"It seems unlikely," said Dr. Brogden, "that a loss of 3 decibels in acuity would appreciably impair the animal's chances for survival; in which case we may properly speak of a safety factor of two. Indeed we may question whether the mortality-ratio among cats would be seriously increased by a loss of three fourths of their normal acoustic equipment, that is by a functional attenuation in hearing of 16 to 18 decibels (about 15 per cent.).

Sounds travel four main highways in their journey from the ear to the upper brain centers, for the impulses starting in each ear travel to both sides of the brain cortex.

Loss of one cochlea—the snail-shaped part of the inner ear essential to hearing—which closes two of the highways, is followed by a hearing loss of 3 to 4 decibels. Loss of one side of the brain cortex, also closing two highways, results in a hearing loss of the same magnitude. The experiments indicate that the left hemisphere may be slightly superior in acoustic value to the right, but there is no great difference. Loss of one cochlea plus loss of the brain cortex from the other side (closing 3 paths) results in a loss of only 16 to 19 decibels. Loss of one cochlea plus loss of the brain cortex from the same side results in a loss of only 13 to 14 decibels.

Since, in these last two cases, only a single one of the four highways to the upper brain centers remains open for the hearing impulses, the small impairment to hearing indicates a safety-factor which compares favorably with that found in other physiological systems and with good engineering practice.

TUBERCULOSIS IN THE TENNESSEE VALLEY

THE excessively high tuberculosis death-rate among white persons in the Tennessee Valley area was described by Dr. C. C. Dauer, Tulane University Graduate School of Medicine, and Dr. L. L. Lumsden, U. S. Public Health Service, at the meeting in New Orleans of the National Tuberculosis Association.

More tuberculosis deaths per 100,000 white population occur in Kentucky and Tennessee than in any other state in the country except Colorado, New Mexico and Arizona, where the death-rates are high probably because of the large numbers of tuberculous persons who go to those states from other parts of the country in search of climatic benefit.

An area of high tuberculosis mortality is found in central and eastern Tennessee and in western and northeastern Kentucky, shading off gradually in all directions from this central zone in two broad belts. The central zone had the comparatively high tuberculosis death-rate of 92.6 per 100,000 white population, while the average tuberculosis death-rate for the United States is 57 per 100,000.

Drs. Dauer and Lumsden stated that they could find no explanation for the high tuberculosis death-rate in the Tennessee Valley area. Such factors as climate, economic status, occupation, rural and urban conditions, racial composition of the population, education, age, sex, and prevalence of other diseases were investigated, but gave no clue.

A possible clue in the vegetation and soil content of the region was suggested by the two physicians in a report just published by the U. S. Public Health Service. The area of high tuberculosis death-rate and the adjacent area of about average tuberculosis death-rate lie in the southern portion of the Central Hardwood Forest, as shown on a forestry map of the Department of Agriculture. Farther south, in a region corresponding with the Southern Forest Pine Lands, the tuberculosis death-rate is much lower.

"Such a coincidence so far as it goes presents an interesting field for both speculation and practical research," Drs. Dauer and Lumsden state.

The difference in soil dusts, average sunshine and dew precipitation may influence the ability of the tuberculosis bacillus to survive outside the human body, they suggest. A difference in the living habits of the people, dependent somehow on the trees of the region, is also pointed out as having a possible bearing on the prevalence of tuberculosis.

Families residing in the hardwood regions with good shade trees, it was found in one survey, are much more prone to spend a good part of their time during the day in fair weather sitting out in the yard and freely expectorating on the ground under the trees where young children often play and where dew remains on the grass and fallen leaves through the early morning hours. In the pine-land regions the top soil is usually porous sand, grass is scanty and tree shading in the yards is poor or absent.

Tests with guinea-pigs under similar conditions of soil pollution with human tuberculosis germs, and study of the ability of the tuberculosis germ to survive on these different types of soils are suggested as a means of following this clue to a possible solution of the mystery of high tuberculosis death-rates in the Tennessee Valley area.

VITAMIN D AND TRICHINOSIS PATIENTS

DOSES of vitamin D may be a means of preventing death and providing relief in trichinosis, if further experiments by Drs. Franklin D. Barker and Wayne W. Wantland, Northwestern University zoologists, prove successful.

Trichinosis is a painful and sometimes fatal disease caused by eating raw or under-cooked pork that contains trichina worms. The larvae of the worms make their way from the digestive tract to the muscles. As it does with all foreign substances that enter the muscles, the body encloses these parasitic worm larvae with a coating of calcium as a protective measure. It takes from 10 to 15 months to do this. In the meantime, according to Dr. Wantland, "it seems quite probable that the more general symptoms of trichinosis, muscular pains, fever, etc., are, in part at least, due to toxic products formed by the breaking down of large amounts of muscle tissue together with waste products of the larvae. Thus a continuous inoculation of the infected host with toxins occurs."

Vitamin D, in the form of irradiated ergosterol, definitely hastens the calcification of the trichina cysts in the muscle fibers during the critical stage of trichinosis in rabbits. It is hoped to accomplish the same results with the use of the vitamin in higher animals and eventually in man.

Making use of the property of vitamin D to stimulate calcium absorption from the intestine and calcium deposition in the body, as is done in rickets, calcification of

cysts containing the parasitic larvae have been brought about in from 5 to 6 weeks.

Dr. Barker and Dr. Wantland are now trying to determine whether the calcified cysts in the muscle fibers have any deleterious effect on higher animals. There is a possibility that the particles in the tissues may cause a decrease in efficiency.

It is pointed out that it is significant that the majority of deaths from trichinosis occur from four to six weeks after infection, during that period immediately preceding, or during the earlier stages of cyst formation. It would seem that if cyst formation and subsequent calcification could be hastened this would shorten the critical period in trichinosis and more quickly terminate the disease. The treatment of trichinized rabbits with irradiated ergosterol apparently has a definite therapeutic value. It still remains to be tested in human cases of trichinosis.

INSECTS "EMBALMED" BY NEW METHOD FOR GREATER LABORATORY EFFICIENCY

THOMAS L. CARPENTER, student of entomology at the University of Wisconsin, is investigating the possibilities of preserving insects by a method which is very similar to that used by undertakers in preserving human bodies after death. His method consists of first dehydrating the insects in a solution of alcohol, and then suspending them in an impregnating solution.

While the insects are in the impregnating solution, they are placed in a bell jar and the air is slowly withdrawn, forming a partial vacuum. The reduction of pressure causes the preserving solution to force its way into the body of the insect, where it is allowed to solidify.

By this method, Mr. Carpenter hopes to be able to preserve almost any sort of insect for an indefinite length of time without having the insect shrivel and fall to pieces. Until the present time, entomologists have always preserved their specimens in a solution of alcohol and formalin or mounted them dry if their size permitted this treatment. The disadvantages of this method lay in the fact that when a great number of specimens were to be preserved in solution, a separate bottle was necessary for each specimen and laboratory shelf room soon became crowded. By using the new nitrocellulose impregnating method this will be avoided, for the specimens will be so well preserved that they can be stored in small boxes.

Cockroaches have served as Mr. Carpenter's subjects in his research during the past winter because they are easiest of all of the insects to find during the cold months. He explains, however, that the method will be universally applicable when completed.

ITEMS

BECAUSE a star exploded seven million years ago with the brilliance of thirty million suns, there is a chance that science will know more about the cosmic radiation that continuously bombards the earth from remote depths of the universe. Cosmic ray records are being studied to see if they show any relation to the gigantic stellar explosion or super-nova that was discovered by Dr. Edwin Hubble and Glenn Moore of the Mount Wilson Observatory while they observed with the world's largest telescope distant nebulae in the Virgo constellation. Some years ago Drs. F. Zwicky and W. Baade put forth a theory that cosmic rays originate when a star explodes into a super-nova. With the discovery of the great outburst of Nova Virginis there is new interest in the theory. Dr. Hubble explained that the bearing of his discovery on the theory is as yet indeterminate but that the spectra of the super-nova are being studied.

A SIMPLE process for producing permanent colored surfaces on a wide variety of metals was described before the Cincinnati meeting of the Electrochemical Society. Copper, brass, bronze, nickel, chromium, silver, platinum and iron are some of the metals which can take the brilliant and beautiful colors whose exact hue can be controlled by electrochemical processes. Dr. J. E. Stareck and Professor Robert Taft, of the University of Kansas, described how solutions of copper lactate in an electroplating bath will deposit on the base metals the colors, whose shade depends on the thickness or plating time. Violet, blue, green, yellow, orange and red can be obtained. It is probable that the color is caused by a layer of copper oxide formed on the base metal, for after the color has changed, by depositing different thicknesses, from violet to red it will go back again and repeat the range of the visible color spectrum. This indicates that the color seen is a diffraction phenomenon like a real rainbow color. It was pointed out that the permanency of such electrically deposited films is remarkable. They are so firmly attached that they resist polishing as well as the base metal. With a wire abrasion wheel the deposits are slowly removed but resist abrasion as well as nickel or imitation gold plate. The deposits will withstand weathering and salt spray tests without changing color. Potent sodium hydroxide will not affect them but they are dissolved in mineral acids.

SOUND waves, vibrating so rapidly that they are far above the range of human hearing, are now being used in a method for testing samples of steel and other metals for flaws. They belong to the class of vibrations known as supersonics, and are produced from electrically excited quartz crystals. Their rates of vibration can run into scores of thousands, or even hundreds of thousands, of cycles per second. Human hearing stops at about 20,000 cycles per second. In testing metals, the sample is ground flat on both ends. One end is set against a supersonic crystal, the other against a tiny dish of oil. The vibrations are transmitted through the metal to the oil, and throw its surface into a network of minute waves. A beam of light is projected through the oil. Striking the minute waves, it is broken up into a rainbow pattern, which can be observed on a white screen laid beneath the dish. If the metal sample is uniform in structure throughout, the pattern is steady and even, but if there is a flaw present the pattern is thrown into disorder.