SCIENCE NEWS

TREE RINGS AND WEATHER CYCLES

Science Service

TREES as prehistoric almanacs, giving weather reports for ages when there was no other weather bureau to record them, are described by Professor A. E. Douglass, of the University of Arizona, in the annual report of the Smithsonian Institution.

Professor Douglass's studies are based on minute examination of annual rings of trees. Beginning with the common knowledge that these rings are formed at the rate of one a year, the light, porous section growing in the spring when there is plenty of water and the denser part when the summer drought comes, he went on to study the effect of years of drought as compared with years of plenty, of accidents to the roots, of fires and of attacks of disease. Every event in the life of a tree left its record in the rings.

After learning the correlation between known historical conditions and comparatively recent tree rings, Professor Douglass began to carry his researches back into earlier centuries, using trees of the age-old forests of the Southwest as his "time-sticks." Weather records of the time of the discovery of America, of the Crusades, of the Norman invasion of England, and of even more remote periods, can be read on many stumps in California.

One of the interesting pieces of information shared by the trees is a confirmation of the theory of an eleven-year sunspot cycle held by astronomers and weather students. Every eleven years there is a band of relatively narrow rings, indicating a time of heat and drought, with wider rings that tell of easier times in between. Secondary sunspot cycles of longer duration are also suggested by the tree records.

In one of the recently discovered prehistoric pueblos a study of the construction timbers showed what the weather was like when the building was started, how long it took to erect it and how the work progressed more rapidly at some times than at others. By "matching rings" with beams in another pueblo, it was found that one of the buildings was fifty years older than the other.

Many similar possibilities have been opened up by the development of the method. Perhaps one of the most fascinating is the idea of studying the weather conditions of long past geological ages by the study of rings in fossil trees, hundreds of thousands or even millions of years old.

ORION IN THE EVENING SKY

(Isabel M. Lewis, Science Service)

ORION, the Warrior, the most popular and widely known constellation in the heavens, visible from all corners of the world because of its position on the celestial equator, has returned once more to the evening sky and may be seen towering majestically above the eastern horizon by nine o'clock in the evening.

The quaint star maps of the ancient astronomers pictured Orion with uplifted club in his right hand, its tip close to the horns of Taurus, the Bull, which he faces, and with a lion's skin thrown over his uplifted left arm. Four brilliant stars outline the hero's huge form. Two—ruddy Betelgeuse in the right shoulder, and blue-white Rigel diagonally opposite in the left foot—are of the first magnitude. The remaining two—Bellatrix in the left shoulder, and Saiph in the right knee—are of the second magnitude. The left foot of Orion rests upon Lepus, the Hare, the small constellation directly below Orion, and his head is marked by a group of three faint stars. At his heels follow the two dogs, Canis Major, which contains Sirius, the brightest star in the heavens, and Canis Minor, farther north, with its first magnitude star Procyon. Depended from the Belt of Orion, which is marked by three stars of the second magnitude in a straight line slanting toward the southeast, is the famous Sword of Orion, containing a line of faint stars, the central one rather fuzzy in appearance. Viewed through the telescope this fuzzy, starlike object is transformed into what is generally considered to be the most magnificent object in the heavens, the Great Orion Nebula, a glowing mass of luminous gases of enormous size and extent which includes in its ramifications the entire constellation.

The Orion Nebula is most brilliant in the neighborhood of the multiple star Theta, which is embedded in its heart. This star and its surrounding nebulosity is the fuzzy stellar object that is visible to the naked eye. Small telescopes break this star up into a system of four stars, but more powerful telescopes show that it is really a sextuple star, that is, six gigantic suns forming one enormous system.

According to the latest investigations the luminous gaseous nebulae, of which the Great Orion Nebula is the most illustrious example, owe their luminosity either to the reflected light of stars associated with them or to electrical excitation produced in some way by these stars or to both causes. It is probable, then, that the multiple star Theta in the heart of the Great Orion Nebula is largely responsible for the brilliancy of its surrounding nebulosity.

The most reliable estimates place the typical Orion stars, such as the brilliant Rigel, the three stars in the Belt of Orion and the stars in the Sword of Orion, at a distance of approximately six hundred and fifty light years from the earth, or nearly four thousand trillion miles. All these Orion-type stars are intensely hot with temperatures of ten or twelve thousand degrees Centigrade or over and with the element helium conspicuously present in their spectra.

The red variable star Betelgeuse, which has been in the past few years one of the most talked of stars in the heavens because of its huge size, is not a member of the Orion group of stars. Its distance from the earth is less than two hundred light years or about one third that of the true Orion stars. It is merely seen projected against the background formed by the more distant stars in a convenient position to complete the outlines of this celestial figure which man has fashioned out of the stars and which will some day lose its distinctive form as surely, if not as fleetingly, as the forms we picture in summer clouds.

THE NEW RUSSIAN ALPHABET

Science Service

SPELLING reform, for which President Roosevelt, Andrew Carnegie, and many prominent American scholars struggled vainly a dozen years ago, has been accomplished for the Russian language by the Soviet administration.

The reforms in the Russian alphabet, as announced by the Russian Ministry of Education, by shortening the written language by one twelfth and making its spelling twice as logical, are declared by Dr. John P. Harrington, ethnologist of the Smithsonian Institution, to be of material advantage in the study of this difficult Slavic language.

Dr. Harrington also pointed out that it is fortunate for Russia that this reform has been declared at just this time. "Spelling reform failed in America largely because practically all Americans could read and write already, and were reluctant to change what they had learned, but in Russia it is different. Illiteracy is still common in Russia, and the great mass of the people have nothing to unlearn. When education becomes universal among them, as it is finally bound to, it will be based on the new spelling.

"The changes should effect a saving of about four years out of the education of every Russian child and they will reduce the cost of printing in Russia by something like $15,000,000 a year. Five of the letters of the alphabet have been thrown out bodily, reducing it from thirty-seven letters to thirty-two.

"The spelling of Russian has remained unaltered since it was standardized by Peter the Great and the grammarian Lomonosov, in the eighteenth century. No change was allowed, though in many ways the orthography was most whimsical.

"For instance, the Russians were using two kinds of 'e'. One word might require the variety of 'e' known as 'ye', and another would call for the 'e' known as 'yat'. There were also two kinds of 'i', one written like our own 'i' and the other like our 'u'. The 'dotted' kind was written before a vowel, and the 'double' before a consonant. No word was allowed to terminate in an unpalatalized consonant, a 'hard sign', as useless as the mute 'shewa' of Hebrew, having to be written at the end. All this nonsense has been eliminated, and Russian is now the most scientifically spelled language of Europe.

"The question was raised in the Ministry of Education of introducing the Roman alphabet, which is the one we use in writing English, instead of the modified Greek character in which Russian has always been written. Psychologists claim that the Roman small letters, with their projections above and below the line, present a contour more readily grasped by the eye than the solid blocks of Russian lower case characters, which are practically all the same height and correspond to our small capitals. Thus 'malchik', which is the Russian word for 'boy,' in Russian type is a rectangle, while 'boy' in Roman type has projecting signals. But the advocates of retaining and 'scientificizing' the Russian alphabet prevailed."

Russian is now written without the dotting of an "i" or the crossing of a "t", which cause the lifting of the hand from the paper in writing English.

Dr. Harrington also told of the history of the Russian alphabet. "In the ninth century two alphabets were introduced among the Slavs in the vicinity of Salonika," he stated. "They have since become known as the Glagolitic and the Cyrillic alphabets. They were founded on the cursive Greek alphabet of the time; but much as the Slavs may wish to deny it, two of the letters "sha" and "shcha" were supplied by the Jews. They are merely the three-pronged "shihn" of the Aramaic alphabet.

"The Glagolitic form is now used only in Croatia and Dalmatia, while the Cyrillic is employed by all Russians, Servians and Bulgarians. It is the form in which the earliest Russian New Testament translation was written in 1057 A. D., and to which the Russian Ministry of Education has now given the benefits of scientific improvement."

THE MEXICAN BEAN BEETLE

Science Service

A DESTRUCTIVE invasion of the farm lands of the eastern United States by hordes from Mexico, which started in central Alabama in 1920, has now reached the shores of Lake Erie. The defense, entrusted to the Department of Agriculture, has resisted with all the means at its disposal, but has been unable to prevent a great extension of the enemy's front with each year's campaign.

The invader is the Mexican bean beetle. Long known in the Southwest as a moderately destructive, but not alarming pest of truck and farm crops, it was never reported from the East until 1920, when it became troublesome in a half-dozen counties in central Alabama. By the following summer the invaded area had been increased sixfold, making extensions into Tennessee and Georgia. In 1922, further extensions carried the war into central Kentucky and the western parts of the Carolinas. In 1923 the first raid outside of Dixie occurred, and the beetle reached central Ohio, and this year its range covers virtually the entire state.

It is extending eastward much more rapidly than it is moving toward the west, probably because its migration is controlled by the wind, which is prevailingly from the west. Its stronghold is the Allegheny highlands, for it likes to over-winter in dry, upland woods and can not thrive on well-cultivated lands or in marshes and swamps. For the latter reason, probably, it has not gained much ground to the south.

The beetle itself is a large member of the same family as the familiar little "lady-bird" beetles. It is about one fourth of an inch long, and has eight black spots on each of its copper-colored wing-covers. Both the beetle and the larva are very destructive feeders, stripping the soft green parts out of the leaves and leaving them as mere skeletons on the plant.

The bean beetle now makes a third unwelcome immigrant that has reached this country from Mexico. The other two are the potato beetle and the boll weevil.

RACES OF LICE

Science Service

LICE have scientific value as well as intensely practical interest. Therefore, Dr. H. E. Ewing, specialist in such creeping things for the U. S. Bureau of Entomology, has made a study of them.

He has found that as races mingle the vermin that plague them mingle also, and hybridize. Any ex-soldier can tell of the too great intimacy of the front-line trenches and how the Russian body-louse reached the American dough-boy *via* the German and French armies.

But Dr. Ewing is more interested in the fundamental race problems presented by the head-plaguing vermin, or "graybacks." He finds that in America the head lice of Caucasian, Indian and Negro are all merged in a conglomerate hybrid breed; there seems to be no color line in this unsavory universe of the unwashed.

To find records of graybacks in the pride of their ancient racial purity he has had to turn to the past. The heads of mummies supplied him with material. A few Egyption lice were turned up; but the best crops were yielded by mummies from ancient Peru and from the old Indian dwellings of our own Southwest. And the inhabitants of the hair of these oldest inhabitants, before the present palmy days of racial melting-pots, were quite distinct. There was a Peruvian type of head louse, a Southwest Indian head louse, a head louse peculiar to the white men of Egypt. And the ancient American vermin are quite distinct from modern Asiatic types captured from the Chinese and Japanese.

Another interesting result of Dr. Ewing's studies seems to indicate that the long-tailed monkeys of the American tropics owe us humans a grudge, for the vermin that afflicts them apparently were passed on to them by man. We may boast—or try to conceal—a simian ancestry, but it seems that the things the simian scratches for traveled the other way.

EFFECTS OF CLOSE INBREEDING

Science Service

THE largest-scale inbreeding experiment ever conducted has failed to show any disadvantage in the mating of close relatices, provided the stock is good to start with, according to results just announced at the Wistar Institute of Anatomy and Biology of the researches of Dr. Helen Dean King.

Dr. King's investigation dealt with the data for twenty-five successive generations of albino rats, comprising over 25,000 individuals, that were obtained by the closest form of inbreeding possible in mammals—the mating of brother and sister from the same litter.

Comparisons made between inbred and stock animals, reared under similar conditions of environment and of nutrition, show unmistakably that inbred rats are larger, more fertile, and that they attain sexual maturity earlier and possess greater vigor of constitution than do stock animals.

The conclusion is drawn that inbreeding, *per se*, is not injurious, provided that the animals inbred are of sound stock and that there is a careful selection of the individuals that are used for breeding.

ITEMS

Science Service

DID stone age men begin to learn to write fifty or a hundred thousand years ago? Professor William Paulcke, student of the ways of the ancient cave dwellers, thinks it possible. As support for his theory he points out the steady change in early stone age art, from the realistic to the conventional. The cave paintings of the earliest peoples, he shows, were much better pictures, looked at purely as art, than were the later ones. There was a steady tendency through the early ages to formalize art, until at last the figures became simply conventional symbols and were no longer pictures at all. Toward the close of the Old Stone Age they painted mysterious signs on pebbles, which have been found in the upper strata. They may have been merely playthings; but Professor Paulcke points out that the present-day Australian aborigines have similar painted stones and sticks. The figures on these ancient pebbles are strikingly like the picture-writings of the Chinese, Babylonians, Egyptians and Mayans.

ELECTRIC locomotives of a new type, that carry their own transformer stations and "step down" a high-voltage alternating current to a low-voltage direct current, are being installed on the New York, New Haven and Hartford Railroad, and, according to statements of William S. Murray, engineer in charge of electrification, promise to open a new era in motive power for railroads. One of the main obstacles in the way of complete electrifications of railroads has been the wide differences in the requirements for transmission of electric current and for its best use. Electricity is most economically transmitted as alternating current of high voltage. It can be most efficiently and economically used as direct current at low voltage. Until the present time, electromotive engineering has had to be content with compromises. Less economical types of motors have had to be used, and railroads have had to maintain costly "step-down" transformer stations along the right of way. The new locomotives carry their own transformers with them, and change 11,000 volt alternating current which they take directly from the trolley wire to lower voltage direct current which is fed to their motors.

CEDAR oil can now be produced in paying quantities from shavings and waste wood in cigar box factories, by a process worked out in the laboratories of the Bureau of Plant Industry, U. S. Department of Agriculture. The oil can be used with cheaper, odorless woods, to make the aromatic boxes insisted on by cigar manufacturers. This discovery is expected to be of importance to the cigar industry, for the small West Indian cedar from which cigar boxes are made is becoming increasingly scarce. The cost of obtaining the oil is relatively small, and after its extraction the waste can still be used, as at present, for fuel.