

bombs to be carried, or a longer cruising radius.

With petroleum assuming such an increasingly important place, one naturally wonders about the potential supply. This seems ample, for the present at least, but such research methods as these must go on to assure their most efficient use. Figures on the world's petroleum are given in a recent paper by John W. Frey of the petroleum conservation division of the Department of the Interior in the *Geographical Review*, published by the American Geographical Society of New York.

"In 1939," he says, "the world production of crude oil was about 2,100,000,000 barrels, of which more than three-fourths was produced in the western hemisphere, a little more than one-eighth in Europe, and about one-tenth in Asia." Of course, in some parts of the world there is a great potential supply that may be realized in the future, but now, he states, "the United States and Russia are the only great world powers that have self-sufficient production."

He concludes with a warning:

"The United States produces about 60 per cent of the world's oil and consumes about 55 per cent. The economic and social structure built on oil during the past 30 years differentiates this country from all others. It is almost impossible to find a shred of American life that is

not affected by oil. No other industry has a more highly developed technology or a more efficient personnel. Violent economic consequences have been generated by the uncontrolled development in most states and production in excess of demand has on several occasions in the past decade placed the industry in a perilous condition. The present known reserves are satisfactory for the immediate future, but the magnitude of the base of demand, now a billion and a third barrels a year, has such far-reaching effects that a continuous supply at low cost is of national interest.

## PHYSICS

## Electron Microscope May Be Combined With Television

THE electron microscope, now being made commercially in this country as well as in Europe, can be advantageously combined with television, according to U. S. Patent 2,219,113, just granted Martin Ploke, Dresden, Germany. He has assigned his rights to the Zeiss-Ikon Aktiengesellschaft, also of Dresden.

The size of the light waves themselves sets a lower limit to the dimensions of objects visible through an ordinary microscope. Electrons, behaving like waves of much smaller size, are used in the electron microscope to form the image, and they reveal smaller details. Though the electrons cannot be focussed with lenses, this is accomplished with coils of wire, setting up electrical and magnetic fields to bend the electron beams.

In his patent specifications, Mr. Ploke says that when the object to be examined is bombarded with electrons heat is produced, and that his invention avoids this.

In one arrangement, he uses a beam of X-rays to throw a shadow of the object being examined on a thin metal foil closing one end of a vacuum tube. Where the X-rays fall, electrons are given off; these are focussed, by electrical and magnetic means, on a sensitive television transmitting surface. The currents can be amplified many times, and the picture viewed on a television receiver.

Though the patent does not mention it, another advantage seems to be that the object under examination is in the open air, while in one form of electron microscope, now on the American market, the object must be in an evacu-

"The prevention of avoidable waste has been in the hands of the states for a number of years, and there are states in which the objectives of the laws and the administration leave little to be desired; but this cannot be said of all the states. The lack of coordination in the matter of waste is a national problem—one that we cannot afford to meet with careless indifference. Only through the wise use of this vital and irreplaceable fluid energy can this country avoid many of the extremely serious difficulties that confront other nations."

*Science News Letter, November 9, 1940*

ated chamber. Also, if desired, the television receiver could be some distance away, with a wire, or even a radio connection, to the microscope proper.

X-rays, being of much shorter wave length than light rays, reveal details as well as the electrons. For use where such extreme magnifications, of 20,000 diameters or more, are not desired, Mr. Ploke also describes a device using ultraviolet waves, shorter than visible light, though not as short as X-rays. These form an image of the object on a window at one end of the tube, electrons are given off where the rays fall, these are focussed on a fluorescent screen at the other end, where they are changed to light, and the magnified image is clearly seen.

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*Bread* sold in England is now standardized to four loaf sizes.

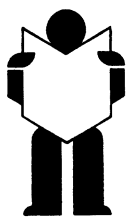
Serbia's *gypsies* are vanishing, says an anthropologist, who reports that they are settling in gentile villages, adopting village trades and manners, forgetting Romani speech, and marrying gentiles.

## ● RADIO

Frederick Osborn, official of the American Eugenics Society will discuss "Mothers and Fathers of Tomorrow" as guest scientist on "Adventures in Science" with Watson Davis, director of Eugenics Society will discuss "Mothers and Fathers of Tomorrow" on the Columbia Broadcasting System, Thursday, Nov. 14, 3:45 p.m. EST, 2:45 CST, 1:45 MST, 12:45 PST.

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