SCIENCE NEWS

Science Service, Washington, D. C.

PHOTOGRAPHY WITH INFRA-RED RAYS

SEVERAL years ago a group of executives visiting the research laboratory of a large photographic concern were photographed in the dark, with infra-red rays, which consist of waves too long to affect the eye. But now a special photoflash bulb will soon be placed on the market, to permit any photographer to take such pictures. The bulb is covered with a filter that looks black, because it stops all the visible light. However, the infra-red goes through freely.

Ordinary film will not work with this bulb, but infra-red sensitive film is now available from several manufacturers. As the rays are focused at a different plane from those used in ordinary photography, the focusing must be changed slightly if sharp pictures are to be secured. The most convenient way of using the new bulb is with a synchronizer that permits snapshots, the shutter being opened automatically while the flash is at its height. However, as with ordinary flash bulbs, the shutter of the camera, on a firm support, may be opened, the bulb fired, and then the shutter closed. This method is not effective in stopping rapid movement.

Photographs may be taken in theaters and similar places without disturbing the audience. Another use is seen in case of possible blackouts, where photography can be done without the visible flashes of light that might be of use to enemy raiders.

The new infra-red flash bulb is manufactured by the Wabash Photolamp Corporation, of Brooklyn, N. Y.

CRUDE OIL RESERVES IN THE UNITED STATES

DESPITE the possible oil shortage in the eastern part of the country, on account of transporation difficulties, the crude-oil reserves of the United States, consisting of supplies "in sight or extractable by present methods and at approximately current prices reached a new peak on January 1."

This is reported in the Minerals Yearbook, shortly to be issued by the U. S. Bureau of Mines. At the beginning of 1941, according to the yearbook, quoting the American Petroleum Institute, the total reserve was 19,025,000,000 barrels, compared with 18,483,000,000 barrels a year before. At the present rate of use, this is a 13-year supply. During 1940, 1,894,000,000 barrels of reserves were discovered and developed.

Summarizing world production, the report says:

"The estimated world production of crude petroleum in 1940 was 2,149 million barrels—a gain of 70 million or 3.4 per cent. United States production rose from 61 per cent. of the world total in 1939 to 63 per cent. in 1940—a gain of 87 million barrels; production in the rest of the world declined 16 million barrels. Russia showed no substantial change, while output in Venezuela decreased 21 million barrels, in Iraq 5 million and in Rumania 3 million. Colombian production gained four million. Increased exports of crude and refined oils to the United States from Caribbean countries partly offset the loss of their continental European markets and helped to maintain their crude output at a higher level than might have been expected.

"In the United States the new production of all oils increased by 91 million barrels, rising from 1,319 million in 1939 to 1,410 million in 1940. This output, however, exceeded demand, as indicated by an increase of 39 million barrels in the stocks of all oils compared to a decrease of 41 million in the stocks of all oils in 1939."

As usual, 1940 set a new record for domestic motor fuel demand, with 589,424,000 barrels, an increase of 6 per cent. over 1939. Even greater was the increase in fuel oil.

"The demand for fuel oil in 1939—a record up to that time—was far surpassed in 1940," it is stated. "A gain in exports and a decline in imports of fuel oil in 1939 were just reversed in 1940 when, owing to adverse international trade conditions, exports dropped sharply below the record volume of 1939, while imports, because of an unusual demand for heating oils in the opening months of the year and an expanding industrial program, were double the quantity received from foreign sources in 1939. The running of more crude to stills and a greater percentage yield brought about increased production of fuel oil in 1940 compared with 1939. A downward trend in stocks in 1939, which resulted in a shrinkage of 12 million barrels in the fuel-oil inventory for that year, was checked in 1940 when 6 million barrels were added to storage."

The demand for paraffin wax also established a new record in 1940. In fact, states the Yearbook, "Coke was the only major product of petroleum for which the domestic demand was lower in 1940 than in 1939."

THE IMPORTANCE OF TIN TO THE UNITED STATES

IN the chapter on tin in the Yearbook it is pointed out that despite all efforts to accumulate a stockpile of this vitally necessary metal, the most optimistic estimate sets the supply now on hand at only a little over a year's normal consumption. While increased imports from Bolivia and other parts of the world will help, there is nowhere tin enough in sight wholly to replace the Indomalaysian supply should it be cut off.

Of the 169,500 long tons of tin used in the world last year, this country consumed nearly half—76,000 tons. Britain accounted for 32,000 tons, or nearly half of the remainder. This was substantially more than the combined tin utilization of the combined Axis powers, which totaled 26,500 tons. (The tons in these reckonings are long tons of 2,240 pounds, not the more familiar short ton of 2,000 pounds.)

Britain has long had a near-monopoly of tin smelting. In normal years about half of the world's supply has been smelted in British Malaya, and an additional quarter in the British Isles themselves. Most of the remaining fourth has been smelted in the Netherlands, the Netherlands Indies and China.

It has never been considered economically advisable to

set up tin smelters in the United States, because the finished product could be purchased abroad more cheaply than it could be produced from imported ore in this country. Now, however, with a war emergency staring us in the face, one smelter has been contracted for, to be built at Texas City, near Galveston. It will be government-owned, but operated under contract by an American affiliate of one of the larger Dutch firms. Its cost is to be $3,500,000, and its annual output 18,000 tons of refined tin.

Bolivia is the only important tin-producing country in the Western Hemisphere. The United States has contracted with several Bolivian mining concerns to purchase annually for the next five years sufficient ore to produce 18,000 tons of tin.—FRANK THONE.

THE SHORTAGE OF SILK

SHORTAGE of silk for hosiery, which seems imminent with the freezing of Japanese assets, has resulted in many inquiries by the trade concerning the researches of the U. S. Government over the last few years on cotton for stockings.

This work has been done in the Research Center at Beltsville, Md., by the Textile Technology Division of the Bureau of Home Economics of the U. S. Department of Agriculture. A small textile plant has been set up on the grounds, where many different designs of cotton fabric for hosiery are being made up in swatches. Also, the division has made up 116 different styles of cotton stockings to show their appearance.

The effort has been to improve both appearance and the wearing qualities of the cotton hosiery, and at the same time add style, something which has not been done previously, according to David H. Young, of the Textile Technology Division. The new stockings are an answer to the objections of the public and the manufacturer that cotton hose get fuzzy, fade, wrinkle and wear poorly. The sheerest of hose can not be made of cotton, but in the service weight many designs and styles are available which compare most favorably with silk.

Much effort now is being expended in the preparation of a Dictionary of Cotton and Lisle Hosiery. This will ultimately include about 300 designs, of which 33 have been placed on exhibit in New York at the Cotton Textile Institute and Mercerizers' Association of America, where they can be examined by manufacturers.

Mr. Young said that 85 per cent. of the machines now used in making full-fashioned hosiery can be used for cotton with only minor adjustments. Thus, it should not take long for production to start when the silk supply is curtailed. With cotton, nylon and strong rayon, the hosiery situation can easily be handled despite the silk shortage.

The present nylon production is about 20 per cent. of that required for the entire full-fashioned stocking industry. This will be increased this winter with the completion of a new nylon plant in West Virginia. He expressed the belief that use of nylon in parachutes and for other defense purposes would not reduce this greatly, as there has been no let-up in the production for hosiery during recent months even though the government has bought large quantities for other uses.

THE USE OF PECTIN IN SHELL SHOCK

THAT pectin, used in jelly-making, may be used as a substitute for blood to be transfused into the veins of war-wounded soldiers and civilians to save them from dying of shock, is proposed by Dr. F. W. Hartman and associates of the Henry Ford Hospital, Detroit, in a report appearing in the *Annals of Surgery*.

Tests on patients, guinea pigs, rabbits and dogs, conducted by Dr. Hartman, Dr. Victor Schelling, Dr. Henry N. Harkins and Dr. B. Brush, show that pectin solutions may be useful in treating shock and that they can be used safely.

The present war has reemphasized the urgent need for blood and blood plasma in the fluid or desiccated (dried) state, which may be used to combat shock and hemorrhage. Collection of dried blood plasma for American troops has been undertaken by the American Red Cross, but even with the largest drying units only 1,000 or 1,200 units of about half a pint each can be produced in a week. It is pointed out that from the standpoint of production alone, to say nothing of cost, transportation, storage and application, it seems obvious that some other substances which may be used as substitutes or supplements for blood and blood plasma must be found.

The primary need in cases of shock and hemorrhage is to replenish the volume of fluid circulating in the veins with a fluid which has identical or similar physical characteristics to the fluid part of the blood. The red blood cells in many cases are not needed and may even be undesirable. Isinglass (fish gelatin) and gum acacia solutions have been tried as blood substitutes but have not proved entirely satisfactory. Pectin solutions, properly prepared, have the necessary physical characteristics for transfusion into veins and they do not produce any damage as measured by tests of kidney and liver function.

Pectin, of course, is abundantly available at a nominal cost and the solutions for transfusion can be easily prepared. It shows promise as a remedy for shock, although so far it has been used chiefly as a substitute for blood transfusions to ward off shock from surgical operations in a small number of cases.—JANE STAFFORD.

THE POSSIBILITY OF AN EPIDEMIC OF PLAGUE IN THE UNITED STATES

A WARNING that the United States may have a plague epidemic to combat is issued by the American Medical Association through an editorial in its journal published recently. While typhus is being held in check only with the greatest difficulty in Europe and may have reached epidemic proportions in Poland and the Balkans, the *Journal* states that "no doubt plague, as far as this country is concerned, is a problem of greater potentiality."

Plague is present on the Pacific coast, not as human cases, but in fleas of rats, ground squirrels and marmots. From these sources it is feared that the dread disease can spread to cause an epidemic in human beings when conditions become suitable.

Long-continued and careful plague control, involving ratproofing of buildings, trapping, poisoning and examinations of dead rodents, must be practiced in any area in which plague has appeared.

The consequences may be tragic if there is not a careful integration of the plague control activities of cities, counties, states and the Federal Government, with the use of trained personnel and the appropriation of adequate funds.

The four horesemen of the apocalypse—war, hunger, disease and death—travel with the increased speed of mechanized transportation. Sudden and wide-spread outbreaks of disease arising from hidden infections are more likely than ever. The insulation of this country from the disease consequences of war will prove a colossal task and will require the most careful planning and effort.

THE ANTI-TYPHUS VACCINE

DR. R. E. DYER, assistant director of the National Institute of Health, and his colleague, Dr. N. H. Topping, left from Miami on August 2 for La Paz, Bolivia, to make an extensive, thorough trial of the anti-typhus fever vaccine on which the safety of British and American troops and even the outcome of the present war may depend.

The possibility that American troops may have to go into typhus fever regions of South America on hemisphere defense, as well as plans for aid to Britain which include supplying her with the typhus fever vaccine, make it imperative to know whether or not this vaccine works. Previous attempts to test the vaccine in European countries where typhus fever is a constant threat to life have failed because of the war abroad. Large batches of the vaccine, made according to the method originated by Dr. Herald R. Cox, of the U. S. National Institute of Health, were sent to Hungary, Rumania and Spain. Reports as to the results of the trials have either been inconclusive or have failed altogether to reach officials here. So the U. S. Public Health Service is going to make the tests itself under conditions that will leave no doubt about the results.

Enough vaccine for 5,000 persons has already been sent to Bolivia, where public health authorities and officials have promised full cooperation for the tests. The director of the state health department laboratory will probably work with Dr. Dyer and Dr. Topping.

These tests present one of the most difficult problems in disease-fighting. For each person vaccinated there must be one person unvaccinated who lives under exactly the same conditions as the vaccinated person, living in the same house, even sleeping in the same bed if possible, and thus equally exposed to the typhus fever germs which are spread by body lice.

The dangerous European type of louse-carried typhus fever, which kills from a fifth to about three fourths of those who get it, is always present in the highlands of Bolivia and certain other South American countries, often flaring up in disastrous epidemics. If an epidemic should break out in regions where Dr. Dyer and Dr. Topping have vaccinated half the population, they will have a quick answer on what the vaccine is worth, from comparing the number of cases, if any, among the vaccinated with the number among the unvaccinated. There is always so much typhus in Bolivia, however, that they will get an answer even without an epidemic. It will take longer, perhaps as long as nine months, Dr. Dyer said, but Bolivia offers the best opportunity for field trials of the vaccine. It can not be tried in the United States, as we do not have any European type typhus fever here.

The Cox vaccine is the best of all those that have been prepared to fight typhus fever, according to the Public Health Service, because it has given the best results in animal protection tests and because it can be manufactured on a large scale. While Dr. Dyer thinks he will only need to vaccinate 5,000 people in Bolivia to determine its value, he can get vaccine for 100,000 should he need it.—JANE STAFFORD.

ITEMS

THE wave of extreme heat that has ended in the East "presented an outstanding weather aspect of rare occurrence," the U. S. Weather Bureau states. It started in the Pacific Northwest and marched slowly and deliberately across the continent, taking a solid fortnight for the trip. Hundred-degree temperatures were reported in western Oregon on July 13, and the Virginia-Pennsylvania area saw the mercury hit the 100° mark on the twenty-eighth. There were heavy rains here and there during the heat, but the downpours were all local. In general, it has been dry, with crops in the great central agricultural region showing most effects. Corn has been damaged, but thus far not seriously. In the South, a let-up in the almost continuous rain has benefited cotton. Except in the South, what the country really needs is a spell of cool, wet weather.

THE common impression that the Irish have an unusually high birthrate, and that they are a "breeder nation," is erroneous, according to Dr. George F. Fitzgibbon, of Boston College. A number of factors have contributed to the creation of this impression, not the least of which is the high proportion of adults among Irish immigrants, and the preponderance of women over men. Among immigrants in general, about 80 to 85 per cent. of all arrivals are adults, but more than 99 per cent. of Irish immigrants were over fifteen years of age. And whereas men greatly outnumber women in other immigrant groups, among the Irish arrivals there were only seventy-four men to every one hundred women. It is true that Irish married women have large families, continued Dr. Fitzgibbon, but this high nuptial birthrate is offset by several other factors. The Irish have a tendency to marry late, many of them do not marry at all, and a rather high proportion of Irish marriages turn out to be childless. Furthermore, the high nuptial birthrate obtains only among the actual immigrants themselves; their American-born descendants have families little if at all larger than those of other Americans. At the other end of the picture, Dr. Fitzgibbon pointed out, there appears to be an abnormally high deathrate among the Irish in the United States. There are no national figures, but the deathrate among people of Irish descent was 23.6 in Pennsylvania and 20.5 in New York, at the time of the 1910 census. This is attributable to such causes as high proportion of immigrants over sixty years old, laborious and often dangerous occupations, and concentration in densely populated industrial areas.