

cause the air becomes polluted with the discharge of combustion.

Cold air is big business, important business, at this NACA Lewis Flight Propulsion Laboratory at Cleveland. Without the enormous quantities of refrigerated air made each day, it would be impossible to carry on the vital research needed to help America's aviation industry to build the more powerful jet engines of tomorrow.

Jet engines of today and tomorrow will have to be completely dependable at altitudes of 50,000 feet and higher. They will have to function at temperatures of 65 degrees below zero Fahrenheit as well as at surface temperatures. At an altitude high enough to give this low temperature, the air is so thin that a man would suffocate immediately. Ordinary electric circuits just will not work at such altitudes.

Biggest Refrigerating Plant

To supply the cold air needed in engine development, the Lewis Laboratory has four costly cold-making installations. One of these is the biggest refrigerating plant in the world. It can produce at capacity the equivalent of 30,000,000 pounds of ice every 24 hours.

This installation contains a battery of 14 centrifugal compressors, each rated at 1,500 horsepower. A total of 30 tons of Freon 12, a non-toxic refrigerant, is required. A centrally-located control room rations out the cold air to more than 100 test installations at the laboratory which require it. Temperatures involved in testing range from 90 degrees above zero Fahrenheit to 108 degrees below zero. The installation was made by Carrier Corporation, Syracuse, N. Y.

The Lewis Laboratory at Cleveland is, of course, not the only agency conducting fundamental research in aviation engines. Both the Air Force and the Navy have laboratories doing important and outstanding work. Also there are many educational institutions, private organizations and aviation industrial laboratories making important contributions to the future of flying.

Notable among aviation laboratories in research work are those of the U. S. Air Force at the Wright-Patterson Air Base, Dayton, Ohio. Included in its equipment is what is called an all-weather laboratory which can produce any type of weather found anywhere around the globe and simulate altitudes up to 150,000 feet.

Weather Conditions Simulated

This Environment Laboratory, as it is called, contains 14 weather chambers. Most of these chambers are cubical affairs about eight feet in size into which airplane and engine parts, and instruments, can be placed for testing under conditions ranging from Sahara dry to jungle wet and Arctic cold. Plate glass fronts aid observations.

Each chamber is for particular tests. Some are low-temperature chambers in which temperatures down to minus 112 degrees Fahrenheit can be obtained. In one, the temperature can be dropped from that of

the ordinary room to 65 degrees below zero in five minutes.

Then there is an all-weather chamber with extreme range in temperature but in which 100% relative humidity can be made. A sand and dust chamber has relatively no humidity and its temperature range extends from 70 degrees to 185 degrees Fahrenheit. A salt fog chamber simulates coastal conditions. A fungus chamber maintains conditions favorable to the growth of fungus encountered in various parts of the world and permits testing of plane parts in a fungus-laden atmosphere.

The sun and rain chamber is of particular interest. Within it, rain from a quarter of an inch to four inches an hour can be provided under various temperatures. "Sun" is provided by a strong mixture of ultraviolet and infrared radiation. Within the chamber, conditions can be reproduced equivalent to the sun's rays at noon when the sun is just over the equator.

Brine Circuits Maintain Cold

Important in this all-weather laboratory is the refrigeration system supplying low temperature brine for cold weather testing. Extreme low temperatures are achieved by operating three Carrier Corporation centrifugal refrigeration machines in series. Two independent brine circuits are maintained, one of which is kept constantly at ultra-low temperatures. The other provides brine at a maximum of 30 degrees above zero. In both, the brine is methylene chloride, dyed with red oil so that leaks can be detected.

The need of continuous research in military planes and their engines is emphasized by the fact that these weapons must be always in condition to operate in any part of the world. Also that the plane taking off from a tropical desert or jungle at high temperature may within a few minutes be high above the earth at temperatures far below zero. Engines that function under all conditions are essential.

Science News Letter, May 12, 1951

MEDICINE

New Drugs Combat Effects Of Deadly Chest Disease

➤ A NEW disease, a result of our increasingly complex industrial life, has been retarded by the new drugs ACTH and cortisone. A pulmonary chest disease, it is called chronic berylliosis.

It attacks the lungs and occasionally other parts of the body. Small amounts of beryllium, a metal now being used in copper and other alloys, sometimes get into the bodies of workers and others who have contact with it.

The new treatment was reported by Dr. H. E. Tebrock of Sylvania Electric Products, Inc., at the Industrial Health Conference in Atlantic City, N. J.

Dr. Tebrock reported that other treatments had been unsuccessful, but that patients responded well to first ACTH and then cortisone.

Science News Letter, May 12, 1951

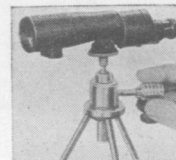
WAR SURPLUS BARGAINS

MAKE A MICROSCOPE—Get wonderful results. Own an instrument worth many times the cost to you. Simply convert a U. S. Gov't. Rifle Scope (Gov't. cost over \$65.00). It's easy! We show you how. No machining required. Get up to 40 Power. Scope we furnish is used but good condition . . . sent complete with extra lenses and direction sheet.
 Stock #959Q.....\$7.90 Postpaid
WRENCHES—for above project, to simplify and speed up work.
 Stock #289-Q.....\$1.00 Postpaid
NON-ABSORBING BEAM SPLITTING MIRROR—Latest development! Optically flat to ¼ wave length. Size: 1-15/16" x 2-15/16"—3/8" thick. Reflects approximately 50% and transmits approximately 50%. No light is absorbed. Has a three-layered film which accomplishes non-absorption.
 Stock #567-Q.....\$5.00 Postpaid

AMAZING POCKET-SIZE 10-POWER SPOTTING SCOPE

Complete With Tripod and Swivel Head

Only 5½" long—8½" high on tripod. Adapted from Army telescope and worth many times our price. Excellent for clarity and sharpness. Has prism erecting system, achromatic objective, Ramsden Eye-Piece. Lenses low reflection coated. Ideal Scope for sportsmen and hunters.



Stock #955-Q.....\$14.95 Postpaid

BINOCULAR BARGAINS—American Made! Brand new! Finest Grade! Light-weight, dust-proof, moisture-proof, expertly collimated. Optics low reflection coated. Sturdy Carrying Case included. Guaranteed!

Stock #963-Q.....6x30.....\$75.00 Postpaid
 Stock #964-Q.....7x35.....\$5.00 Postpaid
 Stock #965-Q.....7x50.....\$98.50 Postpaid
 Stock #966-Q.....9x50.....\$99.50 Postpaid
 (Be sure to add 20% Fed. Tax on Binoculars)

8 POWER ELBOW TELESCOPE

Gov't. Cost \$200.00! Our Price \$27.50!

Big 2" diameter objective. All lenses Achromatic. Amici prism erects the image. 4 built-in-filters—clear, amber, neutral and red. Slightly used condition but all guaranteed for perfect working order. Weight 5 lbs.



Stock #943-Q.....\$27.50 Postpaid

SPECIAL! SPECIAL! RONCHI RULINGS

Black Line Grating

Plate glass with etched parallel black lines—space between each line is same as thickness of the ruled line itself. Made by photographic process. Number of lines per inch ranges from 65 to 133 as shown below. Normally cost \$4.00 to \$5.00 per sq. inch. Used for fine measuring, testing and measuring astronomical mirrors, testing microscope objectives, camera objectives, and magnifiers, used in pairs to see diffraction pattern. (Some seconds, with slight scratches.)

1 in. x 1 in.			2 in. x 2 in.		
Stock No.	Lines Per In.	Price	Stock No.	Lines Per In.	Price
2122-Q	65	\$.75	2133-Q	65	\$1.50
2126-Q	85	.75	2134-Q	85	1.50
2127-Q	110	1.00	2136-Q	110	2.00
2128-Q	120	1.00	2137-Q	120	2.00
2129-Q	133	1.00	2138-Q	133	2.00
2130-Q	150	1.00	2139-Q	150	2.00
2131-Q	175	1.00	2140-Q	175	2.00

All above sent Postpaid.
TELESCOPE EYEPIECE—Consists of 2 Achromatic Lenses, F. L. 28 mm. in a metal mount.
 Stock #5140-Q.....\$4.50 Postpaid
SIMPLE LENS KITS! Kits include plainly written, illustrated booklet showing how you can build lots of optical items. Use these lenses in experimental optics, building TELESCOPES, low power Microscopes, etc.
 Stock #2-Q—10 lenses.....\$ 1.00 Postpaid
 Stock #5-Q—45 lenses.....\$ 5.00 Postpaid
 Stock #10-Q—80 lenses.....\$10.00 Postpaid

PRISMS! PRISMS! PRISMS!
 We have the world's largest stock, widest variety, at the lowest prices. Write for our FREE Catalog Q.
SLIDE PROJECTOR SETS—Consist of all unmounted lenses you need to make the following size projectors:
 Stock #4029-Q—35 mm.....\$2.85 Postpaid
 Stock #4038-Q—2¼" x 2¼".....\$3.35 Postpaid
 Stock #4039-Q—2½" x 3½".....\$3.35 Postpaid
We Have Literally Millions of WAR SURPLUS LENSES AND PRISMS FOR SALE AT BARGAIN PRICES. Write for Catalog "Q"—FREE!
 Order by stock No. Send Check or M.O. Satisfaction Guaranteed!

EDMUND SCIENTIFIC CORP.
 (Formerly Edmund Salvage Co.)
 BARRINGTON, NEW JERSEY

