SCIENCE NEWS-LETTER

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(Three articles on Evolution---The attack on the theory of evolution by ex-secretary of state Bryan and the attempt of certain religious denominations and state legislatures to suppress the teaching of evolution in colleges has revived interest in the old controversy and made it necessary to have clear explanations of how evolution is now viewed by scientific men of today. Science Service has therefore secured three brief and popular articles on the subject to appear in successive issues. The first is by Dr. Vernon Kellogg, formerly Professor of Entomology in Stanford University, and author of Darwinism Today and numberous other scientific books.)

MR. BRYAN MISCONCEIVES EVOLUTION

By Vernon Kellogg,
Secretary, of the National Research Council,
Washington.

The recent recrudescence of attacks upon the fact - not theory - of organic evolution necessarily attracts the attention of scientific men. They are used to having to win their fights with ignorance over and over again, but each new necessity for a re-winning of the evolution fight comes with fresh interest because, if it results in no other good, it at any rate furnishes a special stimulus and occasion to take stock of the advance that has been made by science in connection with the investigation of evolution, the evidences that prove it, the factors that produce it, and the results of its incessant working. It is also interesting to learn what new angles, if any, are taken by the attackers, whether the successors of that early champion, Bishop Wilberforce, who delivered himself into the hands of Huxley, the successful defender of Darwin fifty years ago, are better informed and more skilful and plausible in their arguments than he was.

Mr. Bryan, who essays the role of Bishop Wilberforce fifty years after, brings nothing really new or that has not been answered often before, except perhaps one thing, and of that he makes mis-construction. He points out that the scientific men differ among themselves about the explaining causes or factors of evolution. It is

true, they do, but they do not differ about the reality of evolution itself. About that they are agreed. But Mr. Bryan manages to suggest that their disagreement is about the fact of evolution. This is not true. When one reads or hears a biologist's doubts about Darwinism, one is learning of his doubts about the validity of natural selection as the only, or the principal, or even an at all acceptable explanation of species-forming; for Darwinism is not used by biologists synonymously with evolution, as it is by Mr. Bryan and other critics of evolution. It is used by biologists with the definite intention of referring to Darwin's explanation of the "origin of species" which is the explanation by natural and sexual selection. That natural selection is an important arbiter in determining what evolutionary lines of animals and plants can successfully persist, practically all biologists agree; but that it is a sufficient causal explanation of the formation of new species very few biologists now maintain. Our new knowledge of heredity and variation and mutations, almost all of it gained since Darwin's time, have revealed the weakness of natural selection as a species-forming agent, and have suggested the greater validity of other agents. But there is no general acceptance or agreement now on just how new species arise. It is this debate and frankly expressed criticism by scientific men of various evolutionary factors that encourages the modern Bishop Wilberforces, lacking equally with their predecessors, accurate information of the subject they are discussing, to enter the lists again with the declaration that biologists are themselves divided and doubtful with regard to evolution.

We know now many more evidences of the reality of evolution; we know much more about the effects or results of evolution; we know much more about the methods and mechanism and power of heredity and more about the relation of varying environment to the individual and the species; so much more indeed about all these things that we are less inclined than in earlier days to accept Darwin's apparently simple and all-sufficient single explanation of species-forming and evolution. There is much more in the explanation of new species and evolutionary change and progress than Darwinian natural selection alone. If this is comfort to Mr. Bryan, he may make the most of it.

As to the origin and evolution of man, which, of course, is the real bete noire in evolution to Mr. Bryan and his followers, there was enough known to Darwin and Huxley fifty years ago to make unanswerable their arguments for man's relation to the other animals and to reveal clearly his steady evolutionary progress from the days of his first appearance on earth to historic times. But we know now immensely more about this prehistoric story of man, and all of it but confirms and makes more certain this relationship and this evolutionary progress. The history of human evolution since early Glacial Time until now is so full and detailed that the gaps in it are no longer disturbing as to its general course. They leave enough still to be found out to make it an attractive field of search and discovery by professional anthropologists and paleontologists, but to the layman who wants chiefly to know whether men really has an evolutionary prehistory, the affirmative answer is clearly revealed.

There is one question, however, in connection with the scientific man's fact-story of evolution that may well call for more special consideration and discussion on his part - indeed, on the part of us all - and that is: Does the acceptance of the truth of evolution and of human evolution in particular rob us of our hope and confidence in the high estate of human-kind? Because man has been developed by the inevitable workings of the factors that have produced the evolution of the lower-sensed animals and the senseless plants, does that make it necessary to accept man of today and man's future evolution as the sole results of non-human factors and determination? Does the acceptance of evolution rob or release man of today and the future of personal responsibility? If it does, then evolution would spell dismay and utter cynicism and we should all hope against hope for its disproof. We should all want to join Mr. Bryan and the uninformed churchmen - there are many informed ones, - thank Providence - in their violent prejudice and bitter words against this soul destroying monster. But the answers to my questions are not Yes, but No. Let me briefly explain why.

From all the evidence concerning pre-historic man now available to anthropologist in the way of human fossils - and there is much of this evidence - it seems certain that there has been little physical change, due to biological evolution, in human kind during the twenty thousand years or more which have elapsed since the times of Neolithic Man. There was certainly considerable physical change (biological evolution) in man during the much longer period (several hundred thousand years) of Paleolithic Man, but the recovered skeletons and skeletal parts, especially skulls, of men of earliest historic times and of the Metal and Neolithic Ages, show no appreciable

differences from the skeleton of man of today. Man today has no larger brain than had man of the Cro-Magnon race which lived in Europe at least twenty-five thousand years ago. However,man of today is a creature of immensely more achievement than man of Neolithic time. If, therefore, man of today shows no advance in biological evolution over Neolithic Man,what is the explanation of his better present position. The answer lies in the phrase, social evolution.

With speech and with writing and printing and education man now is able not only to accumulate knowledge, but to hand it on to succeeding generations for their use and inspiration and as basis for finding new knowledge. It is this power of registration and social inheritance of knowledge that gives man his present power over Nature and himself. And it is by the social evolution made possible by this knowledge and power, an evolution that can be largely controlled by man himself, that man can climb to the highest possible heights of humanness.

Thus instead of being robbed by evolution of personal responsibility and of hope of steady racial betterment,man is by this very evolution given more and more personal responsibility, and has not only hope but assurance given him that by wise and beneficent use of his knowledge and altruistic emotions he can lift himself and his race to an ever higher spiritual plane. Evolution does not destroy religion: it justifies it.

SCIENTISTS TO EXAMINE
BODIES OF SIAMESE TWINS

Chicago. According to Dr. Benjamin Breakstone, the physician in attendance at the death of Rosa and Josepha Blazek, Siamese twins, it is proposed to turn their bodies over to American scientists for examination, after which they will be cremated and the ashes sent to Czechoslovakia. Popular interest in conjoined twins has always been mainfest; and for biologists twinning has become a problem of importance. The physical similarity of twins is well known, but it is only recently, since methods in the science of psychology have been perfected, that mental features have been compared. Tests reveal that there is a consistent similarity with respect to general alertness, intensity of attention, deliberation, cooperativeness, sense of humor,and emotional reactions,

Conjoined twins have been known from very early times. The most celebrated pairs were, perhaps, the Biddenden Maids,born in Kent in 1100, the Hungarian sisters,born in 1701, the sisters Millie-Christine (colored) born 1851, the Tocci brothers,born in Turin, 1877, and the Bohemian sisters,Rosa and Josepha. There is now living in Washington, D.C. a pair of so-called "Siamese twins". They are boys still in their teens, and natives of the Philippines. Under a ruling of the census director they were counted as two persons in the last enumeration.

The term "Siamese twins" as applied to Rosa and Josepha had its origin in the most famous of all such twins, the original Siamese twins discovered in Siam by a British merchant, in 1824. They were taken from Siam to this country where they eventually settled down in North Carolina under the name of Bunker. They became farmers and married two sisters at the age of forty-four. Their death occured in 1874.

BROADCASTS

Radio News of the Week

VACUUM TUBES OPERATING
ON DRY CELLS PERFECTED

Pittsburg.. Vacuum tubes that operate on dry cells have been perfected and the mussy, heavy storage batteries that are now a necessity with vacuum tube radio receiving sets are doomed. Although the new tubes, only three inches long, have not yet been advertised, they are being placed in quantity production by the Westinghouse Electric and Manufacturing Company.

Most vacuum tubes have filaments requiring a current of from 0.6 to 1.0 amperes, at from four to six volts, that can only be supplied satisfactorily from a storage battery. The new Westinghouse tube's filament requires but 1.1 volts to operate and uses 0.2 amperes continuously. This means a power consumption of less than one-fourth watt as compared with three to five watts in the ordinary tube filament. It is said that one No. 6 dry cell, if the tube is operated one hour out of the twenty-four, will last about ninety-five days. The filament of the new tube is of platinum, about one-eighth as thick as fine tissue paper, and about one-hundredth of an inch wide. It is coated with a very thin layer of certain oxides with the result that a special form of Wehnelt cathode is formed. A special spring keeps the filament in position, but allows the filament to move freely in case of a severe jar.

The Western Electric Company has also produced a vacuum tube that operates on dry cells but these are not being sold for radio use, although they are used in hearing devices and other such instruments.

Radio experts predict that the dry cell radio vacuum tube will open a new era in radio reception when once given wide distribution,as it will then be possible to take a receiving set practically anywhere.

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RADIO STATISTICS SHOW
STEADY GROWTH IN DECADE

Washington. Radio has been growing steadily during the last decade or more, although the average person has only been impressed with its possibilities during the past few months. Figures compiled by the experts at the Bureau of Standards of the Department of Commerce show that there were 13,560 licensed radio stations in the United States in 1921, andincrease of more than 3000 over 1920. Amateur

radio stations that receive only are not included in the licensed list. It has been estimated that there are 600,000 to a 1,000,000 receiving sets now in existence while a year ago there were not over 60,000. The pre-war peak was in 1916 when the number of licensed stations was slightly over 5,600. During the war there was a large drop in the number because all but official stations were prohibited. In 1904 the money invested in the production of radio telegraph instruments was only $114,050 and in 1919 the amount had risen to $7,600,698. United States merchant ships equipped with radio in 1921 numbered nearly 3000.

METRIC ADVOCATES BELIEVE
RADIO AIDS THEM

Washington. Advocates of the Ladd-Britten bill in Congress, which provides for the adoption of the metric system of weights and measures in the United States after ten years, look upon the present interest in radio with favor. They feel that the constant use of "meter" and "gram" and other metric terms by radio fans will do much to acquaint the people with the advantages of the metric system. All electrical units are based upon the units of the metric system instead of the more complex English and American systems.

HOW DID SCORPIONS GET
IN NORTH DAKOTA MINES?

Puzzle--Who planted poisonous scorpions in North Dakota?

Fargo, N.D. Specimens of scorpions, ordinarily found only in semi-tropical or tropical countries, which were recently found in a lignite mine in western North Dakota, have been the causes of widespread flights of imagination in local communities and of serious speculation by entomologists of the state during the past few weeks.

Three specimens of these creatures - Uroctonus mordax Thor to be exact - are declared by Dr. R. L. Webster, entomologist at the Agricultural College here, to be the first ever found in the state. Authoritative dopesters believe that the scorpions may have been brought to North Dakota with the lumber used in the lignite mines, while other people interested in the find suggest that they may be relics of bygone ages - that their families may have been living closely associated with the lignite for centuries and more.

NEWS OF THE STARS

HOW FAR IS THE FARTHEST STAR?

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

The record long distance for stellar objects is held at present by a faint globular star cluster in Delphinus which is 220,000 light years from the earth. This cluster is known only by its catalogue number of N.G.C. 7006.

When the human race was still in its infancy the light-rays from this cluster that are now entering our telescopes started on their long journey through the universe at the speed of 186,000 miles a second. While these rays have been traveling toward the earth the sun with its planets has also been journeying onward at the rate of about one million miles a day and has covered a distance of fourteen light years. Every 15,750 years the sun covers a distance of one light year which is equal to about six trillion miles. The nearest star, Alpha Centauri, is four and one-third light years away, and the brightest star, Sirius, is eight and one-half light years from the earth. So our solar system has traveled a distance greater than that which separates us from the nearest stars while the light from this cluster has been speeding toward us.

The method of measuring the distances and diameters of the globular star clusters was developed by Dr. Harlow Shapley, formerly of the Mount Wilson Observatory, now Director of the Harvard College Observatory. Dr. Shapley has made a detailed study of practically all of the known globular clusters, about seventy in number. The results of his investigations show that all of these clusters are at enormous distances from the earth. Even the nearest, Omega Centauri, is more than 22,000 light years away and many of the clusters are nearly as distant as N.G.C. 7006.

Measurements of the distances of the globular clusters are obtained through a determination of the apparent brightness of giant variable stars that exist in all of the clusters. The absolute magnitude or intrinsic brightness of the giant red and giant white variable stars is very accurately known. So when the apparent brightness of these stars has been found the distance of the cluster they are in is obtained from a very simple relationship connecting the apparent brightness and the absolute magnitude or intrinsic brightness. In fact, now that the method has been perfected, there is less labor entailed in determining the distance of a globular

star cluster many thousand light years away than in finding the distance of the nearest stars by the trigonometric method of direct measurement, and the results are proportionally more accurate. It has been estimated that the errors in the values given for the distances of the globular clusters do not exceed one-fifth of the measured distances.

All of the globular clusters consist of thousands of suns many of which are several hundred times more brilliant than our own sun. Indeed a star no brighter than the sun would be entirely invisible if located in one of these clusters. The diameters of some of the globular clusters are so great that light would take several hundred years to cross them.

In the most powerful telescopes N.G.C. 7006 appears visually as a nebulous star but a seven minute exposure on a fast photographic plate has shown about two hundred stars in this cluster that are well within the limit of visibility of the greatest telescopes.

ANIMALS FATTENED
IN THE DARK

By Wallace Craig, Professor of Philosophy, University of Maine, Orono, Me.

When a fowl is to be used for meat it may be fattened by keeping it in the dark for two or three weeks before killing. While in the dark it will eat readily, but it takes little exercise, with the result that its flesh becomes fat and tender. In Europe, calves which are to be used for veal are fattened by the same method. A French scientist, M. Oltramare, has experimented in this manner on a variety of animals, including rabbits, guineapigs, cocks, pigeons, tortoises, frogs and fish, some of these being kept in the dark for more than three months. With all these different forms he finds similar results. They gain in weight more rapidly than animals kept in the light with the same quantity of food. If kept without food, the animals in the dark lose weight less rapidly than those in the light. Contrary to the general belief, M. Oltramare finds that darkness does not cause anemia, does not diminish the number of red blood corpuscles. The animals kept in the dark remain in good health.

DRILL THROUGH MADE ROCK--In the cementation process of sinking mine shafts through water-bearing ground, holes are first drilled in a circle around the proposed location of the shaft. Cement and water are injected into the holes with a force pump. The cement spreads through the loose ground, and on setting forms a water-tight wall, inside of which the shaft can be sunk without difficulty.

SUGGESTS MUSICAL
COMPOSITION OF PERFUMES

Birmingham, Ala., April 5.- Perfumed preludes and scented symphonies composed from a scale of delightful odors were suggested by Dr. Marston T. Bogert, professor of organic chemistry at Columbia University, in a public address here tonight before the American Chemical Society.

Instead of music from the organ, piano, or violin, Dr. Bogert would draw from tiny vials in the laboratory the perfumes which would blend into an olfactory harmony.

Symphonies of light recently made their appearance in New York. Dr. Bogert's suggestion looks forward to renditions which fall upon the nose instead of the ears and eyes. Dr. Bogert said that Dr. Septimus Piesse, a French chemist, maintained that every perfume produces its own peculiar effect on the olfactory cells just as every musical note has its characteristic effect upon the ear, and that therefore all odors can be arranged corresponding to the musical scale.

Dr. Piesse composed a scale of odors corresponding to the musical scale. The heavy odors are assigned to the low notes and the sharp, pungent odors to the high notes.

Starting with the bass clef, three octaves below middle C, the musical notes and the odors assigned to them by Dr. Piesse are: Do, patchouli; Re, vanilla; Mi, clove bark; Fa, benzoin; Sol, frangipane; La, storax; Si, clove; Do, sandalwood; Re, clematis; Mi, rattan; Fa, castoreum; Sol, pergulaire; La, balsam of Pere; Si, carnations and pink; Do, geranium; Re, heliotrope; Mi, iris; Fa, musk; Sol, pois de sonteur; La, balsam of tolu; Si, cinnamon; Do, rose.

The perfume of rose on this scale corresponds to middle C, and from it the treble clef continues with Re, violet; Mi, Cassia; Fa, tuberose; Sol, orange flowers; La, newmown hay; Si, aurone; Do, camphor; Re, almond; Mi, Portugal; Fa, jonquil; Sol, syringa; La, tonka bean; Si, mint; Do, jassamine; Re, bergamot; Mi, citron; Fa, ambergris; Sol, magnolia; La, lavendar; Si, peppermint; Do, pineapple; Re, citronell; Mi, vervain; Fa, civet.

Dr. Piesse also pointed out that when the perfumer wishes to combine the simple odors he must use those that combine into a harmonious mixture. His scale of odors

tells which perfumes will harmonize and which will discord. As a painter blends colors, in the sam way a perfumer should blend the aromas. When a bouquet of several perfumes is made, it is necessary to mix them so as to introduce a slight contrast.

Dr. Piesse gives the following examples of perfume bouquets:

These perfumes harmonize into a bouquet based on "Sol": Sol, pergulaire; Sol, pois de senteur; Re, violet; Fa, tuberose; Sol, orange flowers; Si, surone.

The following is a "Do" bouquet: Do, sandalwood; Do, geranium; Mi, cassia; Sol, orange flowers; Do, camphor.

The total effect of these odors is "Fa": Fa, musk; Do, rose; Fa, tuberose; La, tonka bean; Do, camphor; Fa, jonquil.

That odors play the same part in the world of the ant that light does in the human world was suggested by Dr. Bogert.

"If we imagine ourselves either blind or in total darkness," he said, "but possessed of exceedingly delicate olfactory organs in our finger tips, we can get an idea of the sensations an ant experiences as he moves about. As we moved about, touching various objects, our environment would appear to be made up of spherical perfumes and oblong stinks.

SEES BRIGHT FUTURE
FOR RUBBER INDUSTRY

Birmingham, Ala. April 4.- Though the price of crude rubber suffered a phenomenal drop from $3. a pound, the price due to the tremendous demand in 1910, to about 13 cents a pound, the selling price during the period of over supply in 1920, Dr. William C. Geer, director of the Chemical Laboratories of the B. F. Goodrich Co., in an address here tonight before the American Chemical Society, declared that the future of rubber is bright. All parts of the world, he said, will need improved transportation facilities in the future and rubber will necessarily play an important part in this development.

As crude plantation rubber costs from 18 to 25 cents a pound to produce, Dr. Geer declared that any ideas as to new uses for rubber would now be welcomed by rubber manufacturers. But he pointed out that although about 10,000,000 of the 12,000,000 automobiles in the world are in the United States, the future would see improved highway development throughout the great continents of Asia and Africa and with it a great increase in use of rubber tires.

The world uses about 300,000 tons of crude rubber and seventy-five per cent of this comes to America, Dr. Geer said. Three-quarters of the American import is used in pneumatic tires, solid tires and inner tubes.

During his address, Dr. Geer revealed for the first time that organic accelerators for hastening the interaction between sulphur and the rubber during vulcanization were first developed and used in America. "The laboratory record books of The Diamond Rubber Company, which was later consolidated with The B. F. Goodrich Company, show that George Oenslager, in the early months of 1906, experimented with anilin oil, and a long list of other organic compounds, with the definite purpose of hastening the time of vulcanization," he said. "In June of that year, A. H. Marks directed its use in factory formulas, and in February, 1907, he used thiocarbanilide. The German patents were not published in this country until 1912, so that it may be safely stated, unless some one comes forward with earlier unpublished data, that the use of the organic catalysts of vulcanization originated with Mr. Oenslager and Mr. Marks in 1906."

The perfection of a test that ages rubber as much in a day as in six months under normal conditions was announced by Dr. Geer. "To determine over-cure and how rapidly a new compound will age in comparison with one of known properties, I devised a test some ten years ago by which the rate of decay could be predicted," he said. "From this ten years' experience I now believe that in the heat of 70° C. with plenty of air, one day in the 'short life oven' corresponds to about six months natural ageing."

GRAPEFRUIT, SHRIMP, AND FIGS
MAY NOW BE CANNED

Birmingham, Ala. The practicability of canning food products such as shrimp, grapefruit, okra, figs, cane syrup and sweet potatoes, which are peculiar to the south, has already been demonstrated, Dr. W. D. Bigelow, director of research laboratories, National Canners Association, told the American Chemical Society in an address here.

That a method of concentrating cane syrup so that it would neither crystallize nor ferment has been perfected by the U. S. Bureau of Chemistry was announced by Dr. Bigelow. The syrup made by the evaporation of sugar cane juice heretofore could not be canned because of either fermentation or crystallization, but the new

process, which produces a non-crystallizing product by a method which inverts a part of the cane sugar, will place a new and inviting syrup on the market.

NEW MATERIAL FOR
TRANSPARENT TUBES

Birmingham, Ala. April 6.- A medicine dropper and a small graduate created some excitement here today at the meeting of the American Chemical Society. They were new pieces of chemical apparatus designed by Louis J. Cortman for measuring and handling hydrofluoric acid, the substance which quickly turns into vapor the ordinary chemical apparatus made of glass, silica, porcelain or other such materials. The new pieces of apparatus were made out of transparent bakelite which is unharmed by the powerful acid. Heretofore opaque lead tubes have been used in carrying out the tests in which hydrofluoric acid was used.

$44,049,922.00 INVESTED IN
CHEMICAL EDUCATION IN UNITED STATES

Washington. $44,049,922.00 is the amount invested in chemical education in the United States according to a survey made by Dr. Clarence J. West and Miss Callie Hull of the National Research Council. New York was the state with the largest investment during 1920-21 with $4,790,015. The states with the next largest investments were: Massachusetts, Ohio, Connecticut, Pennsylvania, Minnesota, Illinois, California, Michigan and Indiana. $7,553,300 is being used for appropriations for new buildings and equipment under construction at this time. The total number of students in all courses in chemistry is given as 112,771.

CANCER TENDENCY IN MAN IS
FOUND TO BE INHERITED

Washington. The question as to the inheritance of a tendency to the formation of malignant tumors has long been an open one. The Carnegie Institution of Washington has published a careful tabulation from the numerous family histories at the Eugenics Record Office, and it was discovered that children of cancerous fathers and non-cancerous mothers showed a striking excess of individuals inheriting this disease over those produced from normal parents. But, singularly, it was further found that in the case where the mother was cancerous and the father was non-cancerous the excess was still greater.

DO YOU KNOW THAT -

The city of Bradford, England, is a "wool city", the majority of its people depending for their livelihood upon wool and its manufactures in some form or other. The local press sometimes calls Bradford "Woolopolis."

Ground soapstone is used to some extent in foundry facings, as a lubricant, as a dusting agent in making prepared roofing, in low-grade paints and for a few other minor uses as a substitute for low-grade talc.

If doughnut dough is allowed to stand for about three hours it will not take up so much fat in cooking.

The most popular colors of paints in Turkey are red, green, light green, gray and blue.

DO YOU KNOW THAT -

Natives of Liberia rub garlic on their legs, finding that venomous reptiles retreat from the odor.

South American ant bears have been imported into the State of Washington by fruit and vegetable growers to keep down the various insects that infest this region.

Although the jinrickshaw is part of our mental picture of Japan, a Philadelphia clergyman invented this horseless carriage less than a hundred years ago, while paying a visit to the Orient.

From the presses of the United States are issued eleven and a quarter billion copies of daily newspapers annually.

DO YOU KNOW THAT -

Electricity has been successfully used to land swordfish off No Man's Land, Mass. A specimen weighing seventy-five pounds was recently taken by sending an electric current through the steel harpoon.

The Japan Toy Company was obliged to discharge many of its employes because German competition has caused a dwindling demand for Japan-made toys.

Garbage has about one-fourth of the fuel value of poor coal and can be used to bring about its own destruction by burning.

Galen, born about 129 A.D., complained that there were no real seekers after truth in his time, but that all were intent upon money, political power or pleasure, and that not five men of all those he had met preferred to be rather than to seem wise.

DO YOU KNOW THAT -

A motor truck completely equipped as a medical and dental clinic visits the remote tribes in California, accompanied by a physician and a dentist.

The inventor of the friction match is unknown.

In baking a cake, grated chocolate gives better texture than melted chocolate

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After a long continued diet, consisting of one-fourth part of white-pine sawdust in their ration, cows, in a recent experiment, showed no change in their weight or milk production.

DO YOU KNOW THAT -

A valveless, gearless engine, intended ultimately for the automobile is being brought to the bench-test stage in Manchester, England.

Flour has been made successfully from beans, and a Brazillian establishment is now manufacturing these vegetable flours.

One day last November in London 340,000 pieces of soot were found in each cubic foot of air and the diameter of each piece was one twenty-five thousandths of an inch.

It is customary for local shippers and seedsmen to pay cash for seed.

DO YOU KNOW THAT -

The banana is one of the few articles of trade which has risen in value during the general depression.

The exportation of meat products is a recent development of Brazilian commerce. It resulted from the establishment of American packing plants in the country.

Successive seasons of turpentining cause no lowering in strength or rosin content of pine trees.

The little green plant louse, known as the Aphid, would have a progeny in one year that numbers well into ten sextillion, were it not for the destructive work of enemies and other natural causes.

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FRAGMENTS OF SCIENCE

"Hot Dog" vs. Chicken.

The Frankfurt sandwich at five cents is a most economical source of energy. The sliced chicken sandwiches, frequently sold for 25 to 30 cents, represent an actual cost to the consumer of sliced chicken corresponding to approximately $5.00 or $7.00 a pound.--F. G. Benedict, Director of the Nutrition Laboratory of the Carnegie Institution of Washington.

Vegetarians Score One.

Contrary to the supposition of former times, it now appears that a diet consisting largely of breadstuffs and cereals is more effectively supplemented by vegetables than by meat.--Prof. H. C. Sherman of Columbia University in "The Vitamines".

A Chemical Fish Net.

An area of pollution, deadly to fish, reaching across the stream and flowing downward, acts as a chemical net, sweeping all the fish before it.--New York Fish Commissioner.

Super-Power.

Energy could be supplied by a coordinated super-power system for municipal, private, industrial and railroad purposes at an annual cost of $239,000,000 less than by an un-coordinated system such as is now in use.--George Otis Smith, Director, U.S. Geological Survey.

A Thousand Years of School.

A Matthew Arnold, a John Stuart Mill, could not be manufactured out of any chance material by an ideal education continued for a thousand years.--C. W. Saleeby in "The Promise of Race Culture".