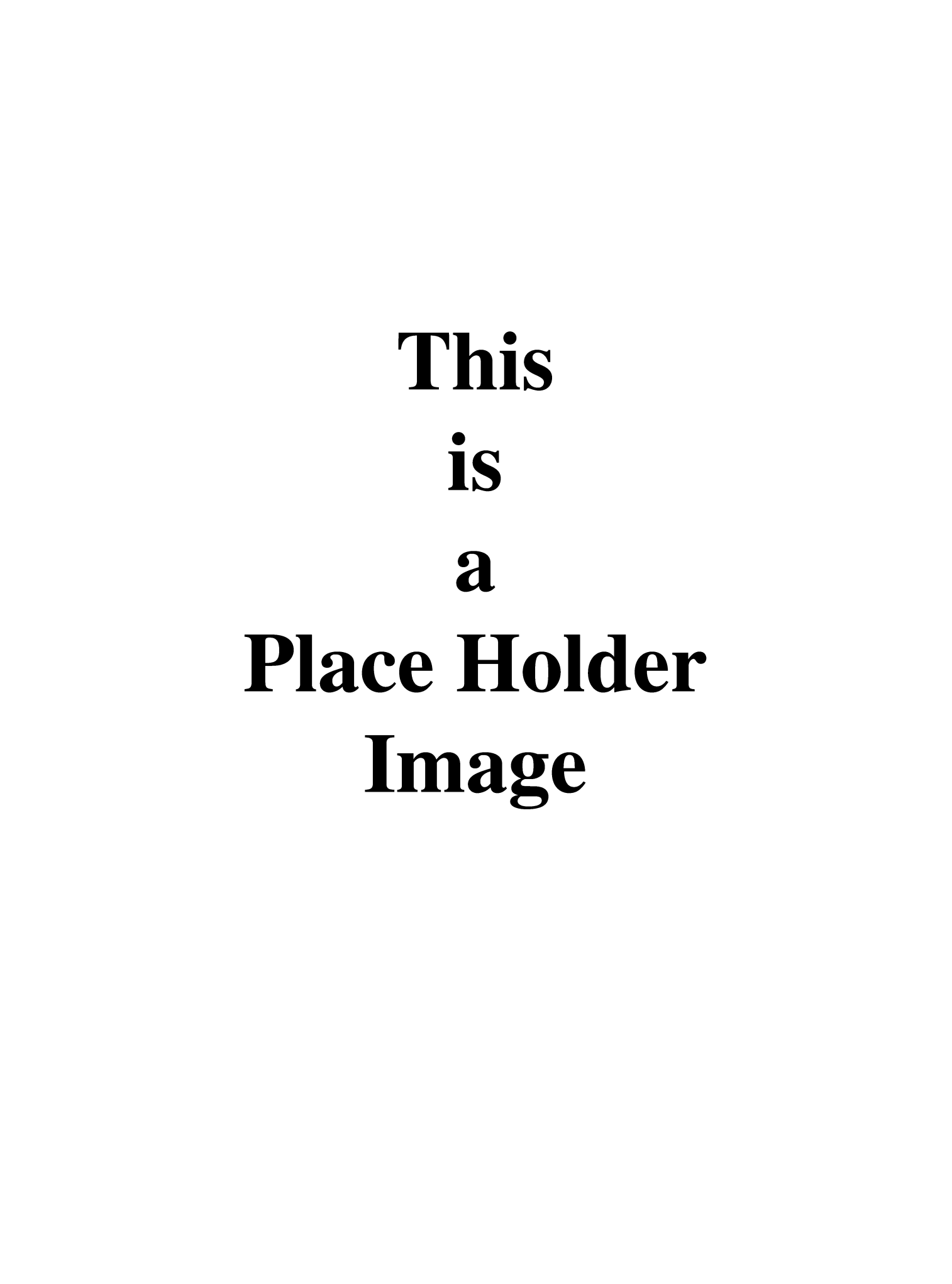
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Liquid ammonia and liquid sulphur dioxide are coming into commercial use as solvents. Information is wanted on all phases of the problems connected with the use of these substances in this connection.

Much remains to be learned about rubber. The behavior of pigments in rubber, the plasticity of unvulcanized rubber, the solubility of rubber, what causes it to "age" after vulcanization; and many other questions of its chemical action and composition are awaiting the trained investigator.

Paints, cellulose, paper, are but some of the other common raw materials of industry about which much is to be learned. The inventor still has his chance.

METHODS OF IMMUNIZATION

Science Service

THE possibility of vaccinating against certain diseases by eating the dead germs or rubbing them on the skin is suggested by Professor A. Besredka, a Russian working on the staff of the Pasteur Institute, Paris, as a result of experiments upon animals and subsequently with human beings. His conclusions are considered revolutionary in their application to the prevention of disease.

Professor Besredka asserts that immunization is effected by bringing the immunizing substances into contact with the tissues where the disease to be protected against usually first enters the body, rather than by injecting them under the skin.

For example, it was found that guinea-pigs could be protected against anthrax, a disease to which they are especially subject, by applying killed anthrax germs to the surface of the skin, where the active germs usually first find lodgement. This immunity is not associated, Professor Besredka states, with the presence of antibodies in the blood, usually considered to be necessary to immunity.

Experiments with cholera, typhoid and dysentery, all diseases which enter the body through the walls of the intestines, have shown that protection may be obtained by administering the vaccines by the mouth, the immunity resulting, according to Professor Besredka, from the effect of the vaccines on the intestinal cells rather than on the blood.

Data have been collected which may be interpreted as indicating that persons in contact with cases of typhoid or dysentery may be protected by eating tablets containing killed bacteria. An investigation of the possibility of protecting against cholera by this method is to be undertaken in Russia by the health section of the League of Nations.

Another possible application is that of vaccinating the skin against invasions of the bacteria known as staphylococci, which cause boils. Evidence is accumulating that protection may be effected by applying the vaccines to the skin instead of the usually accepted procedure of inoculating them under the skin.

Professor Besredka's views are considered revolutionary, and if confirmed by further experience, of the highest practical importance in the prevention of disease. Inoculation of vaccines frequently causes considerable local irritation and in some cases actual illness; practically all of which is avoided by eating the vaccines or rubbing them on the skin. For these reasons it is expected that it will be easier to persuade people to be vaccinated than is the case with the present methods of inoculation. The new method of protecting against disease is not yet ready for general public health application.

ITEMS

Science Service

THE largest vessel to be driven by Diesel oil engines has been ordered by the Union Castle Mail Steamship Co., for their South African service. It will be a 20,000 ton twin screw passenger liner and will be built by Harland and Wolff, Ltd., at Belfast, according to information received here by "Power." The vessel will be by far the most powerful motor ship in the world and the most powerful yet designed. It will be equipped with two sets of double-acting, eight cylinder Diesel internal combustion engines, developing approximately 20,000 indicated horsepower, through the use of crude oil. Pumps for circulating salt water, fresh water, and lubricating oil will be electrically driven as will all the auxiliaries. Electric power will be available for heating and cooking.

THE leather industry in the United States will have to depend more and more upon foreign tanning material of which the forests of South and Central America have an almost inexhaustible supply, says Otto Wilson, former chief of the Latin-American division of the Department of Commerce, in an article to appear in the next issue of the Chemical and Metallurgical Engineering. One third of the natural tanning material now used in this country is imported, the article states. The ready sources of home-grown tanbark have been depleted through deforestation and through the chestnut tree blight which has killed off 80 per cent. of the available supply of chestnut trees, and threatens their complete destruction. Chestnut bark has been in recent years the largest single source of vegetable tannin. Large reserves of tannin still exist in this country, principally in the hemlock forests of the Northwest, but they are economically unavailable at present.

METHYL alcohol, otherwise known as wood alcohol or methanol, is now being made by the chemical combination of carbon monoxide gas and hydrogen at the great German chemical factory of the Badische Anilin und Soda Fabrick at Ludwigshafen according to advices received in scientific circles. The manufacture of this essential raw material in many chemical industries is now effected on the large scale by the direct union of the two gases in the presence of an activating substance or catalyst. The gas mixture is heated to a high temperature and subjected to high pressures. Enough methyl alcohol is now being produced, the reports state, to provide for all of Germany's requirements. Among its uses is that of raw material for the manufacture of formaldehyde, which in turn is used as raw material in the making of artificial resins. Since carbon monoxide gas and hydrogen are made by passing steam over red-hot coals, wood alcohol may now be said to be produced from those simple substances.

THE OBJECTS OF SCIENCE SERVICE

Science Service

MANY scientists are wondering whether the purpose of Science Service is to disseminate scientific news in a readable and interesting form, or to disseminate propaganda. A recent explanation of policy by the editor is not at all satisfactory, especially as applied to the particular case he was explaining.

Again, in the issue of February 8 (SCIENCE, LIX, pp. xii–xiv), we find definitely designated as "gizzard stones" the gastroliths frequently associated with dinosaur bones which have long been known to and extensively discussed by zoologists and paleontologists. No new facts are presented, but a theory is accepted and promulgated in a positive form, without even a mention of another theory quite generally held by naturalists. It is definitely asserted that the stones were used by the dinosaurs in grinding up their food "after the manner of modern birds and fowls." The purpose of pebbles in the gizzards of such birds as have such organs is known, but gastroliths are found in the stomachs of many animals which have no gizzards, being especially common in the stomachs of seals and sea-lions, and not uncommon in certain lizards, snakes and fishes. A bull-snake recently dissected by Mr. E. T. Engle at the University of Colorado contained one pebble 38 × 29 millimeters in diameter and two smaller ones.

Also the unqualified statement that birds are "linear descendants" of dinosaurs will incline many to wonder just who proved it and how. The term has very exact significance and the relationship it suggests has certainly not been demonstrated in this case.

In the same issue Science News, in discussing the great Carlsbad caverns of New Mexico, definitely states that bats "are now the only inhabitants of those vast regions of subterranean gloom." That certainly is not supported by any real evidence. There has been no biological exploration of the caverns such as would be necessary to form the basis of such an assertion. Biologists will be very reluctant to believe that caverns so extensive and so ancient as these are said to be are devoid of a genuine cave fauna, and they will not believe it unless future quite thorough investigation by competent trained biologists fails to reveal such a fauna.

Science Service is an excellent institution, but its value would be greatly enhanced if one could feel that it is to be kept as free as reasonably possible from inaccurate statements and dogmatic assertions concerning matters which are uncertain or unproved. Loose, doubtful and inaccurate statements are not necessary in order to make science news readable and interesting to both the scientific and unscientific reader.

UNIVERSITY OF COLORADO JUNIUS HENDERSON

THE criticism of the Science Service item "Gizzard stones of dinosaurs exhibited" by Professor Junius Henderson is, like other criticisms, based upon a misunderstanding of what Science Service aims to do.

Science Service is prohibited by its charter from carrying on propaganda, but its field would be extremely limited if it were confined to those views on which all scientists were agreed.

Our *Daily Science News Bulletin*, which is prepared for the daily papers, and in part published in SCIENCE, is intended to present scientific "news" and therefore must deal with controverted subjects. Science Service is merely a reporter and it does not have either the knowledge or the right to refute the theories or revise the statements made to us by the authorities we report. The information for both the articles criticized by Professor Henderson came as was stated, from Dr. Willis T. Lee, of the United States Geological Survey. The points to which Professor Henderson takes exception are literal quotations from Dr. Lee's statement. I had no right to alter his words even if I had wanted to. What would Professor Henderson have me do? Should I have put an asterisk after the words "fowls are the linear descendants of dinosaurs and since the fowls use pebbles in their gizzards to grind their food, it is not strange that their ancestors did the same," and appended a footnote reading "so he said, but I don't believe it."

It happens that I did have an opinion on the question of the gastroliths, for I helped Dr. Williston hunt saurians in the chalk beds of Kansas in 1891, in each of which a quantity of gastroliths were found, but I should have no right to interpolate my views in another man's statement.

A fuller report of Dr. Lee's exploration of the Carlsbad Cavern was published in the *National Geographic Magazine* for February. When I called Dr. Lee's attention to Professor Henderson's criticism of his remark that "bats are now the only inhabitants of those vast regions of subterranean gloom" he frankly acknowledged his "error of omission" and added "There are other inhabitants of the cavern which I overlooked. I am told that the bats themselves are inhabited by certain small forms of insect life which I am not personally familiar with and therefore neglected to mention."

Science Service is willing to stand criticism for any mistakes it makes in presenting the views of scientific men and translating scientific articles into ordinary language, but it is not fair to criticize Science Service where it has carried out correctly and conscientiously its duty of reporting and translating.

It is unfortunate for us that duty sometimes requires us, like Red Cross nurses, to work between the firing lines of scientific controversy, but in case we get hit we can, like Red Cross nurses, console ourselves with the reflection that the bullet was not really intended for us, but it was aimed at the opposite side. But I wish they would shoot straighter. In every case so far where our news items have been criticized in SCIENCE we have found on looking up the manuscript that the statement objected to was a literal quotation or a fair paraphrase of the authority cited. This, I respectfully submit, is a good record, considering that Science Service is now producing for the public press more than ten thousand words a week. If more scientific men would aid us by supplying us with early and authentic information it would be more helpful to the cause than *ex post facto* criticism.

EDWIN E. SLOSSON,
Director of Science Service