

CHEMISTRY

Obtain Pure Extract of South American Drug

AMERICAN chemists have isolated in crystalline form the potent material which South American natives have long used in the rough state to combat a wide range of diseases.

This important finding of a powerful protein-cleaving enzyme which dissolves parasitic worms was announced at the sessions of the American Chemical Society by Dr. Alphonse Walti, research chemist of Merck and Co., Rahway, N. J.

The enzyme, obtained as an extract from the milky sap of the fig tree and therefore named ficin, is found to dissolve live worms in the laboratory. Ficin has been identified as the active principle of Oje, the mysterious healing agent widely used by South American natives.

"The natives regard Oje as a specific for tuberculosis, anemia, chronic stomach troubles and as a cure for ulcerous sores," said Dr. Walti.

In 1934, Dr. Walti continued, Profs. B. H. Robbins and P. D. Lamson of Vanderbilt University showed that the milk, or latex, of the fig tree contained a similar protein-cleaving enzyme. In 1929 Dr. Fred C. Caldwell of the Rockefeller Foundation proved the efficacy of the fig tree latex against whipworm.

The experiments, wherein worms were dissolved by the crystalline enzyme, upset previously-held theories on enzyme reactions, Dr. Walti pointed out.

"It has previously been maintained," he said, "that enzymes are without effect on living cells or organisms. The dissolving of live ascaris by crystalline ficin renders this common conception invalid."

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CHEMISTRY

Ounce of Oil Covers Eight Acres of Surface

HOW FILMS of oils can spread so thin that one ounce of oil can cover up to eight and nine acres of water surface was described at the meeting of the American Chemical Society by Prof. William D. Harkins and Dr. R. J. Myers of the University of Chicago.

Such thin films which are often only one molecule thick—about one twenty-millionth of an inch—have important uses in the lubrication of automobiles, the making of paint, the manufacture of laminated "safety glass" for windows, in

color printing and in biology and medicine.

A new finding of scientists, said Prof. Harkins, is that such thin films can also exist in a layer several molecules thick. Science has as yet no adequate theory to explain the characteristics of such films.

The behavior of the films is, indeed, strange. With new apparatus the University of Chicago chemists are now learning that the films can be in a "tight" condition wherein the molecules stand on end and side by side like the riders of a rush-hour subway car. Or they can also be in an "expanded" state where they seem to lie over more and take up more room.

Other types of oil molecules like to lie flat on the surface and thus cover more area. They too have the "tight" or "expanded" pattern.

An ounce of oil with the upright films will cover three and one-half acres of water surface, said Dr. Harkins. The expanded films will occupy eight acres of water surface. And if the "lying-down" molecules are considered they will be found to cover from fifteen to twenty acres of surface.

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PHYSIOLOGY

Spinach Loses Favor After Chemical Research

SPINACH, long held to be a needed factor in the diet of growing children, took a scientific setback at the meeting of the American Chemical Society. The trouble with spinach, it appears, is that it contains oxalic acid.

In studies reported by scientists of the Children's Fund of Michigan the calcium retention of one little 5-year-old girl was .176 grams a day. When spinach was added to her diet the retention fell to .122 grams a day. In a test period when oxalic acid was added to her diet the calcium retention decreased to .082 grams a day.

Oxalic acid, it appears from the report, combines with calcium in the diet and turns it into a form which the human body cannot use. The relatively high oxalic content of spinach appears to be the cause of the vegetable's action.

Calcium is needed by the growing child for the formation of bones and the teeth.

The Children's Fund scientists included: Priscilla Bonner, Frances C. Hummel, Mary F. Bates, James Horton, Helen A. Hunscher, Marsh Poole, and Icie G. Macy.

Science News Letter, September 19, 1936

IN SCIENCE

MEDICINE

Cancer Explained As Uncontrolled Cell Growth

CANCER was explained to the University of Wisconsin's Cancer Institute as "the uncontrolled multiplication of permanently altered body cells which no longer need the special environment or special agent which originally induced them to grow."

Dr. Warren H. Lewis, Carnegie Institution embryologist of Baltimore, Md., said that this finding is the result of research during which rat and mouse tumor cells were kept growing several years. The agent that induces normally behaving cells to "go wild" or become malignant may be a virus, a hormone or a chemical substance, Dr. Lewis said. The cancerous cells grow true to their own particular type and where they grow the normal cells soon disappear.

Thyroid gland added to the diet speeds and increases the growth of mouse tumors induced by coal tar irritation, Dr. Leiv Kreyberg, Norwegian scientist, told the institute. He has been testing theories as to cancer growth by animal experimentation. Fresh liver also increases rate of growth but does not influence the time of onset. Magnesium salts have no influence. Discouraging is his conclusion that well nourished animals have more vigorous cancer growths.

Heredity plays a large part in cancer, Dr. Madge Thurlow Macklin of the University of Western Ontario told the institute.

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ENGINEERING

State of Washington Leads in Water Resources

THE STATE of Washington leads the United States in potential water-power resources with 8,768,000 horsepower available 90 per cent of the time, according to a new estimate just announced by the U. S. Geological Survey. Next comes California with 4,605,000 and Oregon with 4,361,000 horsepower. These three states possess more than 40 per cent of the total for the United States.

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E FIELDS

ENGINEERING

Prefabricated Houses Now Made With Glued Wood

By G. W. TRAYER, Chief, Division of Forest Products, U.S. Forest Service

GLUED WOOD construction is the basis of the Forest Products Laboratory's new system of prefabricated all-wood house construction.

Erection of the first demonstration house was accomplished by seven men in three working days. This one-story 4-room and bath house, complete in every particular, was put on exhibit last year. This spring the further development of two-story construction, with attractive modifications in architectural treatment, was put on display.

This style of prefabricated house is not being manufactured commercially. All I can say at this stage is that its economy and structural merit have created keen interest among builders and housing authorities, sufficient to put extra steam into our work to perfect its details.

The unit panels of which the house is built represent a principle of airplane design brought down to earth, namely, the stressed-covering principle. By making a covering integral with its framework, the full strength of the covering is utilized, and the framework can be made lighter. That is where the glued wood construction comes in.

In our studies of the housing problem, it occurred to us that gluing was an ideal way to secure this integration in the panels we needed. It worked. Floor panels of glued plywood were constructed in which the joists were four inches narrower from top to bottom than the usual size, yet a loading of 300 pounds per square foot was carried equally well. Similar gains in strength and lightness were made in wall panels.

The next step was to standardize panel sizes and to devise means of fitting them together quickly and efficiently. When this was done, our first demonstration house was built, showing that wood can be shaped into units capable of speedy assembly into a comfortable modern dwelling.

Glued wood construction is pressing forward on many fronts. Plywood and

veneers are an important example, already in use on a tremendous scale. Plywood consists of several sheets of veneer glued up with the grain of the sheets or plies running crosswise to one another, so that all tendency of the wood to split is ironed out, and shrinkage is minimized.

Modern glues are a wonderful substitute for nature's joinery; our tests show that beams, columns, and arches made up of small pieces glued along faces and edges are as strong as solid wood.

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PHYSICS

Measure Cosmic Rays At Record Altitude

SOARING to a record height of 92,000 feet (17½ miles), a tandem of five balloons carried a sensitive self-recording electroscope to a new altitude record for cosmic ray research, Dr. Robert A. Millikan, California Institute of Technology head, revealed.

The instrument, one of five released early in July at San Antonio, and one of four recovered, obtained a perfect film record of cosmic activity at the extremely high level.

The record is the first obtained by an electroscope that shows that ionization in the upper air reaches a definite maximum and returns rapidly to lower values as still higher altitudes are reached.

The 92,000-foot mark, 2,000 feet higher than ever before attained by pilot balloons, was 98.3 per cent of the way to the top of the atmosphere.

Each electroscope, released by Dr. Millikan, Dr. H. Victor Neher, and Dr. S. K. Haynes, was carried aloft by five balloons, and a reward of \$6 was offered for the return of each instrument.

The instruments, rising to an altitude varying from 55,000 to 92,000 feet, were found between 30 and 100 miles from San Antonio. The balloons were aloft about three hours.

Three of the same electroscopes, together with five new ones, are en route to Madras, India, where Dr. Neher will make similar stratosphere explorations.

Regarding the significance of the evidence that cosmic ray ionization reached a maximum and started the other way, Dr. Millikan said it indicated that incoming rays are not in equilibrium with their secondaries.

Drs. Neher and Haynes developed the new electroscopes used. Dr. Millikan hailed their perfection as "a really notable feat."

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MEDICINE

Germs May Give Cancer Fighters a Cure

DISEASE germs may provide a cure for rapidly-growing cancers. Steps in the development of this important and promising weapon against certain types of cancer—for it will probably not be a cure for all cancers—were reported by Dr. H. B. Andervont of the U. S. Public Health Service at the University of Wisconsin's Cancer Institute. Although still in the experimental stage as Dr. Andervont reported it, the results of the animal studies are promising enough to suggest the possibility of clinical trials being made soon.

The growth of mouse cancers has been checked and the tumors have hemorrhaged and died when preparations of disease germs were injected into or spread on the cancers. Almost any kind of disease germ or bacteria will do, it seems. Among those used in the experiments have been the colon bacillus and the germ that causes meningitis. The cultures of bacteria are killed by heat, filtered and treated chemically to remove all traces of substances that would be poisonous to the animal body, without removing the substance that destroys the tumor.

The material finally obtained and injected into the mouse tumors is called a bacterial filtrate. It apparently contains a substance which destroys the newly-formed blood vessels of rapidly-growing tumors, thus cutting off the nourishment for the tumor cells, whereupon they die as seen by the recession of the tumor. Efforts are now being made to isolate from the bacterial filtrate the substance that has this effect on the blood vessels. Not all types of animal tumors have yielded to this bacterial treatment. The spontaneous breast tumors of mice, for example, are not affected by it. Some of the tumors induced by chemicals are affected by this treatment.

Using bacteria to fight cancer is a new-old method of attack. The idea goes back some forty years, originating when it was observed that development of an infectious or germ-caused disease occasionally checked the growth of a cancer from which the patient had previously suffered. Attempts to apply this observation were made but were unsuccessful and the idea was more or less abandoned. Only within the last few years have intensive efforts been made to develop a cancer weapon along this line of approach.

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