

SCIENCE NEWS - LETTER

EDITED BY WATSON DAVIS

PUBLISHED BY
SCIENCE SERVICE

1115 CONNECTICUT AVENUE

WASHINGTON, D. C.

OWEN E. BLOSSON, EDITOR HOWARD WHEELER, MANAGER

A WEEKLY SUMMARY OF CURRENT SCIENCE, FOR PERSONAL USE OR
USE IN CLASSES, STUDY CLUBS OR LIBRARIES. PUBLICATION OF THE
ARTICLES CONTAINED IS EXPRESSLY PROHIBITED. \$5 A YEAR, POSTPAID.

No. 68

July 29, 1922

ARMY BUILDS BIG AIRSHIP TO CARRY BATTLE PLANES

Washington. - The first large-sized semi-rigid helium airship of all American design is now being constructed at Akron, Ohio.

This will also be the first American floating aerial base and airplane-carrier.

This ship will be used experimentally to develop the lighter-than-air machine as a fuel saving, long distance carrier and mother ship to airplanes that will take off from and attach themselves to it in the air, according to Major P. E. Van Nostrand, in charge of the balloon section, United States Army Air Service here.

The new craft was planned by the Army Aeronautical engineers of McCook Field, Dayton, Ohio, in connection with the aeronautical department of the Goodyear Tire and Rubber Company which is building the ship.

The new craft will have a capacity of from 700,000 to 750,000 cubic feet of gas and will be something less than 400 feet long and will be propelled by four 12 cylinder Liberty motors able to drive the airship at the rate of 70 miles an hour. It will be able to carry two or three airplanes, but experiments will be begun with the use of one plane of small-type which will be carried underneath the ship and launched from that position. By merely throttling down the speed of the plane, it will be able to fly underneath and hook on to the mother ship. Airships large enough to carry from five to fifty planes may be developed as a result of these experiments.

"Leaving and returning during flight is a simple matter," Major Van Nostrand claims. "As long as the airplane stays in its natural element there is little chance of trouble. It will furnish a safer method than that of the hydroplane lighting on rolling ships around which there are frequently treacherous air currents and will be

much superior to present ground landings.

The new airship is especially designed for helium gas which has about eight per cent less lifting power than flammable hydrogen heretofore used. On account of this the bag must have a larger capacity to raise the same amount of dead weight.

Helium gas is also too scarce and valuable to be released to regulate the altitude of the craft. In the ordinary hydrogen balloon and airship when it is desired to go higher ballast is thrown out and when necessary to descend gas is let out. In the new helium aircraft, the necessity of valving or throwing out ballast is partly compensated for by cooling or heating the helium and thus causing it to contract or expand as desired.

Using the gasoline fuel during a long trip would ordinarily lighten the ship and cause it to rise. But loss of weight in fuel is compensated for by collecting the water in the exhaust gases formed by the hydrogen in the gasoline combining with the oxygen of the air in the engines. For one hundred pounds of gasoline used there is about 100 pounds of water produced and the weight approximately equalized.

SCIENTISTS ON MEXICAN SUB-CHASER HUNT SCARCE PACIFIC SEALS

San Diego. - The Mexican sub-chaser "Tecate" has left here carrying American scientists equipped with scientific apparatus and motion picture cameras to hunt down the facts in regard to the herds of the almost extinct southern fur seal and southern sea otters on the islands off the west coast of Lower California. It is hoped that international cooperation between the United States and Mexico for the protection of these seals may result from the work of the expedition, says Dr. Barton F. Evermann, chairman of the committee on Pacific Marine Life of the American Association for the Advancement of Science.

Records show that in the years 1808 to 1811 more than 203,000 fur seals were taken on the Farallone Islands besides thousands from other islands in these waters. Before 1806 more 22,000 sea otters had been taken from this same region. These species are now believed to be nearly extinct, but recent reports indicate that some

remnants may still remain.

The scientists of this expedition will explore the islands off the Lower California coast thoroughly. Motion pictures will be made of birds, snakes, mammals, and insects as well as of the seals. Skulls and fossils will be collected of the animals which have passed beyond the point of posing even for a slow-motion movie. As these islands have been but little explored, it is thought likely that many new species will be discovered.

The expedition is under the direction of Senor Torreon of the National Museum of Mexico and the Mexican government has detailed the submarine chaser to carry the explorers. The American organization conducting the work is the Committee on Conservation of Marine Life of the Pacific of the Pacific Division of the American Association for the Advancement of Science, and the expedition is being sent out under the patronage of the National Geographic Society with which is associated the Scripps Institution of Biological Research, the California Academy of Sciences and the San Diego Society of Natural History. Dr. G. Dallas Hanna, secretary of the committee, is in charge.

RADIO NEWS OF THE WEEK

GOVERNMENT TO SUPERVISE
RADIO SET TESTS.

Washington. Retailers of radio receiving sets have arranged for a New York electrical testing laboratory to test the apparatus they sell under the supervision and following the testing rules laid down by the radio experts of the Bureau of Standards of the Department of Commerce.

The rapid growth of the demand for radio apparatus caused many dry goods stores to be un-
willing to handling such material to sell it, but they have had much difficulty in deciding whether the sets offered by manufacturers are of poor or good quality.

The tests outlined include: Investigation as to the material and workmanship, the mechanical and electrical design, simplicity of adjustment, ruggedness, sensitivity, sharpness of tuning, wave length range and faithfulness of reproduction in

radio telephone reception. The committee of the National Retail Dry Goods Association, arranging for the tests, has suggested that from a commercial standpoint it would be of assistance to their members if responsible manufacturers would plainly mark their equipment, indicating the receiving radius of each instrument under every atmospheric condition. Owing to the large number of factors which enter into the determination of the range over which signals can be received with a given set, this is a very difficult problem, impossible to solve at the present time by any brief statement or mark. Strength of signals required by a receiving operator, height and location of receiving antenna, power of transmitting station, its location with respect to other stations capable of causing interference as well as the sensitivity of the particular receiving set must all be considered.

TRANSCONTINENTAL DAYLIGHT RELAYS UNSUCCESSFUL

Hartford, Conn. Incomplete reports from amateur stations to the American Radio Relay League indicate that the attempts at relaying messages across the continent in daylight on July 2, 4 and 9 were unsuccessful.

On all three days the message started from the west coast did not succeed in getting across the Rockies on account of static and the long relays necessary. The eastern first message left a Massachusetts station and got as far as Atlantic City, the second reached Clarendon, Va., while the third day's trial was last heard from in upper New York City.

"While these test messages went no great distances, yet the fact that a few years ago it would have been difficult to send them over more than 25 to 50 miles at the most on account of the relatively poor efficiency of the transmitters then, indicates in some measure the advance of amateur radio," says an official of the League. "On the first two days, static conditions were very bad, thunderstorms being reported in the afternoon, which make it almost impossible to transmit for any distance."

SCIENCE AND ORGANDY BANISH
INK FROM FINGER-PRINTING

Washington. It does not matter if criminals have their fingers stained with ink when being finger-printed, but Miss Postal Saving Depositor, dressed up in white organdy, objects decidedly. Nevertheless, she and all the other thousands of thrifty people who prefer Uncle Sam's post office department banks will have to use their finger-prints every time they draw money. This is the official decision following postal robberies.

But, thanks to science, ink stained fingers now have no chance of becoming a badge of saving. Bureau of Standards experts have developed a method that rescues Miss Depositor's dress from ink stains and the Post Office Department from a large expenditure of money.

The dainty fingers of the depositor are first coated by pressing them on a sheet of heavy paper impregnated with mineral oil. An invisible impression of the thumb is made on the necessary documents, and it is "developed" and made visible in the same way that the police bring out the lines of involuntary finger prints when they are solving a crime mystery. The oil print is dusted with lampblack which makes it visible, and the mark is preserved by spraying with a dilute solution of shellac, just as an artist fixes his charcoal drawing.

An expensive camel's hair brush has been used to dust on the lampblack, but the scientists economically suggested the use of a small ball of absorbent cotton coated with lampblack or gas black and tied up in a cover of organdy, the same material as Miss Depositor's dress, which they have protected from ink.

MILLIONS WASTED BY FORESTRY MANAGEMENT

Seattle, Wash. Investment value of \$400,000,000 in timber and land in western Washington can only be preserved by a proper conservation of forest productivity, according to Prof. Burt P. Kirland, of the College of Forestry of the University of Washington, who has compiled figures to show that it is cheaper for the large holding companies of the West to manage with a view to future growth than to follow their present system of exploitation. "The present system," he declares, "requires that a greater part of the annual returns from cutting be charged off a depletion of capital. Under the proper system of forest management, the amortization of the capital invested in the virgin timber is accomplished more slowly, although not so completely, and at the same time leaves the land in such condition that it is producing annual returns." -----

FIRST EGG-LAYING
MAMMAL ARRIVES IN AMERICA.

San Francisco. .- At last, the first living platypus has reached America. This specimen of the Australian duck-bill that has the bill of a bird, the fur of an animal, lays eggs and yet suckles its young has just arrived among a consignment of kangaroos, wallabies, and other Australian animals under the care of E. S. Joseph, animal trader.

If it is carried alive to New York a leading supporter of a New York zoological society will pay several thousand dollars for it.

Up to this time no one had succeeded in bringing a platypus across the sea alive. Mr. Joseph embarked with two of the animals but one died at sea.

Attempts to keep the animal in captivity have usually ended in the early death of the platypus. But Mr. Joseph has managed by studying the tastes and wants of the animals to keep one in good health and spirits for twelve months.

The platypus is one of the only two mammals in the world which lays eggs. The other, the echidna, or ant-eater, is much hardier and more adaptable. One lived for 17 years in the Philadelphia zoo.

TIN HAS EIGHT ATOMIC
WEIGHTS, NOT ONE

London. . Tin has eight different atomic weights, or isotopes, instead of the single one of 118.7, commonly accepted by chemists, so Dr. F. W. Aston, British physicist, has announced. Lines corresponding to atomic weights of approximately 116, 117, 118, 119, 120, 121, 122 and 124 have been located in the spectrum. His new method of preparing photographic plates for spectrographic work makes them ten to twenty times as sensitive as formerly. He also announces the confirmation of a suspected split of the element, xenon, into two components with weights of 128 and 130.

It was supposed until recently that all the atoms of an element were exactly the same but this work shows that what was taken as the atomic weight was merely an average of several different kinds of atoms. This accounts for the decimal fraction in the accepted atomic weight of tin, 118.7.

PROVES WATER INTOXICATES
WHEN TAKEN INTEMPERATELY

Rochester, Minn. Water in excess is an intoxicant. With the aid of an extract from one of the ductless glands and also without such assistance in controlling thirst, Dr. Leonard G. Rowntree of the Mayo Clinic has proved that excessive water drinking by either man or animals intoxicates.

"Water intoxication," he says, "is hard to produce as nature has provided against the accumulation of water in the body in poisonous amounts. Through thirst the intake of water is regulated to the body's needs. Unless the intake is greatly in excess, the output through the kidneys and the skin takes care of the surplus.

"In order to control the thirst, an extract from the small ductless gland at the base of the brain was used. Under the influence of this drug, the patient kept drinking water until he developed marked headache, nausea, a staggering gait, unsteadiness of muscle and inability to stand or walk, which lasted for a few hours."

This same process was tried with dogs with even more striking results. Cats, rabbits, and guinea pigs were also sent on a dangerous water jag by the excessive taking of ordinary drinking water or distilled water irrespective of the temperature of the fluid and without the aid of the glandular extract. Although the quantities of water are excessive, about an ounce per pound of body weight every hour, the amount absorbed is definitely limited. The intoxication is not accompanied by significant changes in body temperature or by constant or marked changes in the blood volume. Blood pressure is somewhat increased.

The convulsions of water poisoning are cerebral in origin and of extreme violence at times, usually lasting from one to ten or fifteen minutes. A strong salt solution administered intravenously after the early evidence of toxicity prevents, as a rule, the onset of convulsions and coma. All the symptoms of uremia can be experimentally induced by excessive water.

SCIENTIFIC MUSIC
TAUGHT IN KANSAS

Manhattan, Kans. - "The science of music" may sound strange to artistic ears, but Prof. E. V. Floyd of the Kansas State Agricultural College here is teaching it. He calls his course "The Physics of Music and Musical Instruments" and claims that it is the first attempt in the United States to give students the underlying scientific principles upon which music is based. The study treats of such subjects as the analysis of tone and why one violin string is better than another.

"The time is past," said Prof. Floyd, "when an artist is satisfied with knowing only his art. He is looking for the explanation of long known facts which have puzzled him. The art of music has always been far in advance of science. The secret of manufacture of the Cremona violin was known only to one Italian family, and it is only today, years afterwards, that scientists are discovering the lost art, which consists only of the fundamental scientific principles which underlie its manufacture."

No advanced work in science or higher mathematics is required; demonstrations are used. Many musicians have pondered over the law of compound tones. Prof. Floyd compares the tone of a tuning fork, poor in quality, to that of the violin, rich in quality. He fastens a string to the prong of a tuning fork and then sets the tuning fork into vibration. He then applies different tensions to the string which causes it to vibrate as a whole, in halves, and in thirds. Then by comparison Mr. Floyd shows how the violin string vibrates as a whole, in halves, and in thirds, simultaneously.

"From this we find that the violin string is a compound tone, while that of the tuning fork is simple," says Mr. Floyd, "and thus we find that the compound tone is a musical cord of many tones, each decreasing in loudness as the pitch increases."

ORIGINAL CHINESE FOUND IN SIAM

Washington. - J. F. Rock, adventurous plant hunter, reports from Kengtung, Burma, to the Agricultural Department here that he has found a village of the original Chinese referred to in the oldest historical book of China which dates back two thousand years before Christ. "They are called Miao," he says, "and do not eat or grow any rice but only corn. They cut down the forests and plant corn at an elevation of 3,500 to 4,000 feet on the elephant-shaped mountain of Doi Chang on which they live. They are the dirtiest people I ever saw, barring not even the Tibetans. Their naked children wallow in the mire with the pigs. They are natives of Kweichow Province, China, but have migrated over into Yunnan and even into north Siam."

(A Chat on Science)

MEDIUMS AND TRICKSTERS.

By Dr. Edwin E. Slosson,

Those who believe in spiritistic phenomena call upon their opponents to disprove their hypothesis, and hold, rightly enough, that if ninety-nine mediums are merely tricksters, it does not prove that the hundredth is not genuine. It is, of course, impossible to prove the universal negative of such a proposition. It is merely a question of probabilities. We can merely say that if spirits do return, it is extremely unfortunate that they can only return under those conditions which are most favorable for deception.

What these conditions are we can learn from the practices of amateur and professional conjurers. Let us approach the matter from another starting point than is usually adopted. Instead of speculating as to how departed spirits would manifest themselves to us, a matter which we can know nothing about, let us consider what a trickster would do if he wished to deceive the public into thinking that he was possessed of spirit power, a matter on which we have unfortunately a great deal of information. What conditions would he impose? What methods would he use? The following are the chief characteristics of such fraudulent manifestations:

- (1) Darkness. The less the light the more remarkable the manifestations is the general rule.
- (2) Distraction of attention. This is the chief reliance of the parlor and stage magician. The most striking things in the seance room occur after the sitters are tired of watching.
- (3) Unexpectedness. An experimenter lets us know what effect he is trying to get, and even if the experiment does not work he does not palm off some entirely different phenomenon and claim he has succeeded. The feats of the conjurer - and of the medium - are capricious and unforeseen. That is why trickery cannot be guarded

against by precautions in advance.

(4) Control of conditions. The conjurer and the mediums alike insist on having lights, furniture, sitters and apparatus arranged to suit themselves. On the other hand, the primary requisite of an experiment is the control of conditions. It is, therefore, incorrect to speak of experiments with mediums. They are usually merely observations, and that under circumstances most unfavorable to correct observation.

(5) Suggestion. This is the main reliance of the magician, next to distraction of attention. He palms a coin while pretending to throw it into a hat or into the air. Our eyes follow the motion of his hand and interpret it according to the intent. It is easy under favorable circumstances to cause collective hallucinations of smell, sight or sound. Our sense of hearing is particularly liable to be deceived as to the character and direction of a sound, such as the raps and scratches which are the commonest of mediumistic phenomena.

(6) Concealment. A prestidigitator for his most difficult tricks requires some kind of a table, shelf or screen, but he rarely demands so convenient a shelter as the medium's cabinet or curtain.

(7) Tied or held hands. The releasing of hands and feet when they are bound, knotted and sealed is the cheapest of tricks. I have seen a man handcuffed by a policeman, tied in a bag and thrown into the river, yet he came to the surface promptly with his hands free.

(8) Involuntary assistance. The respectable and well-meaning gentlemen whom the audience select to represent them on the stage do not interfere with the magician. On the contrary, they often aid as well as give him countenance. The magnetic girl who used to throw strong men about the stage was really utilizing their strength, not her own. Where several persons have their hands on a table it is impossible to prevent their taking an active part in its motion.

(9) Emotional excitement. An experimenter must preserve a cool and somewhat detached demeanor. Now, even the most convinced skeptic cannot witness unmoved such violations of natural law as these, purporting to prove the existence of another world, and especially the presence of his deceased friends and relatives. The photographs taken of the seance room show us not merely that the table is suspended in mid air, but that the witnesses, watching it with bulging eyes, open mouths and strained attention, are incapable of critical observation.

In these nine points and others the conditions of successful trickery and the conditions of the seance are the same. For that reason and others most scientists do not think it worth while to spend their time on spiritualism.

NEWS OF THE STARSThe Big Dipper

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

The Big Dipper, the bright design in seven stars which has such a cooling suggestion these hot nights, is, like many familiar things, looked at with unseeing eyes. Everyone in the northern hemisphere from spry youth to tired old age, knows this bright star group. There are not so many, however, that know that five of these steady-looking bright lights are speeding away from the others, and that these five belong to a great moving cluster of stars known as the Ursa Major or Big Bear cluster.

This cluster, which consists of at least thirteen stars, has the form of a disk about fifteen light-years in thickness and one hundred and fifty light years in diameter. It is hard to realize what that means. A light-year is the distance that light travels in one year. The velocity of light is practically instantaneous, 186,000 miles per second. In one day there are 86,400 seconds. Figure for yourself how far light travels in 150 years; that is the diameter of the Big Bear.

Sirius, the brightest star in the heavens which is only eight and a half light-years from the solar system is also a member of this cluster as is also Beta Aurigae, the bright star in the constellation of Auriga which is visible in the winter to the north of Orion. This star is one hundred and thirty light years distant, and the five stars in the Big Dipper which are members of the cluster are about seventy-five light years distant from the earth. It may seem strange that stars so widely separated as the stars in the Big Dipper, Sirius and Beta Aurigae should all be members of one connected group but this apparently great separation of certain members of the cluster is an effect of the nearness of the solar system to the principal plane of the cluster. If instead of being almost in the midst of this cluster we were at a distance of several hundred light years from it, it would appear to us as a small compact group of faint stars similar in appearance to the Pleiades or the V-shaped

Group of the Hyades in Taurus.

The star at the end of the handle of the Big Dipper and the star farthest from it in the Bowl are not members of this cluster and as they are moving in another direction through space the distinctive form of the Big Dipper will in time be lost. But that fact need not greatly disturb us for many centuries will pass by before star-drift will destroy our long cherished Big Dipper. Many generations to come will admire this heirloom of the heavens studded with celestial gems that has been handed down to the present generations from the early days of recorded history, just as we admire it today untarnished by time.

The stars in the bowl of the Big Dipper form the body and the stars in the handle form the tail of Ursa Major, the Greater Bear. The head and paws of the bear are formed by faint stars lying to the west and south of the seven bright stars. Our Big Dipper, then, is but a portion of the far more extensive constellation of Ursa Major and our Little Dipper with the pole-star, Polaris, at the end of the handle, similarly outlines the body and tail of Ursa Minor, the Lesser Bear. Both of these constellations we will now find conspicuously in view in the early evening in the north and northwest.

At this time of year when so many are camping out or hiking in unfamiliar regions it is well to bear in mind a fact which should be well-known to everyone, that the Pointers of the Big Dipper, as the two stars in the bowl farthest from the handle are called, point infallibly to the true north. An imaginary line through these two stars extended upward from the bowl to a distance about equal to the length of the Big Dipper brings us to the pole-star at the end of the handle of the Little Dipper. Anyone abroad at night in an unfamiliar country might find it of great service to have these friendly guides among the stars.

EDITORIALTHE SEAL OF THE FINGER

Kings of old used the imprint of their signet rings to seal their bargains and papers of state.

Rings are not as fashionable as they once were, and they are likely to be lost, but every man, woman and child of us has ten good fingers that will infallibly act as seals and signatures.

Being finger-printed has a criminal suggestion to it. But because they are efficient in identifying the right person as well as the wrong-doer, finger prints can be made equally useful in commercial life. The Post Office Department has decided to use the imprint of the forefingers of both hands to supplement the signature of a postal savings depositor or as a substitute for the signature if the saver can not write and under ordinary circumstances has to use a witnessed X. And scientists have banished the inky fingers and substituted greasy ones. Several New York and Chicago banks are requiring their customers to use finger-prints as check protectors. And during the war one of the largest collections of finger-prints ever made was created when some 5,000,000 men in the army and navy had theirs taken.

At the Leavenworth, Kansas, penitentiary the Department of Justice has the largest collection of criminal prints in America. Criminals serving long terms arrange and classify the 250,000 prints that will bring them cell-mates. But police use of finger prints, while still important, is numerically surpassed by commercial use.

Little skill is needed in applying finger-print identification. When the post office department was considering the adoption of its new system, its officials fingerprinted a roomful of thirteen people and asked an old postal clerk who had never seen a finger-print before to pick out the owner of a certain print. He did, easily.

DO YOU KNOW THAT -

The natives of Ayon Island, 700 miles west of Bering Strait, do not know their own ages - but they kill old people as an act of mercy.

An institute for testing and studying metals has just been organized in Sweden.

The first regular observations on the pulse rate by counting the number of beats in a minute by the watch were made by Sir John Floyer, English physician, in 1707.

Female crickets, grasshoppers, and katydids are dumb.

DO YOU KNOW THAT -

The town of Midland, Mich. has been run for the last six years by chemists. The mayor, three aldermen, and one member of the school board are chemists.

Use of gunpowder for firearms was discovered by a German monk, Berthold Schwarz, about 1300 A. D.

Although some birds have a well-developed olfactory apparatus, scientists doubt that they have any efficient sense of smell.

A machine for mincing microbes has been invented in England.

DO YOU KNOW THAT -

Examination of the fossil skull of the Rhodesian man shows that that prehistoric individual suffered from tooth trouble and earache.

The river Nile is lower than any previous record of modern times, causing a curtailment in water for irrigation of the Egyptian cotton crop.

If the output of iron increases 5% per annum, as it did before the war, it is estimated that the supply would be exhausted in about 130 years.

"Pasteur", a play by M. Sacha Guitry which deals with the life of the great French bacteriologist, has recently been produced in London.

DO YOU KNOW THAT -

Helium, the gas used in the three latest army balloons, was discovered 54 years ago in the sun by means of a spectroscope, 27 years before it was found on earth.

Scrap rubber, spread on in liquid form, is used for road-surface dressing in Ceylon.

The bite of the American tarantula, long popularly believed to be deadly poisonous, is now known to be little worse than a bee sting.

Kentucky blue grass grows successfully in well-fertilized lawns in Alaska.

DO YOU KNOW THAT -

Ants had developed their present highly organized society long before our ape-like ancestors had settled down into communities.

The French state railways are experimenting with gasoline-driven motors on lines with limited traffic.

The crossing of the yak with common cattle as practiced in Mongolia, Siberia, and Tibet, produces an animal more serviceable than either of the parent stock.

Shocks from electrical fishes were used by the ancient Romans in the treatment of various disorders.

DO YOU KNOW THAT -

The longest continuous series of annual weather records known are the rings in the Big Trees of California, dating back as much as 3,200 years.

Mica, the transparent, heat-resisting mineral, familiar to many through its use for windows in heating stoves, has now become so essential in electrical industry that the larger electrical-supply manufacturing companies own and operate their own mines.

The potential energy of falling water of the streams in Brazil is estimated to be about three and a quarter times that of Niagara Falls.

There are on the average three earthquakes a day in different parts of the globe.

READING REFERENCES TO NEWS-LETTER ARTICLES

ARMY BUILDS AIRSHIP TO CARRY BATTLE PLANES, page 1.

Bagnall-Wild, R. K. Progress of aeronautical research. Engineering (Lond) 113: 214-16 Discussion: 187-9. Feb. 17, 1922. U. S. Air Service (War Dept.) Airship and balloon gas manual. Wash. Govt. Print. Off, 1920, 2 vols.

SCIENTISTS ON MEXICAN SUB-CHASER HUNT SCARCE PACIFIC SEALS, page 2.

Townsend, Charles H. Fur seals and the seal fisheries. Wash. Gov't. Print. Off., 1910. (Bul. of the Bu. of Fisheries, v. 28 p. 315-22. Doc. 661).

Jordan, David Starr. The fur seals and fur islands of the North Pacific Ocean. (U. S. Treasury Dept. Com. on fur seal investigations. Wash. Gov't. Print. Off. 1898-99. 4 vols.)

SCIENCE AND ORGANDY BANISH INK FROM FINGER-PRINTING, page 5.

THE SEAL OF THE FINGER, page 13.

Holt, James. Finger print simplified. Chicago, F. J. Drake & Co. 1920.

Murphy, Edward H. Finger prints for commercial and personal identification. Detroit, Inter. title recording and identification bureau, 1922.

U. S. Bureau of Navigation (Navy Dept.) Finger print evidence, Wash. Gov't. Print. Off. 1920.

FIRST EGG LAYING MAMMAL ARRIVES IN AMERICA, page 6.

Ingersoll, Ernest. The life of animals. The mammals. N. Y. The Macmillan Co. 1907, ed. 2. Mammals of other lands. ed. by Charles J. Cornish and others. N. Y. University Society Inc. (1917).

SCIENTIFIC MUSIC TAUGHT IN KANSAS, page 8.

Bragg, William H. The world of sound. London, G. Bell & Sons, 1920.

Miller, Dayton C. The science of musical sounds. N. Y. Macmillan Co. 1916.

MEDIUMS AND TRICKSTERS, page 9.

Hopkins, Albert A. Magic, stage illusions and scientific diversions. N. Y. Munn & Co. Sci. Am. Office, 1897. Read, Carveth. The origin of man and of his superstitions. Cambridge, Univ. press, 1920.

FRAGMENTS OF SCIENCE

Among the lowest, but not physiologically the simplest, of living organisms, the bacteria, we find some species that can produce light. Such bacteria live mostly, almost exclusively, in the sea and more than fifty species have been described by investigators. Practically any single gallon of water than one draws from the ocean contains one or more of them and they are present in large numbers in the slime on the surfaces and in the various body cavities of almost all animals that live in salt water.
