

PHYSICS

Optical System Enlarges Television Pictures

► OPTICAL systems employing special types of mirrors and lenses are now used to pick up television images from the receiving tube in home sets and project them onto a screen suited in size to the requirements of the room in which the television performance is to be viewed.

The new system for the projection of television images was developed by Iouy G. Maloff and David W. Epstein of the research laboratories of the Radio Corporation of America. It consists of a spherical front mirror and an aspherical lens. The mirror looks like a shallow bowl, and the lens is flat on one side, with the opposite side having a special surface contour. The mirror arrangement resembles the one astronomers have used for many years to view the solar system.

The projection system is mounted near the floor of the receiver cabinet, and it projects the image straight up onto a flat mirror inclined at 45 degrees to the incoming beam of light. The mirror throws the image onto a translucent screen which is built into the front of the cabinet. This arrangement presents the advantages of compactness and a cabinet need not be larger than the present floor model radio console.

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ELECTRONICS

Electronic Devices Rushed As Result of the War

► AS A RESULT of the war, many new electronic devices have progressed from the idea stage to actual use in a remarkably short period of time, William C. White, head of the electronics section of the General Electric Research Laboratory, told the National Electronics Conference, held in Chicago.

Without the stimulus of war, he stated, years may elapse between the laboratory development of a good idea and its active commercial utilization.

Two of a number of reasons for this, he pointed out, are that "in place of the deadening mental attitude that accompanies depression, there is instead (in wartime) the atmosphere of energy and a determination to get results and get them quickly. In place of the normal feeling of resistance to change there is the certain knowledge that unless we get ahead of our enemies and keep ahead of our enemies we are licked. Thus, ne-

cessity for change and improvement becomes a very part of our existence."

Industrial electronics equipment, such as resistance welding control, has helped save millions of man and machine-hours and millions of pounds of critical materials since Pearl Harbor, Mr. White pointed out.

"Electronic devices in industry should not be of the nature of gadgets attached to some piece of equipment but rather must be engineered as a closely knit part of the whole," he declared.

"In most industrial applications, the electronic part of the apparatus comprises only a fraction of the cost of the whole. However, in such cases the electronic part of itself may not only be of limited use, but the rest of the equipment without its use is of little value," he stated.

Mr. White laid stress on the fact that the successful use of electronic devices in industry is based upon giving better results than other methods, or because the engineering problem cannot be solved in any other way.

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ENGINEERING

Globe-Flying Planes Meet All Kinds of Weather

► FLYING planes to the four corners of the globe necessitates the development of airplane equipment which will resist corrosion under a variety of humidity conditions, B. A. Rose, of Lockheed Aircraft Corp., Burbank, Calif., told the national aeronautic meeting of the Society of Automotive Engineers, in Los Angeles.

The plane and its parts must withstand practically all the extremes of weather from heat to cold and from tropical cloudbursts to the condensation which occurs when the plane changes altitude or encounters different climates, he reported.

"The little things can ground an airplane just as effectively as the big things," Mr. Rose commented.

The humidity has a direct damaging influence on the airplane and equipment by setting up corrosion which is destructive to electrical equipment, condensed moisture shorts magnetos and causes fire detectors to give false warnings. Ice formation damages electrical equipment.

The overall problems, he stated, can be reduced by providing surface coverings, proper lubrication, rust inhibitors, and by eliminating the possibility of direct water entry by installing moisture seals, traps, and suitable drains.

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IN SCIENCE

PHYSICS

Cosmic Rays to Be Studied In Pamir Mountains

► A GROUP of scientists from the Lebedev Institute of Physics of the U. S. S. R. Academy of Sciences has left for the Pamir mountains to study cosmic rays at high altitudes. The expedition, under the direction of Prof. D. V. Smobel'syn, will continue studies that have been carried on for several years at the Atomic Nucleus Laboratory on Mount Elbrus, the highest mountain in the Caucasus. The Pamir mountains are located in southern Russia, where they reach into both Afghanistan and India.

Main objective of the expedition is to study the composition of cosmic radiations at high altitudes and determine the role played by heavy particles and secondary mesons first discovered in cosmic radiations in 1937.

In conducting its studies, the expedition will make use of a perfected proportional telescope and improved methods which the Atomic Nucleus laboratory has developed.

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POPULATION

War Has Varied Effects On Countries' Birth Rate

► "THE EFFECTS of the present war on birth rates have been much more varied than in World War I," Dr. Louis I. Dublin, of the Metropolitan Life Insurance Company, told the American Public Health Association.

Russian and German birth rates have been most seriously affected and their military losses have been the heaviest of all belligerents, he reported. The French birth rate has fallen but not to the low level of the first World War. In the Netherlands and Denmark, the birth rates have actually increased above prewar levels. The birth rate in the United States has increased to the highest level in 20 years, but a sharp reduction in 1945 is expected because so many young men are overseas and likely to remain there for some time. England also has experienced a war boom in births, with this year expected to put the rate at its highest figure for 15 years.

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CE FIELDS

PUBLIC HEALTH

Polio Cases Still Decline But Meningitis Increases

► INFANTILE paralysis cases continued to decline for the fourth consecutive week. For the nation as a whole 976 cases were reported by state health officers to the U. S. Public Health Service in Washington for the week ending Sept. 30 as compared with 1,159 cases for the preceding week. This brings the total reported since the beginning of the year up to the end of September to 14,548.

Meningitis cases, already high in number, are expected to show a decided increase from now on. So far this year 13,856 cases have been reported. Although about 800 below the report for the same time last year, this is almost eight or nine times as high as would normally be expected on the basis of reports for the past five years.

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SAFETY

Record Low in Accidents On War-Construction Jobs

► CONSTRUCTION jobs during the war period have taken a lower accident toll than ever before, despite rapid labor turnover and many "rush" projects, Lloyd A. Blanchard, chief, safety and accident prevention branch of the U. S. Army Corps of Engineers, told the National Safety Council meeting in Chicago.

A large number of accidents had been feared. Organization of new combinations purely for war construction, the necessary thin spreading of the relatively few outstanding key construction men, intensely competitive labor market, draining of the physically fit personnel by the armed forces, and the utilization of thousands of contractors who knew little about accident prevention, seemed to set the stage for trouble.

"The actual results were completely contrary to the forecasts," Mr. Blanchard stated. "For 1941 with an exposure of 866,000,000 man-hours, the frequency rate was 26.83 and the severity 2.18; 1942 had an exposure of 1,799,000,000 and a frequency rate of 17.61 and a severity of 2.49, and in 1943 the exposure totaled 727,000,000 man-hours and the frequency

rate was 14.61 and the severity 2.89."

Outstanding among the safety activities utilized, he reported, was establishing accident prevention as a contractual obligation; enforcement of specific published construction safety requirements; establishment of mobile first aid field stations, infirmaries and hospitals staffed with adequate professional personnel; and supervision of all work by Government professional safety engineers.

Looking toward a future of even fewer accidents, Mr. Blanchard stated that the accident prevention program which brought such outstanding results during the war can and should be applied to construction work in the postwar era with equally good results.

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ORDNANCE

Shots from Tanks Accurate With New Type Stabilizer

► YOUR POSTWAR car may ride smoother and your train trip be more comfortable when a new gyro-stabilizer that today enables American tanks to shoot accurately on the run becomes available for peacetime application.

Shooting while the tank is racing across rough battlefields is made possible by the gyro-stabilizer unit that reduces the amount of jouncing transmitted from the tank to the gun. The new device was invented by Clinton R. Hanna, of the Westinghouse Research Laboratories in Pittsburgh.

The electrically-operated gyro-stabilizer controls the unit that, in effect, floats the gun on its trunnions, keeping the barrel at a fixed elevation and the target within focus of the gunner's telescope sight regardless of the lurching of the tank. A piston in a cylinder attached to the breech of the tank's gun moves up and down by hydraulic action to stabilize the movement of the gun. The gyro itself is attached to the breech of the gun. Every time the tank rolls over a rock, or pitches into a shell hole, the gyro asserts itself and, by a newly developed device that varies the voltage transmitted to the electric valves hydraulically controlling the piston, causes the piston to move up or down, thus correcting the position of the gun.

The gyro-stabilizer makes possible better than 70% hits over a target range of from 300 to 1200 yards. Without the stabilizer, experienced gunners are unable to score 1% shots under similar conditions.

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METALLURGY

Magnesium Will Be Used In Household Appliances

► WIDESPREAD use of magnesium, the lightweight metal, in postwar commercial and consumer products was predicted by R. P. Lansing, vice president of Bendix Aviation Corporation, at the first annual meeting of the Magnesium Association in New York.

He pointed out that the major problems of fabricating magnesium have been solved by wartime research, so that the metal can be used in such applications as knitting machines, bread-slicing machines, household appliances, portable hand tools, radios, cameras and other items.

Today, magnesium is extracted from sea water and inland magnesium ore for use in castings, airplane parts, and other war materials.

Urging that a postwar program be undertaken on magnesium, Mr. Lansing stated that it should be based on two fundamentals.

"One, providing economic justification for the use of magnesium in competition with other metals—and perhaps some plastics. Two, expanding research into new uses for magnesium."

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CHEMISTRY

Heat Resistant Plastic From Chemical Compound

► BOTH A HEAT-resistant plastic and a synthetic rubber can now be made from a new chemical compound developed by the Mathieson Alkali Works. The new plastic is expected to be of particular importance in electronics and, in general, wherever electrical insulation at high temperatures is required. The rubber is under test in heavy duty tires on motor vehicles.

The new compound from which both materials are made is known as dichlorostyrene. The rubber is made from it and butadiene.

Dichlorostyrene is a chlorinated product. Its monomers are highly active and polymerize readily. The polydichlorostyrene, the plastic, resembles polystyrene in chemical resistance, solubility and general appearance. It differs chiefly by its resistance to heat, and it is more resistant to water. It is stable and shows no tendency to lose hydrochloric acid. It may be molded by conventional methods.

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