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# planes

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## New Draft Law May Exempt Engineers

### Air Cargo Is Vital To World Economy

Commercial air transport has become so routine to the industry of the nation that its tremendous economic impact upon the wealth and health not only of the United States, but the world at large, seldom is noticed.

Air delivery of parts, equipment, medicine, food and other supplies has saved millions of dollars and countless lives because of the speed and economy of air transportation.

For many years American machinery has been used all over the world and sometimes in some pretty remote corners. No piece of machinery, whether automobile or bulldozer, is better than its parts and these, no matter how well built, wear and give way under the strain of constant use.

One of the world's largest construction companies employing 400 men on a tunnel construction in Venezuela was faced with a \$10,000 per day loss when a chain broke on one of its huge machines.

Nearest replacement for the part was in Denver, Colorado. By surface transportation the 300-pound chain could be obtained in two weeks for \$34. Shipping the part by air was \$130.40, but it saved the construction company \$100,000 in workmen's time.

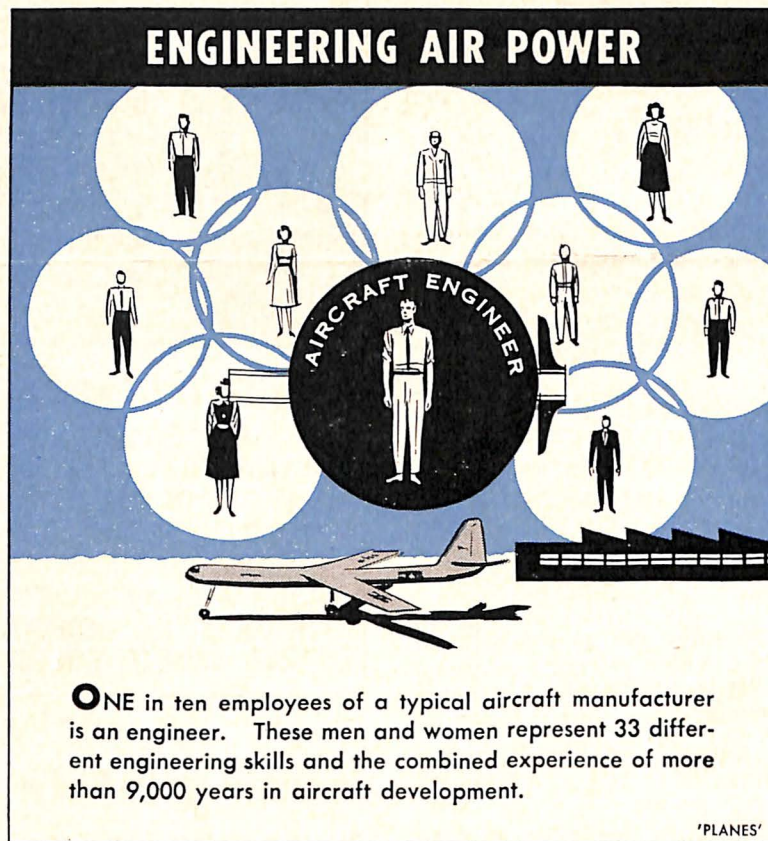
#### Air Cargo Vital to Middle East

In another instance a part, no bigger than a football, broke in an electrical relay on a hoist used to lift cars on a construction project. Every day that the equipment was out of order cost the construction company \$2,700. Replacement by air from factory to job took four days. If the replacement had been made by surface transportation it would have taken 38 days. Air delivery of the vital part saved the construction company \$102,000.

In Ecuador an air shipment of spare parts staved off virtual starvation when the only flour mill in the country broke down, leaving only a three-day supply of flour in the nation.

The parts to repair the mill had to come from London and, flown by air, they reached Ecuador and were installed well within the three day limit.

Of vital importance to Middle East countries are American biologicals and pharmaceuticals. Practically (See AIR CARGO, page 3)



### Fighter Aircraft May Soon Be Able To Convert To Fuel Tanker Role

New methods of aerial refueling, once limited to strategic and tactical operations of Air Force and Navy, may soon enable sleekly lethal interceptors of air defense to possess the same fire power and bomb carrying capability formerly restricted to some larger jet bombers.

The United States aircraft industry, seeking constantly for ways to increase fighter and bomber performance to insure American aerial supremacy, has developed jet engine performance in thrust to an incredibly high degree. But one of the major problems still plaguing engine and airframe manufacturers is the high fuel consumption of the jets.

A typical jet fighter, for example, consumes fuel at the rate of 399 gallons per hour at sea level. One of the latest production light bombers uses 2,150 gallons per hour at sea level—more than six and one-half tons of fuel. This is a formidable amount of weight loss that could be far better utilized in weapons carrying.

In the past, flight refueling has been associated, generally, with large

tanker planes and in-flight refueling operations of several planes. Today, however, to complement this strategic system advanced versions of refueling systems permit ground crews to make a tanker out of the smallest and fastest jet fighter types in a quick conversion.

Several of these planes, so equipped, could fan out to various sectors, rendezvous with an individual roving patrol plane or interceptor, refuel it and return to base and quickly be converted to its original mission.

There are four basic air defense operations through which this type of aerial refueling might give defending jet fighters greater range, mobility, fire power, endurance and economy of operation:

- Maintenance of aircraft early warning radar (AEW) aircraft hundreds of miles from our shorelines.
- Sending jet fighter-interceptors from land or sea bases over the ocean to seek out and destroy any hostile aircraft detected by radar planes.

(See FIGHTERS, page 3)

### Designed To Conserve Scientific Manpower

Written Especially for PLANES

By The Honorable Carl Hinshaw  
Member of Congress from California

If this nation and the freedom of the world are to survive in this age of peril, then the alarming shortage of scientific manpower in the ranks of United States industry must be eliminated.

The creation of modern weapons for defense, air power in particular, is a gigantic and complex operation, that once having gained momentum, cannot be aborted without incalculable waste of irretrievable time.

Yet today, we are falling behind Russia in the production of scientists and engineers. Our schools and universities have not met the need, so it is imperative that we preserve to the utmost our present supply.

But, tragically, interpretation of our present Selective Service system forces those charged with its administration to threaten the very security of our homeland. In their interpretation of the Universal Military Training and Service Act, they must implacably demand the induction of young scientific manpower, knowing full well they may be already engaged in research and development critical to the defense of the nation.

#### Who Leads in Air Progress

Much speculation has appeared in the national press as to whether the Communists are overtaking us in the race for new and improved airborne weapons. Unfortunately, even if we just hold our lead, we may be slipping towards defeat, because if we should lose the cold war in which we are now engaged, we would have no choice but to depend first and most heavily upon aerial superiority.

Our existing air power must always be the product of research and development action taken years past. Currently, the Defense Department—Army, Navy and Air Force—spends just for the development and production of weapons and equipment approximately \$140,000 every working minute during the year.

Despite this great expenditure, the most serious limitation on progress in our overall defensive position, according to Assistant Secretary of Defense Frank Newberry, "is the scarcity of qualified research and

(See DRAFT LAW, page 4)



## PLANES

*Planes* is published by the Aircraft Industries Association of America, Inc., the national trade association of the manufacturers of military, transport, and personal aircraft, helicopters, flying missiles and their accessories, instruments and components.

The purpose of *Planes* is to:

Foster a better public understanding of Air Power and the requirements essential to preservation of American leadership in the air;  
Illustrate and explain the special problems of the aircraft industry and its vital role in our national security.

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## Operation Hush

Heartening reports indicate that communities throughout the entire United States have benefited from the sound abatement program that has been carried on for the past three years by the aircraft industry and its many partners in aviation.

It has always been the desire of the aircraft manufacturers, the aircraft operators and the military to be *good neighbors* wherever they have made their homes.

But severe problems were created after World War II as big, powerful transports entered air service in increasing numbers and as fast, sleek jet planes were seen in the sky in quantities for the first time.

The problem of noise is as old as time, but probably the greatest difficulty caused by this sudden surge into the air age was that of new noises. Most of these noises were created by engines that generate greater horsepower than ever used before, by the increase in the numbers of engines of many modern transports and by the introduction of turbojets.

It was not necessarily that these noises were so much greater, although this was often the case, but they were new, unfamiliar noises heard in greater frequency. And the newness of these sounds introduced problems of sound control that were new to all concerned.

In isolated cases the problem of aviation-community relationship reached the straining point. The welcome mat was pulled in by several localities. There was never a lack of concern by those in the industry, but the mushroom growth of the airplane's popularity was greater than industry's limited knowledge of noises and sounds.

In 1952 an all-inclusive campaign was launched to reduce the disturbing aspects of aircraft in communities adjacent to manufacturing centers and airports.

The program, which now is the broadest of any such project in American history, is sponsored by every segment of the industry, including manufacturers, airlines, airport operators, pilots, government agencies and the military.

That the efforts of these varied interests have proved fruitful is evidenced by the fact that in the past 12 months, complaints received on the West Coast—a major source of concern—have been reduced a reported 40 per cent. In the East, around such great traffic hubs as New York and Washington, equally encouraging results have been obtained. In the New York area, there was a drop of 30 per cent in 1954. And at Washington, reports fell off to only six to seven a month.

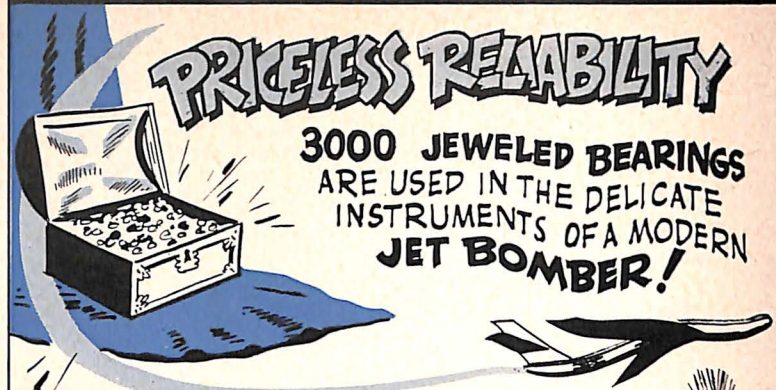
This measure of success can be traced almost directly to the efforts and sincerity of those who have participated in the sound abatement campaign.

In civil aviation, traffic patterns have been altered to lessen the number of flights over congested areas, approach and take-off procedures have been changed, preferential runway systems have been inaugurated, ground run-up times are held to a minimum and training has been moved away from communities insofar as possible.

Both the military and the aircraft industry, besides conforming to the general flight agreements, invoke strict reprimands for infractions of their sound reduction regulations. The aircraft manufacturers have spent enormous sums on specially constructed test chambers for checking both piston and jet engines. In addition, certain areas have been designated for test flying and the run-up of experimental and new engines is limited to certain hours of the day.

These are just a few of the many steps that are being taken to lessen the annoyance of aircraft. All hands recognize that a very real problem still exists, that no panacea has yet been found, but the efforts continue and the future looks bright.

## PLANE VIEWS



# PRICELESS RELIABILITY

3000 JEWELLED BEARINGS ARE USED IN THE DELICATE INSTRUMENTS OF A MODERN JET BOMBER!



MORE THAN 17,944,500 AIRCRAFT LANDINGS AND TAKEOFFS WERE HANDLED BY C.A.A. TOWERS AT 180 AIRPORTS LAST YEAR!

## WEIGHT SAVER

A NEW TUBELESS AIRPLANE TIRE IS CAPABLE OF WITHSTANDING THE SHOCK OF LANDINGS AT 300 MILES PER HOUR WITH AN IMPACT LOAD OF ABOUT 10,000 POUNDS. THESE TIRES SAVE UP TO 40% OF TUBE WEIGHT...



'PLANES'

## Industry Uses Radio To Speed Production

"This is base to unit nine."

"This is unit nine—go ahead, base."

"Unit 333 needs a set of air bottles."

"Roger and out."

Radio eavesdroppers, if they could pick up this conversation and others like it might believe that they were overhearing some highly strategic military orders. In a manner of speaking they would be.

The conversation is typical of more than 50 such exchanges that take place hourly via two-way radio between intra-plant transportation dispatchers and delivery vehicles of one of the larger manufacturers of military aircraft.

The manufacture of today's fighters and bombers, despite their precision manufacture and great complexity, is often based on exact production line timing. And in the huge sprawling aircraft plants building American air power this is more than difficult when considering the fact that these great facilities often cover hundreds of acres.

The system, estimates are, will save more than \$50,000 per year in time and non-productive travel time of personnel for the manufacturer.

## PLANE FACTS

- The electrical circuits of a typical production guided missile are so complex that they must be checked out before delivery by an electronic brain. The device itself contains six miles of wiring, 423 panel lights and 641 switch positions, thus enabling an engineer to check 90 different points in the missile's mechanism at one time.

- The "oldest passenger" carried recently by an airline was a human skull estimated to be nearly 7,000 years old. Features of the skull, a woman's, had been restored in plaster. It was unearthed at Jericho last year, along with six other skulls. Investigation has produced evidence of a massacre around 5,000 B.C., from which the skulls were probably derived.

- A Pacific telephone company literally took to the air recently when it was faced with the task of stringing two miles of telephone wire across rugged hilly country. After spotting the poles on hill tops, the company was faced with weeks of laborious work stringing wire through the treacherous country by hand. Instead they hired a helicopter which did the job in one hour's time.



## Automatic Landing System Gives Navy Air All-Weather Capability

America's aircraft industry has succeeded in giving U. S. Naval aviation an all-weather punch in the successful development of an electronic device which can land a fighter pilot's plane on the deck of a carrier, no matter how adverse the weather might be.

The most difficult single maneuver performed by naval aviators is the final approach and landing of modern high-speed aircraft aboard a carrier at sea. It is a complicated maneuver requiring the coordinated judgment, decision and action of both pilot and landing signal officer. During periods of poor visibility—rain, snow, fog—the physical and psychological demands upon both make the task of "setting down" impossible.

To eliminate this problem, one of this nation's aircraft companies, after several years work, developed an airborne automatic carrier landing system combining both radio and radar. It will also prove to be a "life saver" to wounded pilots unable to bring down their planes in any weather.

The first step in the system involves the use of radar, a very precise unit which locates the aircraft to be landed. It then determines the airplane's altitude and position in relation to the carrier deck. Speed and direction are computed automatically.

All these figures are then fed into an electronic computer which compares the airplane's position with what it should be, instantaneously determines the necessary course cor-

rections and then sends them to a device which actually directs the airplane into the desired flight pattern by radio signals.

The speed of the aircraft carrier also is electronically computed and its exact position, its pitch and roll at the instant the plane is to touch the deck, is calculated and transmitted to the plane's automatic pilot.

### U. S. Plane Quality Best In The World

Complex jet fighters, capable of carrying atomic bombs or flashing down to tree-top level for photo reconnaissance at very high speeds, must be top quality to withstand the stress of modern military flight operations.

America's fighter and bomber planes are renowned the world over for being rugged—the best that money can buy. The ability of American aircraft to "take it" reflects the high quality and standards of the U. S. aircraft industry.

A typical fighter manufacturer employs more than 1,800 men and women in Quality Control departments who work closely with engineering and production teams to maintain standards of quality—and more important to improve the quality of manufacture.

These teams of quality control personnel are inspectors spread throughout the entire aircraft company's production area. It is their business to inspect every part and

### Air Quotes

"The inauguration of scheduled (Helicopter) passenger service by Los Angeles Airways is an event of significance, not only to this great metropolitan area but to all other metropolitan areas of the United States. All of us are acquainted with the rapidly developing transportation problem which the pressure of a growing population has imposed upon the great cities of this country — the problem which confronts the citizen in getting into the heart of the city in the morning and getting back to his suburban home at the end of the day.

"The result of this social necessity is that our large American cities are struggling today with the greatest traffic congestion in this country's history; and they are desperately engaged in the construction of costly highways, terminals and bridges in the hope of solving their problem. Yet despite all the time, money and energy already spent, the metropolitan traffic congestion con-

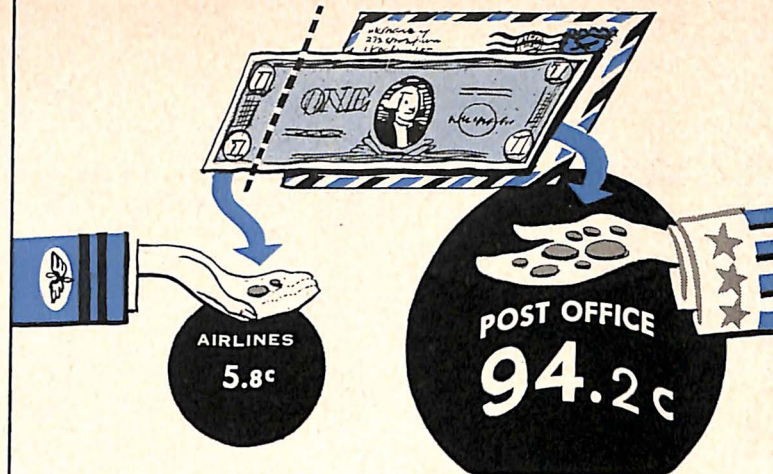
tinues to choke up the streets and arteries of our great cities, imposing inconvenience and burdens upon the lives of their citizens.

"Now in this state of affairs it becomes clear that one of the primary air needs of our time is for a shorthaul, scheduled airline service that can penetrate the centers of our metropolitan cities and link those centers with the outlying suburban communities" . . .

"The common carrier helicopter service will be able to contribute to the solution of that pressing need. For the helicopter type of aircraft with its unique ability to fly at low speed into small and tight places, inaccessible to any other form of air transport, with its ability to land on a narrow spot of ground and take off vertically without the aid of airport runways, is the only flying craft that is capable of meeting this transport need."—Oswald Ryan, Member, Civil Aeronautics Board, November 22, 1954.



### THE 3¢ AIRMAIL DOLLAR



For every ton of mail carried by the scheduled airlines between New York and Chicago in the "three-cent mail by air" experiment, the U. S. Post Office realizes more than \$2,000 in revenues. Of \$2,314.00 per ton received, the airlines are paid \$134.66 and the balance, 94.2 per cent, is retained by the Post Office for operating expenses.

'PLANES'

sub-assembly for perfect workmanship. If they find a defect, they mark it and order it put aside for corrective action.

To further check the company inspectors, the military services provide an inspection team who operate on a surveillance basis. These inspectors double check the company inspectors for conformity to military specifications. In addition, the aircraft manufacturers and the military also operate "surveillance" inspection systems at subcontractor plants.

### Invisible Airplanes

Glass airplanes may soon be plying the airlines. One light plane manufacturer already is building seats, doors, gas tanks, wheel pants, cowl and instrument panels of fiberglass reinforced plastic. Use of the strong lightweight plastic, the manufacturer says, increases speed by about 12 miles per hour.

### Air Cargo Delivery Has Become A Vital Factor In World Economy

(Continued from page 1)

cally all of these and antibiotics, including penicillin, streptomycin and dycrysticin, are shipped by air not only to prevent spoilage but to keep up with the demand.

In recent years English automobiles have become a vogue in the United States. Warehousing and keeping a big inventory of spare parts in the United States would pose a terrific dollar problem for the English, so they just fly the parts needed and, on occasion, have flown the cars themselves.

Germany, whose postwar recovery has amazed the whole world, has been quick to take advantage of air transportation to "recapture" some of its world market. Typical of the assistance to German business is the manufacture and delivery by air of curtain rings to a major U. S. retail outlet. The U. S. merchant found that it was cheaper to have them manufactured in Germany and shipped to the U. S. by air than it was to manufacture them in the United States.

The importance of commercial air transportation to the military services can be vital in peace as well as in war. During the Korean war, for example, civil air lift moved the entire 31st Fighter Escort Wing, in-

cluding its spare engines, ground personnel, tools, and even its records, by air from Albany, Georgia, 9,000 miles across the United States and the Pacific to the Korean theater. Deployment to battle of the 31st was a matter of a few days instead of costly months.

### Fighter Planes May Become Refuelers

(Continued from page 1)

- Maintenance of jet combat patrols over Navy task forces at sea.
- Maintenance of anti-submarine patrols of Air Force and Navy.

In addition fighter interceptors would be able to pack more fire power on combat missions instead of carrying extra fuel reserves, and could stay in battle up to seven times longer, with the knowledge that more fuel was awaiting the fighter's call.

Carrier commanders would have more latitude in defending their ships by sending up a carrier based tanker-jet to meet squadrons of returning fighters giving each enough fuel to hold off until the carrier was in position to take it aboard.



# NEW DRAFT LAW MAY EXEMPT ENGINEERS

(Continued from page 1)

engineering and production organizations, and the scarcity of qualified scientists and engineers to man them."

Because of the fundamental issues involved in the alarming shortage of scientific manpower facing the nation today—and for years to come—the Congress is conducting a searching examination which it is hoped will lead to overhaul of the Selective Service law through enactment of pertinent new legislation.

This proposed legislation would amend the present draft law to provide for the discharge and continuing deferment of certain persons of exceptional scientific, technical and engineering ability or aptitude. It would provide that each individual inducted or enlisted in the Armed Forces "shall within 30 days from the date of his induction or enlistment, be afforded an opportunity to apply to a Scientific Specialist Board . . . for suspension of his obligation for training and service in the Armed Forces."

This legislation would simultaneously create a Scientific Specialists Board, composed of five members appointed by the President, who would have the sole power of determining whether an individual's obligation to serve in the Armed Forces would be suspended.

## Provides Quick Action

The Board would be charged with the prompt examination of the inductee or enlistee applicant for technical ability or aptitude "to warrant suspension of his obligation to serve in the Armed Forces . . . because he is actually or potentially more valuable to the interests of the national security and defense as a scientist, technician or engineer, than as a member of the Armed Forces."

The proposed legislation further provides that "Prior to the expiration of the eighty-fifth day from the date the applicant was enlisted or inducted, the Board shall notify him of its decision with respect to his application."

If the Board decides that an individual who has applied for a suspension is "actually or potentially" more valuable to the interests of the national security and defense as a scientist, technician, or engineer, than as a member of the Armed Forces, then the Secretary of Defense will suspend the obligation of the individual to serve in the Armed Forces not later than the eighty-ninth day after the date on which he was inducted or enlisted.

The Board would be autonomous, with full power of decision. It would not act in an advisory capacity. It would decide whether an individual's obligation would continue to be suspended, and it would be up to the Board to decide if an individual should be reinducted should he fail to fulfill the purpose which justified the suspension of his military obligation. The legislation further provides that an individual who receives

such a suspension would remain liable for induction up to age 35.

It is the conviction of the Congress that every American young man would benefit from military training and that it is his privilege to serve in the Armed Forces for the defense of his country. But this need not and should not be carried to the point of impairing the national security by depriving it of the services of the irreplaceable men who have spent from four to seven years acquiring training and experience that can and must be utilized as efficiently as possible in the national welfare.

Not long ago I brought to the attention of the Assistant Secretary of the Air Force an enlisted man who in civilian life had been working nearly four years at the National Advisory Committee for Aeronautics at Langley AFB, Virginia.

This brilliant young man, holding a master of science degree in aeronautical engineering, figured the computations on the skin friction of the Air Force's X-1A, the highest speed research plane known to be in existence. When his draft board classified him 1A and notified him that he was to be inducted, he enlisted and was unable to get a commission.

He tried for a year to be assigned to Wright-Patterson Air Force Base where his education and experience would, in his opinion, be valuable. He had been unable to effect a transfer until I found him. He had, incredible as it seems, been assigned to blowing a bugle in the Air Force Band, because he could blow a bugle too.

## Engineers Vital to Security

Every year, the government spends in the neighborhood of \$4 billions in research and development, most of which is farmed out to industries and colleges. When we look at these industries and institutions and the brilliant men and women in them, a great surge of pride in their accomplishment rises within us.

If we approach them stating "let's pour some more money into this effort and get more and better results," we learn the blunt truth that pouring any more money into a project won't bring any more results because there are not enough trained brains available for the project. In a recent edition of the *New York Times* there were more than five pages of display advertisements for scientists and engineers. In a recent edition of the *Los Angeles Times* large portions of nine pages of classified advertising space pleaded for scientists and engineers of all types for critical activities.

I am firmly convinced that this nation's only salvation in the technological race for aerial supremacy rests with the scientifically educated youth of America whom we are presently drafting into the Armed Forces for menial tasks.

Because there are those who would doubt the real worth of youth 18-25 years, to scientific and engi-

neering efforts of critical industry I asked for the advice of an expert on the subject—Dr. Lee DuBridge, President of the California Institute of Technology and a distinguished member of the National Academy of Sciences.

Dr. DuBridge declared, "Some of the most brilliant scientists in history have made their most outstanding contributions while they were still in their early or middle twenties. Einstein developed the theory of Relativity in 1905 when he was 26 years old.

## Loss Impairs Military Project

"One of the most brilliant theoretical nuclear physicists in the country, who is to join the Caltech staff next year and has already made important contributions to the theory of nuclear forces, is now only 25 years old. He received his PhD while only 21 or 22 (incidentally, he is not at all sure that he will receive further deferment from his draft board)."

A prominent aircraft manufacturer, asked if the drafting of 50 of his scientific and engineering staff would hurt him, replied: "In many instances, the drafting of even one would halt or impair a vital project."

Another great university at work on a contract directly involved with the military weapons program employs a number of nuclear chemists and physicists and men skilled in electronics and other highly technical aspects of engineering. Laboring on this critical project are 61 employees who have received occupational deferments because of the essential nature of their services. The project was advised that it could expect to lose 34 per cent of them during the first nine months of 1955

to military induction.

At first glance it would seem that a replacement program would be feasible, even for men with four to eight years of academic training and two years practical experience in nuclear procedures. However, at present the project has a shortage of 35 engineers and if it could find 15 more chemists it would be able to meet the requirements of its schedule—but only if it loses none of the men it presently has to military assignment.

America is built upon the principle of equality of all men, but we must not lose sight of the fact that, though all men are conceived to be equal, they are not equal in terms of their talents or the character of the contributions they can make to our society. Any system of manpower control which we establish must accept the distinctions which do exist between individuals. We cannot afford to reduce all our manpower to the lowest common denominator.

## Less Than 20 Physicists

Such men—these irreplaceable talents—are rare indeed. How exceptional must a nuclear scientist be to be considered critical to the national defense? Scarcely a score of theoretical physicists complete their training in any year in the entire United States by achieving their PhD.

We have been told that the size of our Armed Forces may be cut because of the superiority of our new weapons. Yet our draft boards seem bent on placing these very men whose scientific genius and technical skills make possible the invention and manufacture of such weapons into this reduced army.

Shall we kill the eagle that lays the atomic eggs?

