foretell the hidden location of gravel and rock deposits which might provide a cheap and easily accessible source of this valuable road material.

Another way that modern research aids highway building is in the use of thermocouples to determine the temperatures inside the concrete after it has been poured and is setting to its final rock-like nature. Moreover, thermocouples tell how much a large slab of concrete in a highway will expand or contract in the temperature range from torrid mid-summer to frigid winter in the various climes of the nation.

The special, full-sized concrete road at the Arlington Experiment Farm of the U. S. Bureau of Public Roads contains many of these thermocouples.

Some magnitude of the research program on this special test section of highway is obtained from the knowledge that 65,000 measurements of slab expansion and contraction and 30,000 temperature measurements have been taken, as well as 30,000 strain determinations and 25,000 deflection observations.

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between ships and shore, aircraft and ground and directional signals upon which human lives depend can be seriously interfered with by "sky waves" of considerable intensity set up by the short wave diathermy and artificial fever devices now employed by many physicians.

Dr. H. B. Williams of New York City warns physicians of the nation through the *Journal of the American Medical Association* (Nov. 28) that they must take prompt steps to abate this nuisance. Otherwise, he declares, relief through legislation will be sought, with a possibility of undesirable restrictions being placed on the use of therapeutic machines.

The council on physical therapy of the American Medical Association is expected shortly to alter its requirements for acceptance of electrical equipment such as is known to have caused interference. Manufacturers will be asked to submit evidence that the construction and installation specifications are such as to prevent interference.

Even when not a menace, the physician's and surgeon's diathermy machine may be a nuisance, causing static in every radio receiving set that derives power from the same line, Dr. Williams points out.

The chief instance of radio interference from this cause came last winter when important activities of the Naval Research Laboratory at Washington, D. C., were subjected to interference so serious as to stop the work completely.

After great trouble and expense, the disturbance was eventually traced to a diathermy unit located in a hospital at Cambridge, Mass.

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CHEMISTRY

Pre-Shrunk Paint Helps Prevent Surface Weathering

"PRE-SHRUNK" paint has become a reality. Contrived with the help of soybeans and tung nuts, this latest product of industrial research in new farm crops has had two results. It has altered previous knowledge of how paint should be made and further bears promise of solving the problem of weathering in this commodity.

"Pre-shrunk" paint is another of those curious unforeseen accidental discoveries which give constant zest to the life of the research chemist. This one happened in the laboratory of a South Bend manufacturing plant where tung oil's possibilities as a "vehicle" for paint were under investigation.

For use in paint tung oil requires a delicate high temperature treatment. The process, however, is often marked by failure because if the heat goes too high the liquid will change to a solid within a matter of seconds. For thirty years chemists have known how to control that trouble so the tung oil can be used in varnish. But, until recently use of tung oil in paint has been limited.

How the trouble was overcome and pre-shrunk paint evolved was revealed by M. F. Taggert, director of research for the South Bend concern.

"After trying all practical mixtures of oil," Mr. Taggert stated, "we found that a mixture of 45 per cent soybean oil with 55 per cent tung oil was the best combination to prevent solidification in the high temperature treatment required to make the tung oil usable in paint.

"In one particular trial we started with 775 pounds of the oil mixture which is equivalent to 100 gallons. This was raised to the suitable temperature with no difficulty, but in measuring up we discovered that although our mixture still weighed 775 pounds we only had 97 gallons of the liquid. Somehow there had been a shrinkage of three gallons, this being indicated by an increase in specific gravity exactly equivalent to the seemingly missing portion.

"Inasmuch as raw oils shrink during weathering, this pre-shrinking of the soybean-tung oil combination contributes to a longer life of the paint."

This accidental discovery, Mr. Taggert continued, immediately caused the scrapping of all previous knowledge of how paint should be made. Another problem arose, however, involving the question of what type of pigments and in what proportion of those pigments the new oil combination would work best.

Using the new "vehicle" with its peculiar "pre-shrunk" property, the chemists then went to work on hundreds of paint formulae. One pigment at a time was at first used, then pairs of pigments, and so on through the gamut of available pigments until eventually the one formula was determined in which the "pre-shrunk" quality of the oil can be utilized to the best advantage.

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ARCHAEOLOGY

Pipe Played in Stone Age Found in Oldest City

WHAT is believed to be the oldest musical instrument known to man has been discovered at ancient Tepe Gawra, Mesopotamia, it was stated by Prof. Millar Burrows, Yale Divinity School, President of the American Schools of Oriental Research.

The instrument, part of a double pipe of bone, dates from the Chalcolithic Age, when man was shifting from the Stone Age to the Age of Bronze. Tepe Gawra, famed as the world's oldest known city, is being excavated by a joint expedition of the University of Pennsylvania Museum and the American Schools of Oriental Research, under direction of Prof. E. A. Speiser of the University of Pennsylvania.