

Starting with an instrument used to test fluorescent minerals, the scientists threw away the galvanometer and substituted a set of tubes each containing a different strength of quinine solution; each with a different degree of fluorescence. By comparing these with an unknown sample the quinine content can be calculated.

This test, conducted in a few minutes in the heart of the jungle, is expected to be nearly as accurate as more complicated laboratory procedures. Simple instructions included with the new device can be followed by a layman without technical training.

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## PHYSICS

## Sheets as Well as Blankets Necessary for Soldiers

► SHEETS as well as blankets are needed by the Army to keep soldiers sleeping in the open warm and comfortable. The combination of a light blanket and two sheets gives greater body comfort than a single heavy blanket, without necessarily increasing the total weight.

Air permeability is the reason. Wool blankets permit more air to pass through them than do cotton sheets of the ordinary grade. Even one sheet with a blanket is preferable to a heavier blanket alone. These are the conclusions of scientists at the National Bureau of Standards, where tests of the air permeability of sheets, blankets and their combinations have been carried on.

"The thermal transmission in still air," states Herbert F. Schiefer of the Bureau, "decreased considerably when one or two sheets were used in combination with a blanket. The average decrease in thermal transmission for all the blankets tested was 7% when the sheet was used under the blanket, and 15% when the sheet was used over the blanket, and 19% when the blanket was used between two sheets."

The thermal transmission tests were made in still air and in air moving at 15 miles an hour. With blankets alone the heat lost in moving air was 100% greater than in still air. In combination with sheets it was only 37% greater.

A medium-weight blanket and two water-proofed cotton sheets is recommended as standard equipment for lifeboats and liferafts at sea, replacing the present equipment of blankets alone.

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## AERONAUTICS

# Midwest Plants Ready

Warbirds start to hatch from huge airplane factories in the prairies after year of record-breaking construction. City mushrooms around plants.

### See Front Cover

► FREEDOM'S EAGLES are beginning to stretch their wings from two great new nests, built on the wind-swept, horizon-filling prairie. One is the plant of the Douglas Aircraft Company, just finished after a year of record-breaking construction by the Austin Company, outstanding architectural and engineering firm. The other is the Army's own Midwest Air Depot, which lies side by side with the Douglas plant, the two together constituting a veritable city of aircraft workers, with a present population of some 22,000—and many more to come.

At the Douglas plant, celebration of the first anniversary of the ground-breaking has just been held. Last March, the Austin Company laid the first foundations of what has since become a tremendous brick structure. In November, the first unit was occupied; now C-47 planes are coming out of the wide delivery doors. The plant will be devoted exclusively to the production of C-47 transport planes — the "Flying Trains" of the Army Air Corps, that carry troops, munitions, weapons, supplies of all sorts. They will fly in huge flocks, from a hundred unnamable Shangri-Las to destinations which the Axis wishes it could guess. And after the war, the same plant will continue to turn out flocks of new transport planes for peacetime commerce.

For the great brooder of tomorrow's wings is designed for permanency. Its walls are massively built, with heat- and cold-resisting properties equivalent to eighty inches of solid brick, although due to a type of construction that must remain a military secret their actual thickness is only a fraction of that figure. The wide-spanned roof, with untrammelled floor space beneath, permits the big C-47's to be wheeled around like a perambulator in a nursery, and will accommodate even larger planes if that becomes desirable.

Lighting is spectacular in its efficiency. Lines of fluorescent tubes run the full length of the main assembly area—probably the longest lines of light anywhere in the world. Other lines come in at

right angles, indicating the flow of materials, under them the planes slowly grow, like embryo birds in the shell, until at last they hatch through the wide doors at the end, test their engines with a roar on the outdoor concrete apron, and then wheel out onto the Army airfield's runways to swoop up "into the wide blue yonder."

On the other side of the flying field are the great hangar-type shops of the Midwest Air Depot, where the Army Air Corps' planes, in particular the big bombers, come home from Australia and Africa and India and all the fighting fronts of the world for healing of honorable battle wounds and preparation for further battles to come. Right now Flying Fortresses and Liberators are there, whose weight of wrath the submarine nests at Lorient have felt, and braggart Rommel's battered host, and the Japs at Rabaul and Rangoon. Their war-experienced crews often come with them, and the men and women who do the overhauling learn at first hand how our powerful fighting eagles can be given still more power.

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## INVENTION

## Steadier Mortar Bomb Is Alien Invention

► A STEADIER-FLYING bomb for smoothbore mortars is the invention of a Belgian, Jean Wauters of Brussels, on which patent 2,315,145 has been issued, and promptly taken over for the duration by the Alien Property Custodian.

Distinctive feature about this projectile is a rather heavy, detachable tail containing the propellant charge. This falls off as soon as the bomb is clear of the bore, leaving the missile with its center of gravity farther forward and hence capable of more accurate flight.

Another feature is a groove around the waist of the bomb, in which a loosely-fitting ring is free to roll. This is thrust up by the pressure of the firing charge, making a better seal between projectile and bore and thus increasing muzzle velocity and range.

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