

## MILITARY SCIENCE

**Electronic Equipment To Protect U.S. Defense**

➤ A NEW TYPE of electronic equipment promises to protect vital communications and missile systems from the harmful effects of powerful nuclear radiation.

Bursts of nuclear and electromagnetic radiation such as those from a hydrogen bomb can destroy the effectiveness of delicate electronic equipment, temporarily or even permanently.

In case of enemy attack, the U.S. defense system could be disrupted or disabled by this so-called "electromagnetic pulse" (EMP), preventing the nation from protecting itself by retaliating.

The new equipment, which was developed by the General Electric Company for the U.S. Air Force, could help eliminate this weakness.

The heart of the system, a new type of ceramic vacuum tube, has been tested by GE, and is largely immune to harmful effects, both temporary and permanent, of the type caused by EMP.

Miniaturized amplifiers using the new circuits were subjected to bursts of radiation from a nuclear reactor, and suffered only minor difficulties in the region under 100 kilocycles, where much military communication is carried on. At higher frequencies, they did not work as well.

The new equipment achieves its immunity by operating at a temperature of about 1,100 degrees Fahrenheit, where molecular activity is high enough that the EMP effect does not disturb it significantly.

• Science News Letter, 86:180 Sept. 19, 1964

## ENGINEERING

**Brighter Headlamps For European Cars**

➤ NEW HEADLAMPS, soon to be introduced on European cars, will give more brightness per watt than current units, but will make dual headlight installations a must.

The lamps contain iodine gas, which improves brightness by removing from the bulb wall deposits of tungsten that have evaporated from the filament. This prevents "blackening" of the inside of the bulb, enabling it to maintain almost 100% brightness throughout its life.

However, this process requires higher filament and operating temperatures, so that a quartz bulb must be used instead of glass. On the other hand, the higher temperatures give more brightness per watt.

The new lamps can be made only with a single filament, unlike American high and low beam headlights. Therefore, the use of the bulbs will mean that dual headlights will be appearing on European cars, where they are now relatively uncommon.

American high-low bulbs have not proved more popular in Europe, because there is considerable light-leak above the "top" of the low beam. The many bicyclists and pedestrians on the Continent prefer the sharp cutoff of the single-filament low beam lamp.

There is no maximum candlepower limit

in Europe for upper beams, as there is in the United States. The more efficient quartz-iodine bulb is particularly suited for this application. However, it can be used only in very sparse traffic, since the glare is unbearable at distances as great as a mile or more.

Val J. Roper and L. A. Morgenstern of General Electric Company, Schenectady, N.Y., reported on the new lamps in the June 1964 Journal of the Society of Automotive Engineers.

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## TECHNOLOGY

**Use Two Huge Computers To Predict Risky Births**

➤ TWO GIANT COMPUTERS, normally used in the daily work of the British Government's atomic energy research centers at Harwell and Aldermaston, are being used to create a solution by which it is hoped the deaths of nearly 100 babies a week can be avoided.

This was disclosed to the British Medical Association in Manchester by Dr. Neville R. Butler, senior lecturer at the Institute of Child Health at the University of London.

The computers, he said, were being used to analyze a variety of factors that would help in predicting risk in perinatal mortality. This should lead to a better determination of those women whose babies, without skilled care, might be stillborn or die in the first week of life.

Dr. Butler's work is being done for the National Birthday Trust Fund in conjunction with the Nuffield Foundation.

"We are analyzing 200 factors concerned with pregnancy and labor," he said. "Apart from scientific information, all kinds of facts such as the mother's social class, age, height and number of previous children are being fed into the computers. We hope to have our diagnostic chart ready by the end of the year."

It is hoped that computer analysis will reveal the relative importance of factors that could lead to a better selection of vulnerable groups of women who should have their babies in hospitals.

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## CYBERNETICS

**Computer Gives Answers In Print, Via Television**

➤ ANSWERS to questions fed into computers can now be read on television.

An electronic "editor," which flashes answers onto a 24-inch television screen, can compose, read or edit material in the computer's data files. Called QRCC for query response communications console, the "editor" can translate the systems of numbers stored in a computer within seconds into a conventional language or a formula that has meaning to the user.

The QRCC was developed for the U.S. Air Force at Raytheon Company's Surface Radar and Navigation Operation, Wayland, Mass.

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**Questions**

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