

ceiver, reproducing the original in the broadcasting station, can be combined with simultaneous broadcasts, on the same wavelength, the engineers showed the Commission.

The facsimile was broadcast with ordinary "amplitude modulation," in which the waves are the same distance apart,

but vary in their height. The same carrier was given frequency modulation, by which the distance between the waves is changed in step with the sound vibrations. At the receiving end, the two were sorted out, and each used to operate the proper receiver.

Science News Letter, February 8, 1941

RESOURCES

U.S. Has Plenty of Vitamins, Vaccines, and Anesthetics

Only Drugs of Which Supplies in United States May Run Short if War is Prolonged Are From Certain Plants

THE ONLY drugs of which supplies in this country may run short if war in Europe is prolonged are those drugs obtained from certain plants, S. De Witt Clough, president of the Abbott Laboratories, reports in the forthcoming issue of *War Medicine*.

War Medicine is the new medical journal published by the American Medical Association.

Of vitamins, including cod liver oil, vaccines and other biologics, hormone remedies such as insulin for diabetes, sulfanilamide and the other sulfa remedies, anesthetics of all types, antiseptics, disinfectants, bandages and surgical dressings, the United States has plentiful supplies, Mr. Clough's survey shows.

"The drug industry today is in a much better position to supply the medical profession, hospitals, the Red Cross, the War Department and governmental agencies with pharmaceuticals and medicinal chemicals than it was during the World War," he declares.

The botanical drugs of which there is some danger of a war shortage include such items as belladonna and scopolamine, the latter familiar to the layman through its use for inducing "twilight sleep."

"There is already a growing scarcity of such items as belladonna root and hyoscyamus, a source of scopolamine," Mr. Clough reports. "While these botanicals have been coming from foreign countries, it is reasonable to believe that sufficient supplies of belladonna can be cultivated in this country to take care of civilian and military requirements.

"This was the case in the World War, when not only belladonna but digitalis and other medicinal plants were grown in Washington, Oregon, California, Min-

nesota, Michigan, Indiana, New Jersey, Pennsylvania, Virginia and Florida. Digitalis of excellent quality is still grown in the United States but not in sufficient quantity, as yet, to supply domestic, export and military needs. It is hoped that domestic cultivation will be increased.

"Atropine sulfate can be obtained from jimson weed, which can be grown on almost any farm land. It may also come about that the alkaloid, atropine sulfate, can be synthesized. When the World War was over, the cultivation of belladonna and some other medicinal plants was practically abandoned in the United States, owing to the lower cost of labor in other countries."

Mr. Clough urges that agricultural departments of state universities and colleges grow such medicinal plants in this country as are adapted to the soil and climate of the various states and experiment with others not yet cultivated in this country.

On the bright side, Mr. Clough reports that we are in excellent condition to produce large quantities of biologic items such as vaccines and antitoxins; that we could take care of a large part of the world requirements for bandages and dressings; that we are in "an advantageous position" to produce enough vitamin oils to take care of the entire western hemisphere; and that we lead the world in the production of anesthetics.

There is no fear of shortage of minerals used in medicine such as mercury, arsenic or bismuth, since these are either available here or may be obtained from South America. We can make sulfanilamide, sulfapyridine and sulfathiazole from materials produced in this country.

Science News Letter, February 8, 1941

PHYSIOLOGY

New Ideas on Hot-Water And Drugs For Pain

FAMILIAR stand-bys for the relief of pain—hot-water bottles, ice bags, aspirin and other drugs including codeine and alcohol—have recently been put through some rigorous scientific tests by two groups of scientists with results that your doctor may be applying before long.

Instead of ordering a hot-water bottle, to relieve pain, for example, he may prescribe the use of a device that intermittently applies heat or a cooling breeze or both alternately. Results of using such a device are reported by Dr. George D. Gammon and Dr. Isaac Starr, of the University of Pennsylvania. (*Journal of Clinical Investigation*, January.)

The hot-water bottle and the ice bag relieve pain by counterirritation. When you rub the sore spot after bumping against a sharp table edge, you are also using counterirritation to relieve the pain. The Philadelphia doctors tested various counterirritants on themselves and concluded that periodic rather than continuous counterirritation, produced the maximum relief of pain. Tests of some 20 patients with the special device for producing periodic counterirritation suggested that proper use of such a method would give much more relief than "haphazard application of hot-water bottles and ice bags."

The effects of pain-relieving drugs were tested by Dr. H. G. Wolff, Dr. J. D. Hardy and Dr. H. Goodell, of the Russell Sage Institute of Pathology, New York City. Acetylsalicylic acid, familiarly known as aspirin, relieves pain but has very little psychological effect, their studies, also reported in the *Journal of Clinical Investigation*, show. Acetanilid and acetophenetidin are popular as headache remedies, it appears from the studies, because besides relieving pain these substances lessen anxiety and restlessness.

Alcohol, like morphine, has a double action in that it both relieves pain and makes the person feel detached about the pain even while perceiving it.

Giving two pain-relieving drugs together, for example codeine and acetylsalicylic acid, does not increase the pain-relieving action beyond that of the most active ingredient of the combination, but does increase the sedative effects, which may be what your doctor wants to achieve when he prescribes such a combination.

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