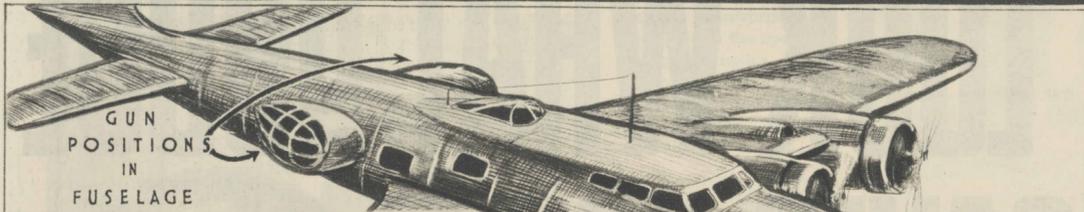
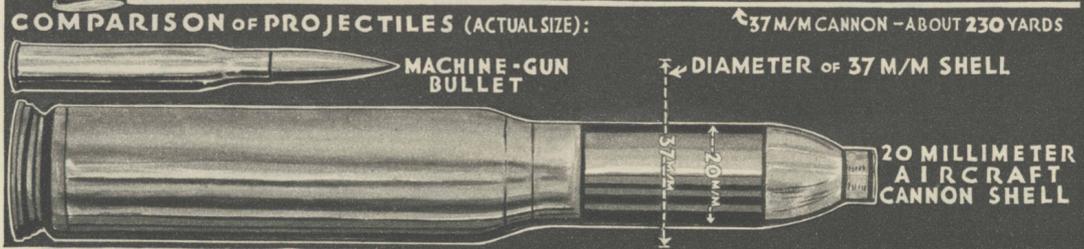


# What's New in World of Air Transportation

**COMPARISON OF EFFECTIVE RANGES:**  
 MACHINE-GUN-ABOUT 25 YARDS  
 20 M/M CANNON- ABOUT 100 YARDS  
 37 M/M CANNON- ABOUT 230 YARDS



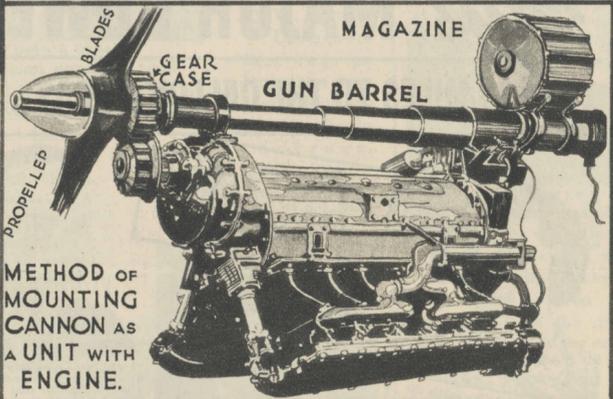
A "B-17" THE U.S. ARMY'S NEWEST COMBAT PLANE - (4-1,000 H.P. ENGINES, RETRACTABLE LANDING GEAR, AIR BRAKES, & 5 GUN POSITIONS IN NOSE AND FUSELAGE).



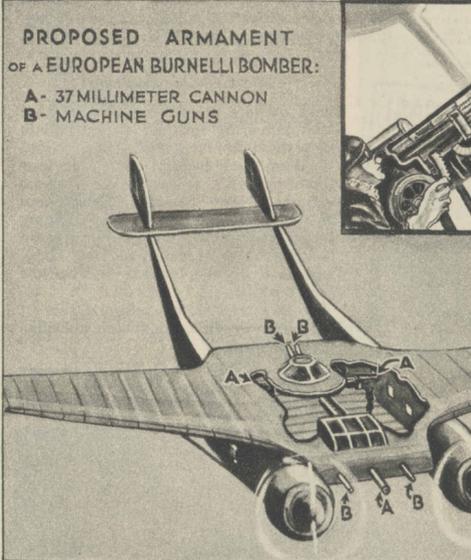
GUNNER IN ROTATING TURRET OF U.S. ARMY PLANE FIRING THROUGH THE PROPELLER SHAFT:



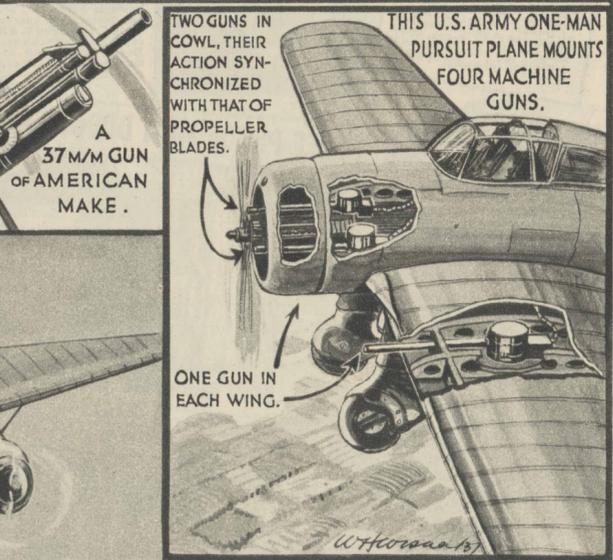
THE DEVOITINE, EUROPEAN ONE-MAN PURSUIT PLANE MOUNTS A 20 M/M CANNON AS SHOWN AT RIGHT....



METHOD OF MOUNTING CANNON AS A UNIT WITH ENGINE.



PROPOSED ARMAMENT OF A EUROPEAN BURNELLI BOMBER: A- 37 MILLIMETER CANNON B- MACHINE GUNS



TWO GUNS IN COWL, THEIR ACTION SYNCHRONIZED WITH THAT OF PROPELLER BLADES. ONE GUN IN EACH WING.

AS WEIGHTS, speeds, and sizes of military airplanes increase, problems of aircraft armors change. Today airmen of every nation are confronted with the difficulty of finding adequate weapons for offense and defense.

Increases in speed alone are enough to make obsolete the .30 and .50 caliber machine guns which have been the chief air arms. Although these weapons fire from 400 to 1,000 shots a minute, their potential of destructiveness is relatively small against aircraft moving 300 miles or more an hour. Even the best pilots seldom are able to bring their guns to bear upon an adversary for more than a fraction of a tenth of a second.

Aside from this phase of the matter, the steel slugs from a machine gun must strike some vital point in an airplane to be effective. While dural spars and an all-metal skin do not

## Military Airplanes Armed with Light Cannon

By WAYNE THOMIS

turn bullets, they allow them to pass through tiny holes which seldom even affect the strength of the members thus pierced.

Armorers are turning to small quick-firing cannon. The shells from such small cannon carry charges which are detonated on contact. The beauty of these cannon, to the mind of the military flyer, lies in the fact that one hit may well put an enemy machine out of commission or may reduce its speed or maneuverability enough to make it an easy victim of a second attack.

Instead of boring through and passing beyond wings or fuselage, the aircraft cannon shells explode when they touch a wing. Thus a shell striking a wing tip

which would be undamaged by a dozen solid bullets will explode, ripping a gaping hole. This might serve to set up vibrations and strains upon a fast-flying machine which would cause it to shake itself to pieces in the air.

Furthermore, the effective range of the small cannon is considerably greater than that of machine guns. For instance, the accompanying drawings portray most graphically, the average air marksman is deadly with a machine gun at a range of 25 yards. This is extremely close for fast machines. A 20-millimeter machine gun cannon is deadly up to about 100 yards and a 37-millimeter cannon up to about 230 yards. While the

machine gun cannon do not fire so rapidly as .30 or .50 caliber weapons, their increased effectiveness more than balances this defect.

Naturally, as the calibers increase so do the weights of guns and ammunition. Only heavily built machines can stand the recoil strains, so that tiny single-seat fighters for some time to come are likely to be armed chiefly with the lighter weapons. Big, new bombers, the heavier, newer fighters, and attack machines, however, will carry the cannon in the next air war. In attack machines these cannon probably will be mounted in wings, to be fired electrically. For single-seaters, however, the cannon are mounted as part of the engine and arranged to fire through the propeller hubs, as illustrated here. On the bomber's guns undoubtedly will be fired from rotating blisters or turrets.

# Canal Gets Favors

(Continued from page four.)  
 boards of trade reported the flight of a number of important industries to the east. The midwest was no longer on "Main street," but had been reduced to the status of a back country.

## Midwest Hit as a Trade Route

With typical American spirit, a number of midwestern groups were immediately formed to combat this tendency, but unfortunately they could not see that the diversion of a trade route was the basis of these unmistakable signs of decay.

A first school of thought accepted the theory that the ascendancy of the east was founded on water transportation. Its devotees demanded that western rivers be improved to furnish "interior seacoasts." Barges were to be loaded at St. Paul, Kansas City, Chicago, St. Louis, Pittsburgh, Louisville, and Memphis with all kinds of manufactured or processed merchandise for both the Atlantic and Pacific coasts. The tendency of these shallow, winding streams to freeze during the winter and to dry up during the summer was to be controlled by an elaborate system of dams and locks.

But they could not see that the colossal venture could never become a trade route because it could not develop that principal asset—overhead traffic. It would merely confirm the location of the midwest on a branch of the trade route that passed through the Gulf of Mexico on its way from the Atlantic seaboard to the Panama canal.

trast, California gained nine and Texas gained three members.

Another source of information is the census estimate of the United States department of commerce for the year 1936. It will divulge that in the six years since 1930 the states of Illinois, Indiana, Missouri, Minnesota, and North Dakota have noticeably slowed down, while Idaho, Wyoming, Colorado, and Utah are barely holding their own. Worse still, eight interior states, South Dakota, Nebraska, Michigan, Wisconsin, Mississippi, Montana, New Mexico, and Arizona, have actually lost in population. By contrast, the coastal states have shown normal and in some cases spectacular gains.

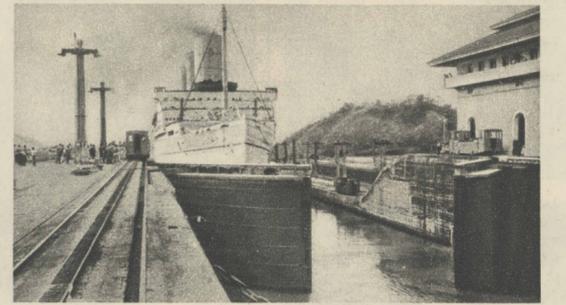
All of the important railway receiverships in the country cover properties that draw the

and are building vessels to navigate the canal that pay tolls as low as 55 per cent of their available cargo space. The midwest should demand that actual and not fictitious measurements should govern.

Next there is the matter of the long and short haul clause. It is claimed that if this provision of the law were removed the railways would destroy intercoastal fleets, but the charge is ridiculous. The principal commodities that pass through the Panama canal are lumber and oil, that are beyond the reach of the rail carriers.

There is no earthly reason why a railroad, like any other business institution, should not be permitted to meet competition where it finds it and offer the midwest freight rates that will enable its industries to recover a share of the Pacific coast market. Congress should not say to the state of Illinois, "Thou shalt not compete with Massachusetts."

Vessels operated in the intercoastal trade should not be subsidized with building loans on better terms than the railways can obtain from the Re-



(Acme photo.)  
 A liner passing through Miraflores locks of Panama canal.

bulk of their sustenance from the prairies. Two years ago President Sargent of the Chicago and North Western railway filed a plan for reorganization of the capital structure of his company. Now he has asked for a stay in the proceedings because in his opinion the future is darker than in 1935. He has suggested an independent fact-finding body.

But is a new commission necessary when an outline of midwest history proves so conclusively that the diversion of a trade route has caused the decay? The railways are failing because the available traffic will not support them. The backlog of overhead traffic has been transferred to the Panama canal.

A perusal of the facts will appear to lead directly to the conclusion that there can be but one salvation for the midwest—the arbitrary closing of the canal—but this is neither necessary nor advisable. The old trade route is still vigorous and will revive itself if congress will cease its discrimination against its own citizens in favor of the government-owned facility.

The canal should be made to pay its own way through the assessment of tolls on a higher basis. In examining this feature it will be discovered, strangely enough, that no rate increase is necessary. The basis for Panama canal tolls on loaded ships is \$1.20 a net registered ton, which immediately suggests the question, What is a net registered ton? Oddly, it is not a measurement of weight at all, but of space.

The number of cubic feet within the skin of a vessel divided by 100 is the gross registered tonnage. From this figure certain allowances are made for nonrevenue space, such as engine rooms, crews' quarters, and areas exposed to the weather. If this latter concession merely covered such space as the promenade deck of a passenger liner there would be no argument, but unfortunately it has created the shelter deck in naval architecture.

If there is a dummy hatchway, or "tonnage well," such as shown in the ship diagram on page four, the shelter deck is exceeded, irrespective of the fact that the opening may be boarded up and the inclosure filled with cargo. Foreign as well as American shipbuilders take advantage of these condi-

construction Finance corporation. If the water transportation industry cannot stand on its own feet it should not be fostered by congress.

As a third consideration there is the matter of railway land grants. When congress gave the original railways large areas to aid construction they attached a condition. War department materials would be carried by the railways at half rates. This traffic consisted of a few troop movements to the posts in the Indian country.

In recent years the activities of the government have mightily increased, with its CCC camps, reforestation projects, and the hundred and one activities of the relief program. It has been ruled that if these supplies are bought through the war department the railways must move them at half rates. There is a loss in revenue of seven million per annum from this source.

The government is exacting no such tribute from the boat lines for their magnificent gift of ships at a small fraction of their value. Land grant rates should be abolished, because the purpose for which they were established has disappeared.

Finally, there is the matter of railway freighters on the Great Lakes, now prohibited by law. That railways can help our merchant marine is clearly shown by the success of the Canadian Pacific railway in operating ships on inland waters as well as on both oceans. Pullman company principles, so successful in overland travel, could be adopted by water lines with success. In localizing American railway traffic the government is standing in its own light. Railway influence can help our foreign trade.

In conclusion, unless something is done to restore the American transcontinental trade route the midwest of the future will offer no better opportunities than its Siberian prototype. The government hydro-electric development promised will not encourage manufacturing plants so far from a trade route. The St. Lawrence seaway would merely encourage future invasion of midwest markets by eastern and foreign interests.

There is but one thing wrong with the midwest. It has been sidetracked by congressional persecution of its railways for the glorification of the Panama canal.