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DISCOVERS METHOD OF DECIPHERING VALUABLE RECORDS CHARRED BY FIRE

(By Science Service)

Washington, March 00.- A method of deciphering completely black charred paper from which important ink records have been apparently completely defaced by fire has been discovered by Raymond Davis, chief of the photographic laboratory of the Bureau of Standards of the Department of Commerce.

Records that were contained in a practically air-tight safe were charred beyond recognition in a fire at Augusta, Ga. The Bureau of Standards was appealed to by the postmaster at Augusta to restore the carbonized records to readibility.

Chemical means of restoring the ink were resorted to without success. Then photographic methods were tried.

The charred record sheet was laid between two photographic plates with the emulsion sides of the plates next to the carbonized paper. For two weeks they were allowed to remain in contact. Then the photographic plates were developed in the ordinary way.

A perfectly decipherable image of the valuable records on the sheet was the result. Contact of the charred paper had affected the photographic plate, but where the ink had been the photographic chemicals of the plate were unchanged. The writing that had been on the paper could thus be read. The only difficulty in the deciphering was that the writing on both sides of the paper showed on both plates, but that on the closer side of the paper was the stronger on each plate.

When photographic plates were first packed for sale, the manufacturers were in the habit of placing printed instructions inside the boxes next to the plates. They soon had to abandon this practice as they found that after the package had stood for a time the paper formed an image on the plates and spoiled them. It is

believed that this phenomenon is similar to the one that Mr. Davis has utilized.

One explanation of the effect of the charred paper on the photographic plate is that the gaseous emanations of the products of the destructive distillation of the wood in the paper cause the effect.

SCIENCE OF GROWING THINGS

Agriculture News of the Week.

HARNESS HEREDITY TO
PRODUCE HARDY FRUITS

(By Science Service)

Plant breeding

Fargo, N.D., March 00.- Harnessing rules of heredity and selection for the purpose of producing hardy fruit adapted to the rigorous climate of North Dakota is a plan that is being carried out in important horticultural experiments by A. F. Yeager, horticulturist at the state Agricultural Experiment Station here.

Realizing the possibilities of cross breeding and selecting fruits adapted to the state's climatic and soil conditions, just as corn, cabbages, fruits, and other plants have been improved and adapted to special growing conditions, testing plots have been established at the station in which breeding investigations with cherries, plums, strawberries, gooseberries, apples, grapes, and raspberries are in progress. Hardy varieties and individual plants that can be found in the state and in neighboring states are being tested, and new varieties are being developed through cross-breeding methods. Hardy varieties, wild species, hybrids and unusual sports are used in the work.

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THIRST OF PLANTS APPROACHES
THAT OF ELEPHANT

(By Science Service)

Washington, March 00.- A practical way of determing how much plants breathe has recently been devised by Dr. H. L. Shantz, a prominent botanist connected with the United States Department of Agriculture. According to the results obtained, the respiratory facilities of some of the hard-drinking plants, such as alfalfa, approach those of the cow or elephant. During the course of one day when the wind was blowing at the rate of seven to ten miles an hour, an exposed pot of alfalfa plants transpired a total of over eight quarts of water.

Dr. Shantz's novel weighing apparatus records the rate of transpiration which occurs among different varieties of experimental plants exposed in galvanized pots

to wind and weather. It consists of an ordinary scale platform upon which the pots are placed. As the plant decreases in weight due to transpiration, the beam of the scale falls until it completes an electrical contact which incites the gradual dropping of carefully graduated steel balls that compensate for the loss by transpiration. An efficient recorder for registering the time that each ball is dropped is provided in the form of a twelve inch drum which makes one revolution in six hours and is continuously offset by a screw, so that four six-hour periods may be recorded side by side on the same sheet.

These intimate tests of plant life secrets show that plant transpiration increases as mid-day approaches and reaches a maximum at about three o'clock in the afternoon during warm, summer weather. Thereafter, it falls rapidly and the transpiration at night is relatively insignificant as compared with that of the day. The presence of excessive amounts of moisture in the air markedly decreases plant transpiration.

BROADCASTS

Radio News of the Week

FREE MEDICAL ADVICE
BY RADIO TO SHIPS AT SEA.

(By Science Service)

Washington, March 00. - Ships at sea can obtain free medical advice by radio as a result of arrangements made between the United States Public Health Service and the Radio Corporation of America. In case of need coastal stations of the corporation will receive requests for medical advice from ships, and hospitals of the service will answer them by radio through the stations.

For ships that do not carry a physician, this will give them some of the benefits of medical advice. In case of necessity much can be done by the master or a sailor working under the wirelessed directions of a physician miles away.

The staff of the United States Marine Hospital No. 70, in New York, is likely to be called upon at any time to act as radio physicians by the following Radio Corporation stations: Chatham, Mass,(WCC),Siasconset, Mass.(WSC),and Bush Terminal, New York City,(WNY). The radio station at Cape May, N.J. (WCZ) will call upon United States Verterans' Hospital No. 49, Philadelphia, Pa., for medical advice and medical messages received at San Francisco, Calif., (KPH), station will be relayed to United States Marine Hospital No. 24, San Francisco, Calif.

The idea of furnishing free medical advice to those at sea was inaugurated by the Seamen's Church Institute, New York, call letters KDKF, which has discontinued this service.

WORLD RECOGNIZES VALUE OF RESEARCH
SAYS HEAD OF CARNEGIE INSTITUTION

(By Science Service)

Washington, March 00.- "The function of research as an activity indispensible to civilization and as a necessary prerequisite of progress seems to have come into fuller recognition than at any previous time in history", declares Dr. John C. Merriam, president of the Carnegie Institution of Washington, in summarizing in its year book just issued the results of the research conducted by the many departments of that institution during the past twentieth year of its existence. Industrial and governmental agencies, he said, as well as academic interests, have given to fundamental investigation a high place in the list of elements essential for advance.

The work of the Carnegie Institution touches in one way or another upon nearly all the principal fields of research. Work of its departments, or done under its grants, is pursued in practically every part of the United States.

Dr. A. A. Michelson's researches which determined the immense diameter of the star, Betelgeuse, and other large stars, are described by Dr. Merriam as "an epoch-making discovery in astronomy", and he announces that:

"More recently, by refinement of the original method, Dr. Michelson has opened the way for corresponding observations on a group of stars which seemed to be entirely out of range in the first use of the interferometer on the 100-inch telescope of the Mount Wilson Observatory of the institution. The results already accomplished give confirmation of much important work done by other astronomers and furnish a new starting point for a great variety of investigations concerning the nature of the universe."

"Important as knowledge of heredity is in its application to development of the animals and plants which contribute to meet our needs, there is no group of questions more significant in the complicated organization of human society than those concerning the meaning and possibility of direction or control of inheritance in man," Dr. Merriam says in announcing that the genetical work of the institution will be made to bear more directly on problems of the human race.

How the leaf transforms the waves of energy coming from the sun into usable food and fuel is being studied at a modest chemical laboratory recently erected by the institution at Carmel, California.

Of the expeditions that the Institution has sent to Central America to study the ancient civilizations of the Maya, Dr. Merriam says: "The story of this people

contributes much that may become critical or determinative in our interpretations of early American history, and we know that the great bulk of this record still remains to be read."

In addition to investigations in its own laboratories, the Carnegie Institution has cooperated with investigators of other institutions. Among others, it has cooperated with Dr. T. H. Morgan, of Columbia University, in the forwarding of his epoch-making studies in experimental evolution.

MAGNETIC TEST FOR QUALITY
OF AUTOMOBILE CHAINS

(By Science Service)

Bridgeport, Conn., March 00.- A simple magnetic test for the small steel chains used for cross-links in automobile chains has been developed by A. V. deForest, research engineer of the American Chain Co. here.

The chains are case-hardened and if they are unnecessarily soft or dangerously hard they will give poor service. The heat treatment of the steel affects the magnetic quality of the chain as well as its wearing quality.

"The softer the road, and the lighter the car, and the slower it is driven, the closer will the best chain come to being one that is deeply case-hardened", says Mr. deForest. "However, this hard chain is the more dangerous, for a chain overhard for the use to which it is put may break in a few miles, while the too soft chain will wear out only after a fair length of travel."

LARGEST SPINY LOBSTER
ON RECORD IN MUSEUM

(By Science Service)

Washington, March 00.- The largest spiny lobster, or monster crawfish as it is known in Florida, of which there is any definite record, has been received by the United States National Museum from the Sarasota County Chamber of Commerce, Florida. This specimen measures about three feet from the end of the tail to the tip of the feelers, and weighs twelve pounds.

The spiny lobster is a relative of the familiar New England lobster but has numerous strong spines in place of the large claws or pincers of that species. It is brilliantly colored and is extensively fished for food, being considered a great delicacy.

CONFERENCE ON FUTURE OF
PUBLIC HEALTH IN UNITED STATES

(By Science Service)

Washington, March 00.- The future of public health in the United States and the education of those who will engage in the public health work of the future will be the subject of a two-day conference to be held here beginning March 14 at the call of Surgeon General H. S. Cumming of the United States Public Health Service.

The deans of the schools of public health and "Class A" medical schools, the presidents of the universities with which these schools are connected, a few professors on public health subjects and a limited number of public health officers will participate in the program.

The two days of discussion will include a survey of present status of facilities for the education of sanitarians, the new aspects that must be considered in training the sanitarians of the future, and the economic and sociological aspects of public health.

Dr. Hubert Work, president of the American Medical Association, who has just been made postmaster general, the second scientifically trained man in President Harding's cabinet, will preside at a session of the conference which will be devoted to a consideration of how guardians of the public health can be recruited and what kind of sanitarians are needed.

DIG UP MAMMOTH
ON GULF SHORE

(By Science Service)

Austin, Texas, March 00.- Remains of a mammoth dug up on the shores of Galveston Bay, near San Leon, will be mounted at Texas Agricultural and Mechanical College.

The skull, tusks and parts of the skeleton were found within a space of a few hundred yards. The most recent find was made by fishermen, who unearthed the tusks which were in almost perfect condition, measuring twelve feet in length and ten and a half inches in diameter at the base.

Dr. O. P. Hay of the National Museum, viewed the discovery and says that it is one of the most nearly perfect specimens of the Elephantus Columbi ever found in North America.

SCIENTISTS FORM CORPORATION FOR ADVANCEMENT OF PSYCHOLOGY

(By Science Service)

New York, March 00.- The formation of the Psychological Corporation, the first business corporation whose objects are the advancement of psychology and whose profits must be used for scientific research, has been announced by Dr. J. McKeen Cattell, editor of "Science" and president of the new organization, whose board of directors is made up of the leading psychologists of the country.

"All scientific men are concerned with the advancement of the science in which they work, but only psychologists are professionally occupied with human conduct and its control," says Dr. Cattell in explaining the object of the new organization. "It is consequently becoming that they should make a new departure in the organization of their own work.

"It has not hitherto been possible for scientific men to follow scientific research as an independent profession. There is no way of paying for the work that is of the greatest value to society. Some three-fourths of those engaged in scientific research in this country are professors who earn their living by teaching; about a tenth are in the government service; others are in museums, botanical gardens and the like. It is only in recent years that a few scientific men have been employed to do scientific work in endowed research institutions and in industrial laboratories.

"There scarcely exists at present any method by which a scientific man engaged in research can be paid in accordance with its value or by which the economic proceeds of research can be used for further work. A single advance in the applications of science, such as the Bessemer steel process, the electric motor or the internal combustion engine, adds billions of dollars to the world's wealth, but the profits go to the millionaire who keeps a private yacht and to the laboring man who rides five miles for five cents. If even one-tenth of the economic value of scientific research could be reserved to pay the scientific men who do the work in order that they might adequately carry forward other researches, knowledge and its applications to human welfare would increase as never before.

"Like the biological and physical sciences, psychology has supplied to society services worth many-fold their cost. But universities are indigent and government is shortsighted. An individual psychologist has no way to collect payment for his work. The services of psychology to the army in quickly sorting recruits into classes in accordance with their intelligence were worth many million dollars to the nation,

but the psychologists who created the tests were not paid, and only charity is now available to pay for the research necessary to improve the tests and to adapt them to business and industry."

The Psychological Corporation has been granted a charter by the State of New York. Its central office is in the Grand Central Terminal, New York City, and branches have been established or are in course of establishment in Boston, Washington, Pittsburgh, Chicago, San Francisco and other cities. The scientific work of the corporation will, however, be done in existing laboratories and institutions. The president is J. McKeen Cattell; the vice-presidents are Walter Dill Scott and Lewis M. Terman; the chairman of the board is Edward L. Thorndike, and the directors include James R. Angell, Richard E. Dodge, G. Stanley Hall, C. E. Seashore, E. B. Titchener, R. S. Woodworth, R. M. Yerkes and the other psychologists who have contributed most to the advancement of their science.

GEOLOGISTS MAP ROCKS
FROM THE AIR (By Science Service)

Ottawa, March 00.- The geologist of the future may use the airplane in searching for minerals in unprospected country. At the meeting of the Canadian Institute of Mining and Metallurgy here, E. L. Bruce declared that he is enthusiastic over the possibilities of airplane mapping and that on a trial flight he had been able to recognize easily the most striking geological formations.

"From the air it is possible to tell various areas by their color and by the general surface features that are characteristic of sections of country underlain by different types of rock," he said. "Granite can be distinguished from those rocks which are more favorable to the occurrence of economic minerals. Use of [illegible] planes will relieve the geologist of a vast amount of work and would save a large part of his time. Areas of granite which are not important economically, and those areas of deep glacial cover where no rocks are exposed, could be eliminated. It would thus free him for the exploration of the areas of promising rocks, and so extend the field covered by each season's operations. It would, moreover, give him an idea of the most advantageous points for inland traverses and would show him the position of inland lakes which might be of use to him in fixing the boundaries of formations."

NEWS OF THE STARS

Do Atoms Contain the Sun's Secret?

By Isabel M. Lewis,
of U. S. Naval Observatory,
(Science Service)

The source of the seemingly limitless supply of energy that the sun has been lavishly radiating forth into space for at least hundreds of millions of years has long remained an unexplained mystery.

Since the discovery of radioactive substances it has been felt that the real clue to the solution of the problem will be found through researches into the nature of the atom itself and in the way in which the energy of the atom can be released. Recent discoveries have a significant bearing upon this problem of the source of solar energy.

Prof. Sir Ernest Rutherford's success in obtaining hydrogen from certain other light elements by bombarding their more complex nuclei with the alpha particle of radium, the most concentrated form of energy known, /This attack which drives out may solve the sun's secret. the hydrogen atom has substantiated the belief that the nuclei of all elements are built up from the hydrogen nucleus, or proton, as it is called.

Researches into the nature of the structure of the atom show that it is a miniature solar system, consisting essentially of a central nucleus. It carries a positive charge and contains practically all the mass of the atom, and a system of negative electrons arranged symmetrically around the nucleus in a series of concentric shells, the electrons being held in equilibrium by the forces of the nucleus. The electrons of the outer shell can be easily removed by the action of light and electric discharges. But the strongly bound central nucleus is not easily broken up, and when this is accomplished the nature of the atom is permanently changed.

It is possible to take 4.033 grams of hydrogen, get 3.999 grams of helium and release in the process 34 milligrams of energy, sufficient to heat 7400 tons of water from the freezing point to the boiling point. How is that conclusion arrived at? The nucleus of helium, which has next to hydrogen the simplest structure of all the atoms, is generally supposed to consist of four protons, or hydrogen nuclei, and two electrons. The mass of this combination is 4.033 while the mass of the helium nucleus is 3.999. In other words, in forming helium from hydrogen there is a liberation of 34 milligrams of mass or, since relativity tells us that mass and energy are the same, a liberation of 34 milligrams of energy.

Dr. H. N. Russell, who is now engaged in research work at Mt. Wilson Observatory,

has found in considering this question of the source of solar energy that a transformation of this nature taking place throughout the entire mass of the sun would supply enough energy to keep the sun shining at its present rate for one hundred billion years. He also concludes that if hydrogen atoms are being taken apart in some way within the highly heated interiors of the stars and built up into nuclei of more complex atoms enough energy will be liberated as a by-product of this process to keep up the radiant energy of the stars for many billions of years.

MILD EPIDEMIC OF
JAUNDICE IN NEW YORK STATE

(By Science Service)

Albany, N.Y., March 00.- Parts of New York State during the past fall and early winter have suffered from an epidemic of jaundice in a mild form, Dr. Edward S. Godfrey, Jr. of the State Department of Health has announced.

Although the recent outbreaks are described as acute and infectious, thus far no fatal result has been reported among the several hundred cases. In fact, during the eighteen outbreaks recorded in the United States since 1850 only five deaths were actually counted and but few more indicated among some 3000 cases of the disease.

In Japan, however, infectious jaundice is a serious matter and from thirty to fifty per cent of the cases terminate fatally..

Certain diseases seem to become modified in the United States and to prevail for the most part in a characteristically mild form. This is true of typhus fever and smallpox, and is apparently the case with this rare infectious type of jaundice. What gives physicians concern is that they never know when and where these maladies may suddenly revert to original and severe types.

During the recent war, epidemic jaundice was observed among French, British, Italian, German and Russian troops from Belgium to Gallipoli. An outbreak was recorded in our own war of 1812, and the disease was quite well known during the Civil War. In civil life in Japan it occurs frequently among mine workers, especially in the moist rather than the dry mine shafts. With the adoption of trench warfare in Europe, where similar damp soil conditions were the soldier's daily lot, the disease soon appeared and investigators readily identified in trench rats the same causative organisms that had been discovered in Japan. New York state laboratory workers are now making progress in an attempt to identify it in rats recently captured in the infected districts. In no American outbreak has the organism been found in a human being, but it is a striking fact that an unusual prevalence of rats is frequently reported in connection with cases now being studied in many New York communities.

TWO PAGES OF FILLERS OR A DAILY FEATURE

DO YOU KNOW THAT -

A few rows of early sweet corn planted in your tomato field will greatly reduce the damage done by tomato caterpillars.

Engineers believe that pulverized coal will help to solve the labor problem. In one plant, installation of pulverized coal eliminated thirty-five men from the boiler room.

Cake will be softer and lighter and have a better texture if the batter is allowed to stand awhile before baking.

The Alaska peninsula and the Aleutian Islands, which sweep from it almost to Asia, is one of the most extensive and most active volcanic regions on the face of the earth.

DO YOU KNOW THAT -

According to a survey made by the American Engineering Council there are more than 500,000 shift workers employed in American industries.

Some investigators believe that the anopheles mosquitoes which carry malaria return where they have been fed but others declare that they have no such "housing instinct".

"Chipmunk" was not used as a name for the ground squirrel of America until after 1842.

The British Launderers' Research Association has offered employment at the rate of $5,000 a week for a scientist who can reduce the high cost of laundry work.

DO YOU KNOW THAT -

Yellow instead of white is the "clear" signal on railroads in this country. A white light means broken glass and indicates "stop".

The metallurgical process that separates minerals by flotation was discovered by Mrs. William Knight Everson about 1880, who studied mineralogy in an endeavor to aid in a mining venture of her husband.

The Klondike variety of strawberries is grown exclusively in Louisiana and they have a wider distribution than strawberries from any other section of the country.

Mahogany veneer is being used in England for the surface of airplane wings as this material successfully withstands all kinds of weather.

DO YOU KNOW THAT -

An application of sodium nitrate to grain at seeding time is a profitable practice on poor soils.

The United States possesses the largest known deposits of molybdenum ores but is relatively poor in high grade deposits of nickel, chromium and vanadium, all of importance in alloying steel.

One of the largest tunnels ever constructed is that for the canal from Marseilles to the Rhone in France. It will be about 8000 yards long.

Wisconsin makes two thirds of the cheese of the United States.

DO YOU KNOW THAT -

Iron which has been in contact with saline, acidulous and alkaline waters or soil for some length of time sometimes becomes so soft that it can be whittled with a jack-knife.

The biggest electric sign in the world, shaped like a star and measuring over a quarter of a mile from point to point, is now operating at the Croydon air station, London, to assist pilots in landing during the winter months.

About two and a half quarts of canned tomatoes is the yearly per capita consumption in the United States, according to figures of the United States Department of Agriculture.

A Colorado investigator put weed traps of wire netting into three irrigation ditches and captured seeds of 81 different kinds of weeds which were being transported by the water.

DO YOU KNOW THAT -

In the early days of the Wright airplane in 1903 the speed of their machine was about thirty miles an hour. Just recently the airplane has touched the mark of 212 miles per hour.

Periodical ear examinations of persons working in noisy industries are recommended to minimize accidents due to the effect of noise.

A new textile, called formio, made from a plant native of New Zealand, is being manufactured on an island in Argentina for sacking, binding cord, sewing thread, and general roping. More than 500,000 plants have been obtained from a few seeds brought to Argentina as a scientific curiosity.

A new nitrate process, said to reduce the cost of production one-half, is being tried out in Chile.
