

## Books of the Week

APPLIED MATHEMATICS FOR RADIO AND COMMUNICATION ENGINEERS—Carl E. Smith—*McGraw*, 336 p., illus., \$3.50.

BONE-GRAFTING IN THE TREATMENT OF FRACTURES—J. R. Armstrong—*Williams & Wilkins*, 175 p., illus., \$7. Foreword by R. Watson-Jones. A William Wood book.

THE ELECTROLYTIC CAPACITOR—Alexander M. Georgiev—*Murray Hill Books*, 191 p., illus., \$3.

ELECTRONICS LABORATORY MANUAL—Ralph R. Wright—*McGraw*, 77 p., illus., \$1. Laboratory textbook for students taking their first course in electronics.

LATIN AMERICA IN MAPS: Historic, Geographic and Economic—A. Curtis Wilgus—*Barnes & Noble*, 330 p., paper, illus., \$1.25. College Outline Series.

METEOROLOGY FOR PILOTS—Robert W. Mudge—*McGraw*, 259 p., illus., \$3.

THE NEW APPLIED MATHEMATICS—Sidney J. Lasley and Myrtle F. Mudd—*Prentice-Hall*, 428 p., illus., \$2.20. 3rd. ed., revised and enlarged.

PROBLEMS IN ENGINEERING DRAWING—A. S. Levens and A. E. Edstrom—*McGraw*, 52 p., illus., \$2.50. Series 1.

REPTILES OF THE PACIFIC WORLD—Arthur Loveridge—*Infantry Journal*, 236 p., illus., paper, 25 cents. Fighting Forces ed., available to members of the Armed Services only.

SOLUTION IN ASIA—Owen Lattimore—*Infantry Journal*, 138 p., paper, 25 cents. Fighting Forces ed., available to members of the Armed Services only.

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the surface under it, have also a distinct value in civilian flying. They are radar devices, depending in action on the time required for the high frequency wave to reach the earth and return to the instrument. They do not, like the barometer, indicate merely height above sea level.

Many of the military applications of radar which the Army Air Forces pioneered in combat were demonstrated or explained to the visiting group.

An unusually interesting piece of equipment, known as IFF, is originally of British design but is American made. IFF stands for "identification, friend or foe." Special equipment in a plane responds only when actuated by an interrogating set on the ground or in another plane. It responds automatically in the particular code set for the day. The pilot is unconscious of the waves from the interrogating set and also of the response sent out by the equipment on his plane. If an approaching plane fails to give an answer, and the right answer, it is regarded as a foe and immediately subjected to gunfire.

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### ELECTRONICS

## Safe Landings

Ground-control approach radar equipment will assist pilots through heavy overcast or in poor visibility. Can "talk-down" a blindfolded pilot.

By A. C. MONAHAN

► OF SPECIAL value for postwar commercial flying, to assist safe landings through heavy overcast or in poor visibility, is a ground-control approach radar equipment demonstrated before a group of science writers by technical men of the Army Air Forces. A blindfolded pilot, flying a gigantic plane, was "talked down" to the runway by a control operator while he was still several miles from the field and a thousand feet in the air. It was the most spectacular demonstration given to the group who had been assembled to learn about former radar secrets and Army specialized radar equipment.

All instructions to the pilot from the control were audible to the group by a special loudspeaker attached for the purpose. We watched the pilot turn to the right or to the left, or downward, immediately upon receiving instructions. He approached the landing strip at the proper end exactly at dead-center. When about ten feet from the surface, and ordered by the operator to take over, he removed the blindfold and made a perfect landing. The feat was a simulation of conditions encountered in landing through a heavy fog with a zero ceiling when the pilot cannot see the runway un-

til the last moment.

The equipment is on the ground only. It links up with the radio-telephone equipment with which all military and most commercial aircraft are equipped. The operating crew of the control equipment "sees" by radar apparatus the plane in the air and the landing strip. The apparatus is as complex as any radar set in existence. The complete unit occupies two large trucks, one of which contains the air-conditioned operating unit and the other a power unit.

### Tail Warning Set

A tail warning radar set, used most commonly in night fighters, lets a pilot, approaching a target or returning to his home station, know if he is being followed by another plane. It does not tell him if the trailing plane is friend or foe, but it does put him on his guard.

This tail warning device may serve a valuable purpose in civilian aviation in the coming days when commercial night-flying aircraft congest the airlines.

### Radar Altimeters

Low-range altimeters, for use within 400 feet of the earth, and high-range altimeters for altitudes between 400 and 4,000 feet, that measure the distance quite accurately between the plane and

## ADD A POTENTIOMETER TO YOUR LAB'S TEMPERATURE-MEASURING INSTRUMENTS

A lab equipped to measure temperatures with a potentiometer has certain advantages:

1. In reaching the hard-to-reach spots, the potentiometer's thermocouple, which is the element exposed directly to temperature, is merely a pair of wires. This couple may be:

- Run to any spot inside a cooker, oven, etc.; distance does not affect accuracy.
- Sharpened to penetrate animal or vegetable tissue.
- Used where the temperature of a very small area is to be determined.

2. A potentiometer is an excellent check instrument because it employs the standard-voltage cell, which makes all readings highly dependable.

3. Measurements may be made from sub-quick freezing temperatures to 1530 C or 2800 F.

4. The thermocouple, which is the only element exposed to the heat, is easily and cheaply replaced when necessary.

A widely-used potentiometer, our No. 8663 is simple, sturdy, dependable; has a number of available ranges for different kinds of thermocouples; and is made in a quantity which permits the low price of \$155.00 for a very high-grade instrument.

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