

SCIENCE NEWS-LETTER

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ENGLISH SCIENTIST PREDICTS WIDE-SPREAD FAMINE NEXT YEAR.

London. Will next year be a year of widespread famine? Sir William Beveridge makes a remarkable prediction of severe crop failure in 1923, and British scientists are now pondering over his prophesy.

Computations that Sir William has made indicate that there are four different weather cycles that affect crops. All of these combine in a maximum unfavorable phase indicating heavy and harmful deluges during the period from February to September, 1923, the growing season of next year.

The prediction is based on the variation in wheat prices in Europe during the last three hundred years. Sir William, using the periodgram method of computation, finds that the maximum price from 1500 to 1869 came at intervals of about 15 and $\frac{1}{3}$ years. This abnormality, his statistical analysis shows, is due to four weather cycles, temporarily operating all together. One of 4.37 years corresponds to one that has been identified in sunspots. Another of 5.11 years has been found in temperature and rainfall records. Two others, that are less definite, those of 2.74 and 3.71 years, seem to have been identified in meteorological or astronomical data.

"The year 1923 is destined to repeat something like the experiences of 1315, the year of the worst and most general harvest failure known in European history," says Sir William Beveridge, "in the excessively improbable event of my arithmetical analysis being complete and accurate in every particular."

The leading scientific weekly magazine of England, "Nature", believes the prediction well-founded. "On the face of it, the evidence seems sound, and the reasoning careful and critical," this magazine says editorially. "To the crowd,

if not to the man of science, the fulfillment of a prophecy always seems to give more adequate support to a theory than any number of agreements with past events, and the year 1923 may be awaited with an interest mingled with anxiety."

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Washington. April 00.- Officials of the U. S. Weather Bureau declare that they have not yet made investigations into Sir William Beveridge's predictions for a widespread famine next year. Prof. H. L. Moore of Columbia University of New York recently made a statistical analysis by the periodogram method of prices from 1882 to 1918 and found a marked maximum at eight years in the cycles of a number of crops and corresponding cycles in the production of the raw materials of industry.

BROADCASTS.

Radio News of the Week

DEVELOP ELECTRON TUBE RADIO
RECEIVER WITHOUT STORAGE BATTERY

Washington. - A radio receiving apparatus that uses ordinary electron tubes for amplification but which does not require a storage battery has been developed by the radio experts of the Bureau of Standards.

The current to light the filaments of the electron tubes is obtained from an ordinary electric lamp socket instead of the storage battery which the experts characterize as "a drawback to the general use of radio sets and the most expensive portion of the equipment for the person who wishes to make his own set."

How to use the electric light wires themselves as an antenna and thus eliminate entirely the need of erecting an antenna has also been worked out by the government radio engineers in connection with this new set, although the signals are likely to come in with less strength when this is done. The new design of receiving set can be used, however, with any type of antenna, either the ordinary elevated antenna, a coil or special forms.

"The new receiving set consists essentially of an amplifier with minor auxiliary parts," the experts explain. "The amplifier utilizes 60-cycle current supply for both filaments and plates of the electron tubes. This amplifier has three radio-frequency stages and two audio-frequency stages, and uses a crystal detector. The 60-cycle current when used in an ordinary amplifier circuit introduces a strong 60-cycle note which offers serious interference. This has been practically eliminated by balancing resistances, grid condensers and special grid leaks of comparatively low resistance,

telephone transformer in the output circuit, and crystal detector, instead of electro-
tube detector. In the final form of the amplifier, there is only a slight residual
hum which is not objectionable. The amplification obtained with a.c. supply was as
good as that obtained with the same amplifier used with d.c. supply. The complete
unit is light, compact and portable. For the reception of damped waves, the ampli-
fier as constructed operated most satisfactorily for wave lengths from 200 to 750
meters. This range was determined by the working range of the radio-frequency trans-
formers used. By using suitable radio-frequency transformers, it is expected that
the amplifier will be effective for the reception of damped waves and undamped waves
as long as 10,000 meters. For the reception of undamped waves, a separate heterodyne
should be employed."

A publication of the Bureau of Standards to be issued shortly will give circuit
diagrams and states the values of the condensers, resistors and inductors used.

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NEW RADIO PHONE AT ARLINGTON MAY CARRY HARDING'S VOICE

Washington. A powerful radio-telephone sending set that will be
able to carry the voice of President Harding and other high governmental officials
to all parts of the eastern and middle western United States is being installed in
the naval radio station at Arlington near here, it was learned today.

Within two weeks or more it is expected that Arlington will start a regular
broadcasting program on a wave length of 2650 meters with this new telephone set.

Heretofore this large radio station, which has day and night for years kept
official Washington in touch with its navy and other outlying government functions,
has not had radio-phone equipment.

The installation of the radio telephone became known only because of test
messages that have been sent. It is declared that these messages were received per-
fectly as far away as New Orleans and Bar Harbor, Me. Officials estimate that the
ordinary range of the station will be about 1500 miles, but it is expected that it
will be possible to receive its broadcasting at much greater distances.

While no definite information can be obtained, it has been intimated that
Arlington with this new equipment will be the broadcasting center for important
governmental announcements, such as presidential addresses before Congress, and it
is even possible that the proceedings of Congress will be sent into the ether through

this station.

The new Arlington set will be much more powerful than the Naval Air Service Station at Anacostia, D.C. which was used by Senator New in his now famous speech to his constituents in Indiana. This station has only a normal range of 150 miles.

Arlington now sends out official U. S. Naval Observatory time signals at 10 o'clock each night with a spark telegraph set on 2650 meters, and its regular code working equipment is an arc transmitter on 3950 and 5950 meters.

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150 RADIO BROADCASTING STATIONS NOW LICENSED

Washington. About 150 radio stations have been licensed by the Department of Commerce to date to broadcast by radio telephone. Awaiting action there are about fifty applications for similar licenses and there are more coming in each day's mail. Many are from electric goods stores and newspapers and these and other non-governmental stations are licensed to use 360 meters wave length. Governmental and state stations use 485 meters.

The South after July 1 will have a radio district inspector of its own. Now the radio inspector at Baltimore is in charge of the fourth district of the radio inspection service as well as the third, whose regular headquarters are in Baltimore. It is probable that Savannah, Georgia, will be the city in which the radio inspector of the fourth district will be stationed. A radio inspector is now visiting the southern states to report on the radio situation there.

SIGMA XI OFFERS RESEARCH FELLOWSHIP AWARDS

Schenectady, N.Y. Research fellowships, each worth at least \$1600. will be awarded in May by the Sigma Xi, a society for the promotion of research, Dean Edward Ellery of Union College has announced.

Awards are made in other fields other than physics and chemistry and are intended for men and women possessing the degree of doctor of philosophy. Dean Ellery has announced that applications for these fellowships will be welcome.

ORGANIZE GEORGIA ACADEMY OF SCIENCES

Athens, Ga. - Scientists of the state of Georgia have organized the Georgia Academy of Sciences which will be the leading scientific organization of the state. Within the state it will hold the same high position that the National Academy of Sciences does in the United States and the famous French Academy does in France. Membership has been limited to fifty, and "notable contributions to science" have set as a prerequisite for membership.

NEWS OF THE STARSStars Obey Molecular Law

A molecule is about eight thousandths of one millionth of an inch in diameter. Giant red stars like Betelgeuze and Antares are from 250 to 500 times the diameter of our sun, 864,400 miles across. But Prof. F. H. Seares, astronomer of the Mt. Wilson Observatory, has found that the molecules and the stars, the smallest and the biggest things in the universe, obey the same law. In the air, for instance, the particles of oxygen and nitrogen are flying about freely in all directions but in such a way as to divide up the energy of motion equally between them. That is, in any gas, the big molecules move slower and the little molecules faster so the average energy is about the same for all. It has now been discovered that the stars likewise follow the rule of the equal partition of energy so that the massive stars have the lowest velocities while the small stars on the other hand move with high speeds.

"This equal distribution of the energy of motion can scarcely hold rigorously for the stars, since such a state can exist only when the motions are completely at random, which is not the case with the stars," says Prof. Seares. "Some of them move as groups, having motions which are parallel and equal. That it holds even approximately is surprising, for in a gas the state of equipartition is brought about by the collisions and close encounters of the molecules. But the stars do not collide, or at least so rarely that in practice we may consider that their motions take place without mutual interference. How then has the equal distribution of energy among the stars come about? We do not know; but obviously its existence is a circumstance that must be considered in any theory which pretends to account for the development of the stellar universe."

This peculiar behavior of the stars results from an extensive investigation of the masses, densities, and diameters of stars of all classes by Prof. Seares, combined with recent measures of stellar velocity by Dr. W. S. Adams and his associates at Mount Wilson Observatory. When the stars are classified according to their intrinsic brightness or candle power and their temperature it is found, as first shown by Hertzsprung and Russell, that the hottest stars do not differ widely in intrinsic brightness, but that among the cooler stars - those which are red - there are enormous differences in luminosity, amounting to 10,000 fold or more. And, what is more extraordinary, there is a gap between the two extremes of brightness, within which we find no red stars at all. We thus have the so-called giant and dwarf subdivisions.

of stars, a grouping which shows most clearly among the stars of lowest temperature, but persists to some degree through all the intermediate temperatures and disappears only in the case of the bluish white stars of high temperature.

The classification according to intrinsic brightness and temperature thus reveals two great divisions of stars, both of which run through the entire scale of temperatures: the giants which, roughly, are of the same order of brightness, all very luminous; and the dwarfs which merge with the giants among the very hot stars, but become fainter and fainter as we run down the temperature scale. Our sun is a typical dwarf star of intermediate temperature, whose brightness is about 1/100 that of an average giant.

SCIENCE OF GROWING THINGS

Agriculture News of the Week

WAR TIME AMERICAN BREAD
TO BE EUROPE'S STANDARD

Chicago, Wartime Americans became accustomed to bread made partly of corn flour, and according to Dr. J. A. LeClerc, corn flour will soon be a part of Europe's staple bread fare.

Dr. LeClerc has just returned from western and central Europe where he studied for the government the possibilities of using larger quantities of American corn products.

As much as ten or twelve per cent. of corn flour can be mixed with wheat flour for bread making without any effect on the flavor of the bread or its food value. In central Europe the price of this corn flour is so much less than wheat flour that use of it in part is economical.

The corn flour can be made from de-germinated corn and its keeping quality insured. Formerly corn flour which contained the ground up germ of the kernel became rancid and thus objectionable for food purposes. This is the cause, now removed, for the strong prejudice against corn products which Dr. LeClerc found in Europe.

That corn grits made from degerminated corn should be supplied widely for use instead of rice as a table vegetable is also proposed. Dr. LeClerc says that in malting grain, corn grits can be substituted with great saving for broken rice which is now widely used.

MEXICAN OIL FIELDS FLOWING SALT WATER
AND OIL SHALE CONTAINS NO OIL --- BUT
SHALE GASOLINE WILL RUN 1925 AUTOS.

By Ralph H. McKee,
Professor of Chemical Engineering,
Columbia University.

When you get that 1925 model car, what will be the source of the gasoline you will use? American petroleum production has about reached its peak and certainly within three years will begin to decrease. On the other hand, our yearly consumption of gasoline and other petroleum products is still rapidly increasing. Even now we are a debtor nation in this respect, for in 1920, in order to make up the shortage, we imported 120,000,000 barrels of petroleum from Mexico and in spite of the extensive industrial depression of 1921 the importation was 20,000,000 barrels greater. But the known Mexican oil fields are soon to give out; already many wells have begun to flow salt water where formerly they gave oil. When salt water begins, then the wise ones know that that oil field is nearing exhaustion. This is one important reason why the market for that Mexican oil stock you own has fallen to a third of the value it had in 1919.

Our consumption of petroleum has been increasing at approximately 50,000,000 barrels a year. The number of trucks, farm tractors and automobiles used must be decreased or we must find another source of motor fuel. Happily, we have another possible supply of oil in the enormous oil shale deposits of Colorado and Utah and the lesser deposits of other states and eastern Canada.

Oil shale is a rock much resembling the slate layer commonly overlying coal seams. If you will look in the coal you are using you will find pieces of this slate which you have purchased at the price of coal. Oil shale has much the structure and appearance of this slate, except that it is generally a mahogany brown instead of black, and further, on heating, it will give petroleum vapor and will burn. For more than sixty years the Scottish and French oil shales have been mined and distilled to get petroleum. From each ton of oil shale rock they get 22 gallons of petroleum. The American oil shale is somewhat different and is richer, giving generally about 40 gallons per ton. This richness makes the shale on heating give a sticky mass which adheres to the wall of the ordinary Scotch retort and requires that the retort be modified if it is to be used successfully on American oil shales.

Oil shale is not a porous deposit containing petroleum in its interstices. Indeed, oil shale contains no oil. It does contain a solid material, apparently resinous in nature, called kerogen, and which on heating gives petroleum. It has

been shown by work lately completed at Columbia University that the formation of petroleum from oil shale takes place in stages. On heating, the kerogen first changes to an asphaltic, tar-like mass of about the consistency of vaseline. The further change of this heavy grease into lighter oils of the character of ordinary petroleum is due to a cracking process, brought about by heating to a high temperature, by which the large molecules are split into smaller ones, the higher the temperature the smaller the molecules formed. Accordingly, by choice of the right temperature, we will get largely motor fuel composed of small molecules rather than lubricating and fuel oils composed of large molecules. By such cracking processes, it is practicable to change fully 30 per cent. of the shale oil to gasoline. Such gasoline gives more miles per gallon than ordinary old type gasoline, but it deposits more carbon in the cylinders, is yellowish in color, and has a little stronger odor - however, who uses even present day gasoline as a perfume? The odor and color we will probably have to endure, but by changing our carburetors or by mixing alcohol with the gasoline, we can avoid the carbon deposit. In England and Scotland they have been using this type of fuel made from oil shale for automobiles for a decade and find it entirely satisfactory.

Already there are several American shale oil plants operating on a semi-industrial scale. With the petroleum shortage and the resulting higher price of gasoline, which will certainly begin within two or three years, the number and size of shale oil plants will rapidly increase and in ten or fifteen years the making of shale oil may be one of our very largest manufacturing industries.

MADE-IN-AMERICA CHINA
SUPERIOR BY SCIENTIFIC TESTS

Washington. If you must subject your china to rough usage, pick out American-made ware. "Domestic hotel china is very much superior to the French, German and English china in ability to withstand sudden blows," says the Bureau of Standards. And if it is not hotel china that you intend to treat rudely, please note also:

"The American vitreous china and earthenware for household use are also much superior to the French, German, and Japanese wares upon which sudden impact tests have been carried out."

American hotel wares did not craze and they only cracked at the highest temperatures employed when subjected to sudden temperature changes. The English wares crazed easily but did not crack, while the French and German wares did not craze but cracked at the lower temperatures used in the test. The American earthenware, with some exceptions, did not craze during the standard test but crazed at the higher temperatures which were employed for comparison. Although the French, German, and Japanese household wares did not craze, they fractured from sudden thermal shock.

(Second Article on Evolution)

MAN'S HISTORY AND STRUCTURE
RELATES HIM TO APES AND MONKEYS

By John C. Merriam,
Formerly Professor of Paleontology and Historical Geology,
University of California.

(From "Beginnings of Human History" delivered before the National Academy of
Sciences.)

As now interpreted, history means nothing if it does not present connected series in which every part contributes somewhat to the interpretation of all other parts or is in turn interpreted by them. Features of contrast may serve as markers for stages of movement and degrees of change, but the essential interest of the subject is embodied in the idea of continuity or unity.

The concept of evolution as we use it in science is only another form of expression for continuity in historic series presenting sequences of apparently different elements. It represents the idea of growth. It involves rate of development and nature of the forces controlling it. It interprets present conditions in terms of the past, and furnishes to some extent a basis of calculation for prediction of the future.

Man Fits In Animal Evolution Scheme

Considering the evident physical, chemical, and biological characters of man, resembling those represented in the general scheme of animal evolution, and taking these characteristics together with man's relatively advanced stage of intelligence and constructive ability, it has been natural to think of the human organism as the next member of the graded series beyond the stage seen in the known history of life. This might, of course, be done without assuming relationship between man and nature. It is, however, logical to inquire whether there is not actually full continuity between the biological world and the distinctly human sphere. As humans, no problem of greater fundamental significance faces us in contemplation of the historical or origin sequence in nature.

Approaches to nearly human history have been made by many roads; one has been that of the investigator working his way back from present to earlier time by way of documentary history, and finding a lower limit in the beginning stage of written record set down by use of hieroglyphs or alphabets. We have also the approach through work of the philologist and the ethnologist suggesting relationships and origins through similarities of language and custom. Advance to still earlier stages of the human record are made by way of archeology, basing its method in part upon superposition of strata. Carrying us still farther down is that aspect of paleontology connected on the one hand with the study of cultures through archeology, and on the other hand basing history upon successions of faunas and floras, and using the sequence of strata worked out by the carefully elaborated technique of the geologist. To these views there must then be added the speculations of the biologist upon relationships of the human family, which naturally follow a broad application of the evolution theory.

Human History Dates Far Back

Consideration of that phase of the problem concerning the emergence of man or the beginning of human history is essentially then an archeological and paleontological problem read out of the geological record. The evidence as we know it unquestionably carries us back into records representing geological periods long antedating the present age in the earth's story.

A study of the beginnings of human history, considered from the point of view of an investigator passing in review the evolutionary process, involves the biological relationship of man to other groups or organisms. These considerations are taken up with a view to determining their value in interpretation of man's place in nature, and the possibility of his growth or evolution out of the natural world. They comprise

1. The question of existing human differentiation. Do laws of variation, such as are found in other groups of organisms, obtain also among humans? In other words, is a biological scheme of classification naturally expressed within the human group?
2. The problem of geographical distribution of human variations with special regard to the question of origin and classification of such differing types.

3. The problems of comparative anatomy and physiology, including consideration of the question whether man's body is structurally similar to that in the higher animals.

Bringing into review the whole range of variation of the human family in all of its aspects, the differences in structure and in other characters, as color, seem to many biologists comparable to the grades of distinction separating species of horses, wolves, bears, monkeys and other mammals. There is, to be sure, the unending discussion whether the various kinds are to be distinguished as varieties, species or genera; but the settlement of this question is of the same nature as the determination whether the species of one author writing on modern mammals are always comparable with those of another. There may, however, be no difference of opinion regarding existence of these distinctions, or that they represent the natural expression of variation or evolution in these groups of organism.

Human Types Distributed Like Animal Types

Along with other natural relations, the geographical distribution of man presents a most interesting resemblance to the situation obtaining generally among the higher vertebrates. We frequently find that a map showing distribution of the members of a group of mammals or birds represents in fairly clear outline of classification the subdivisions such as would be made on the basis of form.

In the distribution of human types, a most striking suggestion bearing upon the relation of distribution to variation is presented in the physical variation among the primitive inhabitants of North and South America. Although there are between one hundred and two hundred linguistic groups in this area, the physical types throughout both continents are not widely different and are very close to those of Asia, the nearest land. Factors of distribution and variation such as we see in the case of man in America indicate that the organisms concerned have been on this continent such a short time that there has been little opportunity for physical differentiation to take place; and that the American forms are evidently derived from an Asiatic source.

The physical characters of man generally resemble those of the apes so clearly that discussion of this relationship inevitably resolves itself into a search not for similarities but for differences.

It is possible that some of the structural features have no relation to the question of ancestry of the human skeleton. On the other hand, as in the case of the ribs rudiments lying between the vertebral column and the hip bones, and in the growth of the first two vertebrae, there is every reason to believe that the mode of development corresponding to that of the reptiles in these portions of the body is not related to specific needs of the skeleton of man considered either as completed or in the process of growth; but that it represents rather a mode of development initiated in a stage earlier than that of the higher animals to which man belongs and persisting in man by reason of the fact that even at this stage in evolution it offers no distinctly unfavorable features.

Man and Apes Differ in Brain

The anatomical characters distinguishing us from the anthropoids are generally considered to be most sharply expressed in form and dimensions of the brain and skull, and in the form and function of the posterior extremities. Difference in brain capacity is accompanied by skull distinction of which the most readily recognized character is seen in the relatively large size and prominence of the jaws in apes.

In some respects the difference between man and the apes seems as clearly expressed in the limbs as in the brain, especially since the difference is not merely one of degree, but is in the limbs a distinction of kind and function. In most apes the relatively long fore-limbs are the principal structures for locomotion, which is by swinging through the trees, and to some extent the hands of these limbs serve the head, though the thumb is not generally opposable. The hind limbs of the apes are used for grasping and the feet, with opposable first toe, serve as hands.

In man the relatively long posterior extremities are used solely for walking. The anterior extremities with opposable thumb of the hand serve the head, and as one among many other functions they may be used for climbing. The opposable thumb is specialized to a high degree, and freedom from use in locomotion permits the hands

a great development of skill in many directions. In apes there are really four hands, but the pair with opposable first digit is situated on the portion of the body farthest from the head, so that neither pair is advantaged to specialize after the manner of the hand of man.

Apes and Man Alike in Structure

To most students of the problem of structural similarities and differences distinguishing apes and men, the greatest divergencies noted are to be classed as differences in degree rather than in kind. This seems in large measure true of skull and brain. The difference in foot structure possibly presents the widest separation and indicates distinction in habits of life conditioned upon locomotion. Yet even with the widest gap that we can open, the apes are still so near us that with man recognized as a biological type he must, when classified, take his place in the line next to the chimpanzee and the orang.

The conclusion which we obtain from a consideration of the biological aspects of the human problem is that physical man may not be separated from the zoological scheme. The sum of evidence from human physical structures gives us an organism dependent upon typical biological processes for its origin, and constructed on the typical mammalian plan. On the basis of general similarity we are obliged to refer the type to that portion of the mammalian group including the monkeys and apes. From the fact that man is differentiated into clearly separated groups related geographically as are the species of mammals, one might assume that he has been subject to the laws of evolution obtaining in other groups of organisms, and that through a long course of history he has gradually spread himself over the earth, undergoing a process of differentiation concurrent with the extension of his geographic range. In this brief statement, it is not necessary to go farther into consideration of the physiological organization of man than to state that, excepting in minor details, the functioning of this organism is similar to that of the higher mammals of the primate division.

MEDICAL MEN TO ADMINISTER FELLOWSHIPS

Washington, A special board of eminent medical men has been appointed by the National Research Council to administer the national fellowships in medicine which the Research Council is able to offer through special gifts to it by the Rockefeller Foundation and General Education Board amounting to \$100,000 a year for five years.

The members of the Board are: Victor C. Vaughan, formerly Dean, Medical School, University of Michigan, now chairman, Division of Medical Sciences, National Research Council; ex officio, chairman; David L. Edsall, Professor of Medicine and Dean of the Medical School, Harvard University; Joseph Erlanger, Professor of Physiology, School of Medicine, Washington University, St. Louis; G. Carl Huber, Professor of Anatomy and Director of Anatomic Laboratories, University of Michigan; E. O. Jordan, Professor of Bacteriology, University of Chicago; Dean Lewis, Professor of Surgery, Rush Medical School, Chicago; W. G. MacCallum, Professor of Pathology and Bacteriology, Johns Hopkins University; Lafayette Mendel, Professor of Physiological Chemistry, Yale University; and W. W. Palmer, Professor of Medicine, Columbia University, School of Medicine.

The fellowships are open only to students who have already obtained the degree of M.D. or Ph.D. or have equivalent qualifications. Fellows will be appointed for one year with the privilege of applying for reappointment. Applications or requests for special information should be made to the Division of Medical Sciences, National Research Council, 1701 Massachusetts Avenue, Washington, D. C.

DO YOU KNOW THAT -

Before the war, all flasks for preparing typhoid toxine were made in Germany. When of necessity an American company had to make them they were found to be far better than any flasks ever imported.

Fifty per cent of the world's gold comes from the Transvaal.

The first engineer to hold a high position in the U. S. Government was George Washington. After 155 years, Herbert Hoover, mining engineer and Secretary of Commerce, is the second.

All pruning should be finished before the time when the buds start to swell and leaves to form.

DO YOU KNOW THAT -

The myth that a Y-shaped stick carried inverted will turn over when it is above the point where a successful well can be dug has been controverted for centuries. The U.S. Geological Survey has issued a voluminous bulletin on the subject.

The smoke problem is nearly as old as civilization itself, for coal was being mined in Great Britain about the tenth century. In 1306, Edward I issued a proclamation prohibiting the burning of coal in the city of London, because of the "sulferous smoke and savour of the firing".

Some 42,000,000 men and women gainfully employed in this country probably lose on an average more than eight days each annually from illness disabilities.

The proposal to move the capital of Portugal from Lisbon to Coimbra, reported in recent dispatches following revolutionary activities, would not mean giving Portugal a new capital so much as restoring a very old one.

DO YOU KNOW THAT -

Constantinople consumes about 1,000 tons of sugar per month.

Cabbage black-leg is a fungous disease of increasing menace among growers. Its spread through a field can often be traced to infected seed.

One of the most promising substitutes is the so-called "white gold" which is an alloy of gold and one of the platinum metals. It is not attacked by nitric acid. "White gold" is used in certain classes of jewelry.

Nine out of ten tractor users in southern states continue to use the tractor once they adopt it.

DO YOU KNOW THAT -

If commercially practicable methods can be devised for extraction, great quantities of starch can be obtained from the rootstocks of the common swamp cat-tail.

The silk industry consumes about 1,500 tons metallic tin per annum in the form of tetrachloride and recovers about 40%. Consumption of pig tin for this purpose is about 900 tons.

An eighth or ninth of the soapstone quarried in the United States is waste but it is planned to utilize this waste as a substitute for low-grade talc.

Some 1,300 Yakima Indians have been granted freedom of their reservation, in Washington State, for ten more years, without acceptance of any duties or privileges of American citizenship.

DO YOU KNOW THAT -

Liquid oxygen is used as an explosive by a metal-mining company at Pachuca, Mexico, operated by American capital.

Thousands of game birds were needlessly destroyed every season at Las Vegas, Nevada, by oil discharged on waters frequented by the birds, but the Union Pacific Railway has remedied this condition.

The Public Health Service insists that European immigrants be reasonably clean when embarking so that they will not bring with them disease-bearing vermin.

The "slowest" crop in the world is the giant bamboo of India. It blossoms only when it reaches its thirtieth year, and then dies. In the meantime it bears an enormous quantity of seed, which is eagerly gathered and used as grain by the natives.

DO YOU KNOW THAT -

Tomato wilt causes an annual loss of more than 115,000 tons of tomatoes in the Middle Atlantic, Gulf, and lower Mississippi states.

Aluminum with 11 to 14 per cent. of silicon yields an alloy which is lighter than aluminum itself, stronger, more resistant, and more suitable for casting than known aluminum alloys.

Approximately 4,750,000 tons of wheat feeds are annually produced by flour mills in the United States. It would require 237,500 twenty-ton cars, or a train about 1,800 miles long, to transport this material.

A leather manufacturer stated that during 1920 the leather trade of England undoubtedly passed through the greatest cataclysm in its history.

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FRAGMENTS OF SCIENCE

Our Internal Army

The blood is the military establishment of the Kingdom of Animal. And it is a military establishment that is perfect in every detail as long as health rules. The realm of Wilhelm with its military perfection boasted of no system such as we have in this fluid army.

Consider it a while. Its purely defensive and aggressive organization. Its Militia, its National Guard, its Home-Defense Corps--the hosts of white cells ever ready for attack. Its Service of Supply--the red cells everlastingly carrying the oxygenated munitions and the simplified protein molecules to the organs needing them, and conveying back the unwholesome gaseous material that the tissues wish to be rid of.

The Quartermaster's Department--the serum with its hidden hormones, its endless enzymes, its aggressive agglutins, its limpid lysins, its opened-eyed opsonins, its fighting antitoxins--ever ready to deliver these agencies wherever needed. Its Intelligence Department, so reliable that a pin prick on the finger tip is sufficient impulse to have a detail of leukocytic scouts there in two minutes, to survey the ground and offer resistance to infection if necessary.

The Sanitary Corps--the serum again that conducts to the kidneys and thence to excretion--the various poisons and wastes that are eliminated by tired organs, and by over-exercised muscles. Its Medical Department with its commissioned Pharmacy Corps that is always responsive to emergency. -- Ivor Griffith of the Philadelphia College of Pharmacy.

"The function of a dream is to guard sleep." -- Dr. William Brown.

"Wars are not paid for in war time; the bill comes later." -- Benjamin Franklin

"Selection does not necessarily result in progressive evolution. It merely brings about the adaptation of a species or group to a given environment. The tape worm is the stock example." -- P. Popenoe and R. H. Johnson.