SCIENCE NEWS-LETTER

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RECORD FLOOD TO END IN JUNE, MORE FLOODS ON WAY

Washington. That the record flood now sweeping the lower Mississippi and forecast by the Government experts from three to four weeks before it started will cease its rampage in June, is predicted by Dr. H. C. Frankenfield, head of the river and flood work of the United States Weather Bureau.

The end of flood season, however, is not yet, he says. The Colorado River is rising and is now in flood, while the melting snows of Idaho, Washington and British Columbia will bring the Columbia to the flood stage early in June.

These forecasts are based upon complicated estimates from data furnished by the river and rainfall stations and the snowfall stations of the Bureau which are scattered throughout the basins drained by these rivers. Many variable factors make it no easy task for Uncle Sam to determine what these fickle waterways will do.

The Ohio River is the most accurate index to what will happen in the way of a flood below the Arkansas River. There is never a great flood on the lower Mississippi without first a flood stage on the Ohio, no matter how the other tributaries of the Father of Waters may rise.

All the tributaries of the Mississippi have never yet been known to be in the flood stage at one time. The flood now in progress is the nearest approach to this condition yet known. Predictions in the larger rivers are chiefly based upon the stages of water at different points along its course and in its tributaries. The records of these river stages along the Mississippi go back 75 years but cannot be depended upon in present estimates for the lower river as there have been many changes in the levees since that time. Since 1916, when the present levee system

was about completed, the records are more reliable. Each change has to be taken into account as well as every climatic variation, yet in the tremendous volume of two-fifths of the water in the United States which passes New. Orleans, the Weather Bureau can ordinarily estimate within three inches the exact amount of the rise which will occur at that point.

Flood stages in such rivers as the Colorado and Columbia are easier to predict than in the Mississippi valley, because the conditions are less variable. The melting snow is the chief cause of floods in these Western rivers and the amount of snow is reported in terms of the number of acres which it would cover to a depth of one foot. The water content of this is then computed and forecasts made from the figures.

Upon these figures many hydro-electric concerns base their contracts for the coming season for light and power; as a short water supply may cause them to resort to steam at greater expense. Irrigation farmers can tell from these reports how much water they will be able to have during the coming season.

Forecasting the action of the smaller streams is a much tougher proposition and forty-eight hours is as far in advance as can be predicted in these cases where figures must be based upon the rainfall alone. The waters rise rapidly and flow out swiftly, as in the case of the Pueblo flood where the Weather Bureau's warning was carried ahead of the onrushing waters by a galloping horseman.

There are sixty-six weather bureau districts in the country with 775 all the year round river and rainfall stations and 125 snowfall stations.

CHIEF GEOLOGIST MAKES
PLEA FOR PLAIN WORDS

Washington. "The universal camouflage of the fake geologist is his protective coloring of technical words," says Director George Otis Smith of the United States Geological Survey. "The economic geologist should tell his story in plain English so that his clients and the public can see things as they are and will learn to refuse the highly colored substitute offered by the quack imitators."

"We are tending to write more plainly -- to say 'sand' instead of 'arenaceous deposit', 'clay' instead of'argillaceous stratum', 'river banks' instead of 'riparian borders',and 'the overlying bed is limestone' instead of'the superincumbent material consists of a stratum of calcareous composition.'"

"The argillaceous character of the formation is very prominent in some localities, although it is usually subsidiary to the arenaceous phase" in plain words means "At some places the formation includes considerable clay, but generally it is made up chiefly of sand." "I even hope the day may come when more of us will say 'beds' instead of 'strata', for the content usually shows that we are talking about rocks, not about furniture," says Dr. Smith. "Exact scientific statement, however, needs special terms, words that best keep their razor edge when used only for hair-splitting distinctions."

(This is the third of a series of Ten Minute Talks on Scientific Topics by Dr. Edwin E. Slosson, editor of Science Service and author of "Creative Chemistry", "Easy Lessons in Einstein", and other popular science books.)

HOW THE OTHER HALF OF THE PLANT LIVES

By Dr. Edwin E. Slosson

How pleasant and peaceful looks a field of growing grain! Its stalks standing in neat rank and file, spaced apart like soldiers in a setting up exercise, idly waving their green banners in the breeze. A fresh supply of carbon dioxide comes to them with every breeze and all they have to do is to open their stomata and breathe it in. No shortage. No competition. Nothing to worry about. Happy plants!

But call no being happy till you know the whole of its life. Look beneath the soil and you will see a different and uglier aspect. Here the struggle for existence is fierce and unceasing. The roots reach out in all directions in search of water and food. Those pretty flaunting leaves above are lavish in their waste of water and this all has to be procured by the humble hidden rootlets and pumped up to the top. The flowers and fruits are dainty in their tastes and insist upon certain salts that are hard to find in the soil.

So upon the tiny tender rootlets devolves the task of forcing their way through the stubborn subsoil in competition with their own kind and foreign weeds.

If a well watered spot on a bed of nitrates is struck there is a rush of all the roots of the neighborhood in that direction. A drawing of the root systems of a patch of growing plants looks like the map of competing railroad companies in territory just opened for settlement.

A band of investigators under Professor John E. Weaver, who is associated with the ecological work of Dr. Clements which is carried on under the auspices of the Carnegie Institution of Washington, have been for many years studying the life history of root development in the chief crops of Nebraska, Kansas and Colorado and they have reached some remarkable results that seem likely to alter methods of agriculture. They find, for instance, that the cereals go deeper for their nourishment than has been commonly supposed. At Peru, Nebraska, the roots of wheat and oats reach depths of 6 to 8 feet. That is, the roots of the grain go more than twice as deep into the ground as the stalks stand above it. Corn rises to a stately and imposing height. Yet corn sticks down as far as it sticks up. A single corn stalk may have some forty feeders in the ground, gather water and nutrients from four feet all around and from eight feet below. All the cereals have two sets of roots; one runn-

ing out laterally and the other striking straight down.

The potato pursues different tactics. All its roots start out sideways first and then when they get out a foot or two they turn and run down.

The old idea that a crop got most of its nutrition from the surface layer of 6 to 8 inches and that the condition of the subsoil did not matter much is exploded by these investigations. For it is found that winter wheat and rye in the prairie states get the greatest amount of their food and drink from below three feet and some of it from the five foot level.

But here is a funny thing. If the young roots, as they are starting out in life, happen to strike a spot rich in nitrates or phosphates they are apt to linger there too long in working the claim so that the root system never reaches a full and sufficient development. Just so many a young man's ambition has been dulled by paying him too high a salary on the start. The lesson is to put the fertilizer a little out of reach of the roots and make 'em scramble for it.

Another practical suggestion arising out of this research is that two crops can be grown on the same ground alternately or even at the same time. For, if one crop has short think roots and the other long spreading roots they will not interfere, but rather help each other. They will feed from different levels.

We may then come to see two-storied agriculture in the semi-arid region, perhaps even subterranean sky-scrapers - so to speak.

AVIATORS MAY BECOME
AD WRITERS IN SKY

London. Ad men here see possibilities of using a new medium for pushing their goods. Smoke writings in the sky have been developed through experiments made during the last three years by the Air Ministry during the perfection of methods of military signaling. While the military men have confined most of their writing to the vari-colored dots and dashes of the Morse code, simple words may be written so as to remain in the sky for from three to ten minutes and even longer.

A pillar of cloud by day and a column of fire by night may soon be leading customers through a wilderness of competitors to the promised land where they may obtain "Somebody's Soap" or "Another's Beans". Couples cooing in the moonlight may look into the dreamy depths of the sky and read there "Own Your Own Home".

A great deal of chemical research was necessary to discover the best materials and mechanism to be provided. The inventor also devised a method of sending small jets of smoke from various parts of the aeroplane wing, so affording a means of studying air-flow from photographs.

BROADCASTS

Radio News of the Week

RADIOS FROM ARCTIC
TO HELP AMERICAN BUSINESS

Washington. Radio reports which explorers will send from the arctic region are expected to add to meteorological knowledge and make more effective the Government's system of weather forecasts according to E. B. Calvert, in charge of the forecast division of the United States Weather Bureau. Arrangements for the first series of the reports from the Amundsen arctic expedition have already been made.

"We feel certain," says Mr. Calvert, "that conditions in and about the polar regions have a decided bearing on conditions of the inhabited regions to the southward. The crying need is for more information from these places. It is not supposed that telegraph, telephone or cable lines will even be advanced into the frozen regions of the north, but it is well within reason and expectation that scientists equipped with radio apparatus will penetrate these regions, suffer hardships for the sake of science, and send daily reports which will mean so much to meteorology and the progress of the world."

Many radio receiving sets are being installed by farmers who have no access to telegraph and telephone service and who do not receive the newspapers until late in the day, if at all. The Weather Bureau has established broadcasting systems in many parts of the country. Already there are 80 stations in operation and the number is being increased rapidly. Soon every progressive farmer will be able to obtain the information essential in the production of his crops as quickly as the city dweller.

Until the advent of radio communications it was impossible to obtain current information as to conditions prevailing over the large water areas or to warn ships after they had left sight of land. Now conditions are different. Last year 10,000 observations were received from 298 individual ships by radio. By means of these vessel reports storms and hurricanes are located and their intensity, direction of movement and rate of progress are determined.

"Last October a hurricane was located in this way in the Carribean Sea southwest of Cuba 500 miles from land," said Mr. Calvert. "It was a storm of tremendous energy such as few vessels could outride or escape without loss or great damage. Five days from the time it was detected, the hurricane struck near Tampa, Florida,

and did great damage, but ships had been turned back by the warnings sent out and not a single one was lost or seriously damaged."

"The system of disseminating the forecasts and warnings for the benefit of ships is the most complete and effective in the world, and is made possible by the effective cooperation of the office of communications of the Navy Department; nearly all the ship reports being received by the naval radio stations and all the broadcasting.

"Radio has also done much to overcome some of the difficulties in communication which have hindered exchange of weather information between nations. Cyclones pay no attention to boundary lines and the conditions prevailing over one country today may affect another tomorrow or a week hence. There must be freedom of exchange of meteorological reports among all nations, both for the good of the individual nation and of the whole.

"Arrangements were made last week for forwarding daily a radio message to France containing about thirty observations from points in the United States and Canada and to receive in exchange a group of European reports.

"Reports are now collected in Europe by radio and transmitted to the United States from London by cable. All of the 12 Pacific and Far Eastern reports come by radio. Observation taken in Japan, China, and the Philippines at 8 o'clock in the morning are received in Washington and charted by 11 a.m.

"Radio cannot, however, replace the present wire system, which is the speediest and most effective in the world. What is equivalent to 11,000 messages could not be sent and received on schedule and with certainty in an hour's time, because many wave lengths would be needed to avoid interference and two hours a day could not be set aside for the exclusive use of the Weather Bureau."

ADVICE GIVEN
TRANSMITTING STATIONS

Washington. "Broadcasting stations should shut off transmitters when not in actual operation to prevent unnecessary interference from carrier wave," says an official warning from the Bureau of Navigation of the Department of Commerce.

"Sending stations are also asked to take care not to extend schedules resulting in interference with the schedules of other stations. Transmitters must be adjusted so as not to produce unnecessary interference. It has come to the attention of the bureau that some stations have interfered over a band of from 200 to 500 meters which may be reported as a violation of the law."

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253 STATIONS
BROADCAST NOW

Washington. Latest figures obtained from the Department of Commerce show that there are 253 broadcasting stations now licensed and in operation.

Most of these are concentrated either north of the Mason-Dixon line and west of the Mississippi or on the Pacific Coast. There are practically no stations as yet in that part of the west that lies just east of the Rockies, and the installation of stations has just begun in earnest in the South.

MASTODON INVITES PUBLIC
TO VIEW HIS REINCARNATION

Albany, N.Y. "The Cohoes Mastodon having stood in his bones before the public for fifty years has now resumed his natural aspect as he appeared at the time of his lamented death some thousands of years ago during the waning stages of the great ice age; and invites you to be present at a private exhibition of his reincarnation".

This was the invitation that was recently issued from the New York State Museum by those who have been interested in the first return to worldly appearance of the American Mastodon. The invitation was accompanied by a small card that said: "The Mastodon desires to extend this invitation to a select number of his personal friends.

The Cohoes Mastodon is the only life size scientific restoration that has ever been made of the American Mastodon. It was executed by Noah T. Clarke and Charles P. Heidenrich and is based on the most careful study of the muscular anatomy and proportions of the animal as derived from exact measurements of the adjoining skeleton and aided by comparison with the external form, skin texture and other details in living elephants.

The American Mastodon had a coat of hair which somewhat resembled the hair of present-day elephants, though very much thicker and longer. It was thus adapted to the low temperature which prevailed in this region at the breaking up of the Ice Age. It was a very distinctive member of the New York Fauna of a few thousand years ago when Mastodons must have roamed these swampy regions in hards comparable in number to those of the Buffalo on the western plains 50 years ago. Parts of more than 100 skeletons have been discovered in New York.

Great Gas Upheavals on the Sun

By Isabel M.Lewis,
of the U. S. Naval Observatory.

Sudden upheavals of vast quantities of incandescent gases of many elements from the surface of the sun are a regular feature of solar activity. Though the height attained by these eruptions usually ranges between 20,000 and 200,000 miles there are exceptional prominences that occasionally reach an elevation of half a million miles or more.

A record-breaking prominence that appeared on October 8, 1920 attained a height of 516,000 miles which is considerably more than half of the diameter of the sun. This prominence rose slowly at first from the surface until the connection with the base was partially severed. Its velocity then changed suddenly to a much higher value and this velocity was maintained until a complete break with the base took place when there was a second sudden increase in velocity. The motions of various portions of the prominence were extremely complex. Part of the material returned to the sun and part became attracted, apparently, to points beyond.

Though eruptive prominences are frequently associated with sun spots they are not essentially so and this prominence was apparently an isolated phenomenon. In this prominence as in many others that attain exceptionally high altitudes calcium gas was one of the chief elements.

A solar prominence observed at the Kodaikanal Observatory in India on May 26, 1916 also attained an altitude of more than half a million miles. In this case a high column of gas accompanied by falling streamers shot up suddenly from the surface with an accelerated velocity that attained a maximum value of 283 miles per second. A velocity of one hundred miles more per second would free it entirely from the control of the sun. Within an hour the upper part of this prominence had become separated from the base and faded rapidly away.

The cause of these solar eruptions is not clearly understood but it is possible that they are produced by a sudden release of subatomic energy beneath the surface of the sun. It is a peculiar fact, however, that these eruptions never occur near the extremities of the sun's axis of rotation, that is, near its poles.

Electrostatic forces may act in some manner in the production of the accelerated motion that is always observed and in the separation of the column from the sun's

surface but in exactly what way is not evident.

There may also be some connection between prominences and the solar corona but a solution of the problem is complicated by the fact that the solar corona can only be observed during the few fleeting moments of a total solar eclipse. Solar prominences, however, can be observed in broad daylight in all their details by means of the spectroscope which serves to reduce the brightness of the background due to the scattering of sunlight by the earth's atmosphere, by spreading out and weakening it while leaving undiminished in intensity the light of the prominences which is composed of single colors.

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134 DEGREES IN SHADE,
THAT'S ALL

San Francisco. Cheer up, it won't get any hotter than 134 degrees Fahrenheit for that is the highest temperature ever recorded at the United States Weather Bureau's substation at Greenland Ranch in Death Valley, the hottest known region on the face of the earth, according to meteorologist Andrew H. Palmer stationed there.

In the winter Death Valley offers great natural scenic attractions, but white men do not pick this region for Fourth of July picnics. Nearly every summer during the past few years the highest natural air temperatures recorded in the United States by means of tested thermometers under approved methods of exposure have been those at the unique Greenland Ranch station.

During the long summer days the air is excessivly heated by the high sun, as there is too little moisture in the air to permit the formation of clouds. The desert sand, gravel, rocks, and salt are so highly heated that they do not have an opportunity to cool during the short nights.

O. A. Denton, the white man to remain the longest in the Valley, stayed eight years, by making his bed in front of a revolving fan driven by an overshot water wheel after wetting his blankets and sprinkling the floor with water.

INSECT ENEMIES CHECKED BY POULTRY

English fruit growers are using a new method of fighting insect pests. They allow poultry to run loose in the orchards. Dr. T. Theobald, agricultural entomologist, gives as an example of what fowls would eat in an orchard an analysis of the crop and gizzard contents of a White Leghorn chicken, five weeks old. He found 190 pear midge maggots, 127 aphids, 12 red ants, 2 tortex caterpillars, and 1 beetle in addition to grain seed and other foods.

A red Sussex pullet contained 14 leather jackets, 10 fever flies, 2 wireworms, 4 cutworms, 5 beetles, 50 ants, 4 slugs, 1 millipede and 20 larvae of the winter moth. The light breeds, such as Leghorns, hunt best and go farther afield than the heavier breeded Wyandottes and Orpingtons.

SCIENCE OF GROWING THINGS

Agricultural News of the Week

DEHYDRATED CORN
GREAT SUCCESS

Washington. Dehydration, the scientific method of performing the old art of drying fruits and vegetables, is a great success when applied to sweet corn, according to W. A. Noel in charge of commercial dehydration for the United States Bureau of Chemistry.

The dehydrated article is twice as profitable to the manufacturer as canned corn and cost the housewife only one half as much. One pound of the dried corn when refreshed in water weighs 2.84 pounds, making it equivalent to three cans of the fancy canned corn.

"As soon as the American public realizes the economic advantages resulting from the use of dehydrated fruits and vegetables," says Mr. Noel, "they will be as much in demand during the winter months as the fresh products are during the summer months."

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ROSES CUT DOWN
POTATO CROP

Orono, Maine. The beautiful rose is one of the worst enemies of the practical potato, according to Edith M. Patch of the Maine Agricultural Station here. By providing a winter home for the eggs of the pink and green aphids, the insects which carry disease from the sick potato plants to well ones, the rose bush becomes a most pernicious weed, she says.

The last generation of these insects in the fall lay their eggs on the rose bush and the young which are hatched out in the spring feed upon the tender, juicy growth. When these insects become full grown, they transfer their attentions to the potato plant, feeding by plunging their beaks into the juices of the plant and innoculating one plant with the harmful virus they have taken from another, thereby spreading mosaic and other potato diseases from the sick to the well plants.

Even so short a distance as a quarter of a mile between potato fields and rose bushes has been found to make the difference between a heavy and a slight attack of the insects. It is not definitely known, however, just how far the aphids can fly.

DO YOU KNOW THAT -

Of the 500 or more species of parrots now known, only two are native of the United States and none of Europe.

The 5000 varieties of dahlia now on the market have developed since the wild single dahlia was introduced into Europe from Mexico a little over a hundred years ago.

North Dakota now leads all States in the production of sweet clover seed.

The Army's largest airhsip since the Roma disaster is of the non-rigid type, with 180,000 cubic feet capacity, 170 feet long, 48 feet diameter, 60 miles per hour speed, and can carry a crew of eight.

DO YOU KNOW THAT -

The greatest breeding ground for water fowl in the United States is in the State of Nebraska.

There were 8,000 bison in the United States last year.

Forty-five per cent of all deaths of infants under one month of age are due to prenatal and congenital causes.

A person weighing 120 to 140 pounds has about as much blood as might be contained in five quart milk bottles.

DO YOU KNOW THAT -

Jimson weed which has spread all over the Eastern United States was introduced from the Old World at Jamestown, Virginia, in the early colonial days. Hence it was called Jamestown weed which was later shortened to Jimson.

Johannesburg, South Africa, is almost on the crest of "the Rand", a 50-mile ridge of gold-bearing conglomerate. The world's greatest stream of gold has flowed from this region since 1906 when production passed that of all North America.

The state department of health of New York is broadcasting five-minute health talks from a radio station at Schenectady twice a week.

There are about twelve million automobiles in the world and about ten million of them in the United States.

DO YOU KNOW THAT -

Alfalfa, although a comparatively new crop to the American farmer, was grown in Italy more than two thousand years ago.

When normal production is restored, Italy, which now holds second place, will be the leading quicksilver producing country in the world as it obtained during the war the great Idria mine, formerly owned by Austria.

The heat of 180 degrees F. or more to which clothes are subjected in a power laundry is sufficient to kill the hardiest of bacteria.

If all the progeny of one oyster lived and multiplied and so on through six generations the heap of shells would be eight times the size of the earth.

DO YOU KNOW THAT -

The sheep gland diet as a remedy for certain subnormal minds is not new. Chinese physicians used it 5,000 years before Christ. Among their prescriptions were directions for preparing soup from the thyroid glands of sheep. The secret was apparently lost and rediscovered by the Occident about 1870.

London is the financial center of the rubber industry; Singapore is its shipping center; and Akron, Ohio, its manufacturing center.

Ordinary tin cans are made of tin-plated steel. Usual practice demands open-hearth base for can ends, but bessemer steel is used for the bodies of the cans.

Bears hate the smell of musk, but are especially fond of the odor of asafoetida.

DO YOU KNOW THAT -

Probably as much as 80 to 90 per cent of the soapstone quarried in the United States is waste, the Bureau of Mines declares as the result of a study of the production and utilization of this material.

Fish culturists have believed that live fish could not be successfully transported in galvanized tanks but experiments by the Bureau of Fisheries controvert this idea.

Cucumbers contain approximately 90 per cent of water.

In Constantinople, because practically all necessities of life are imported, the population is obliged to pay for its needs in a foreign currency. A local British banking authority declares that for this reason "Constantinople is the most expensive city in the world."

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FRAGMENTS OF SCIENCE

There are good reasons for believing that the mass of the red star Betelgeuse cannot be more than ten times that of the sun, while its volume is at least a million times as great and may exceed eight million times the sun's volume. Therefore, its average density must be like that of an attenuated gas in an electric vacuum tube. -- Dr. George Ellery Hale, Director of the Mount Wilson Observatory.

The use of gas and electric stoves makes it less convenient to use cheaper cuts of meat and classes of vegetables which require longer cooking. Regular attendance at afternoon movies and bridge parties encourage the use of more expensive cuts of meats which can be prepared for the table in a few minutes and more expensively processed food products of all kinds. -- Henry C. Wallace, Secretary of Agriculture.

The body is only an instrument to bring to pass the ideas, the ideals, the aims and objects which our minds formulate, and unless our minds can formulate reasonable aims and objects, our healthy bodies are not of much use. -- Dr. William A. White, St. Elizabeths Hospital.

The first fundamental need in the organization of health education is a job analysis - a critical and constructive inventory of the situation showing in profile the various aspects of man toward which health education should be directed and the means at our disposal. -- Dr. Carl E. Seashore, University of Iowa.

The invention and perfection by experiment of objective tests of ability seems to offer the most promising road to progress toward a type of instruction that places less emphasis on information and more on ability to use information intelligently. -- "A Study of Engineering Education" by Charles Riborg Mann.

The regions of maximum human development lie between two desert regions - the deserts of ice and the deserts of sand. -- Preston E. James, Clark University.

The fact is that in the struggle for existence, which includes all the answers back that living creatures make to environing difficulties and limitations, sociality pays just as well as intensified competition, or, it may, pays better. -- Outline of Science.
