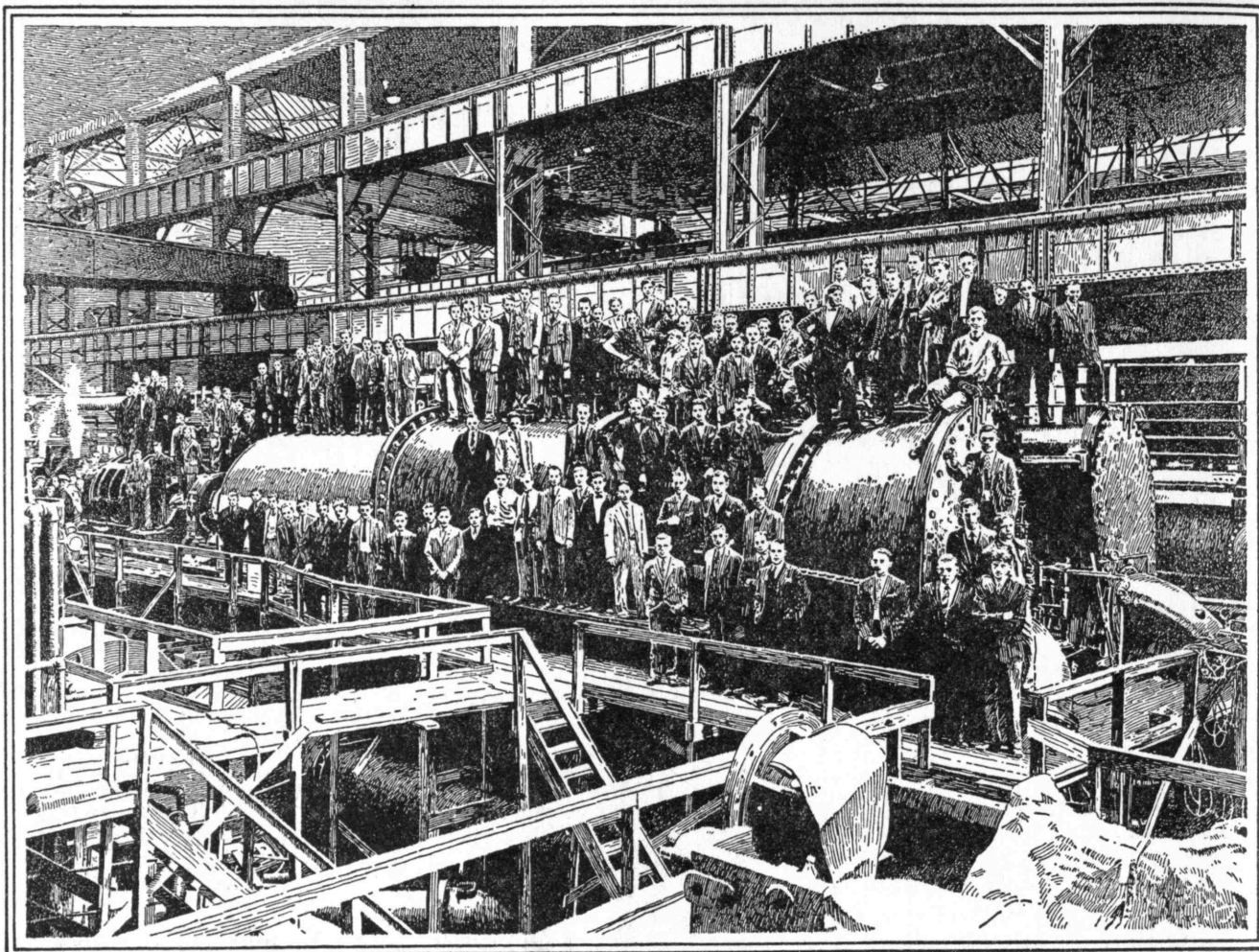


# THE TECHNOLOGY REVIEW

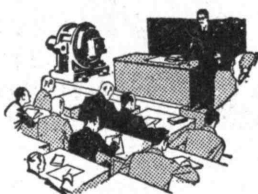


RELATING TO THE MASSACHUSETTS  
INSTITUTE OF TECHNOLOGY  
MAY • • • • 1929





## Generating Brain Power for 1950



*Back of this monogram are the accumulated experience and skill of the world's largest organization engaged in the manufacture of electrical materials and appliances. Always and everywhere it is a safe guide to electrical quality and dependability.*

**T**HE chief operating requirement of the General Electric Company, and of the electrical industry in general is not horsepower, but brain power.

This requirement must be continuously anticipated. The leaders of the future must not only be born, but *made*. Accordingly, the General Electric Company maintains at Schenectady and elsewhere a post-graduate college of electrical science which has achieved a unique

position in the engineering world.

The faculty includes inventors and engineers of international distinction and authority. The students—more than 400 of them are enrolled every year—are the picked graduates of the best-known American and foreign technical schools and universities. The graduates provide not only this Company but the electrical industry in general with many of its most valuable leaders.

# GENERAL ELECTRIC

# CONSTRUCTION and PLANT MAINTENANCE ENGINEERS

*Specify and Insist on*

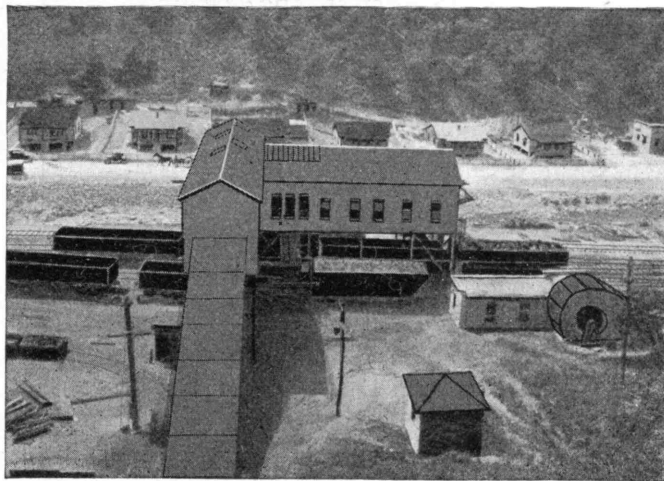
*Galvanum Paint*  
FOR GALVANIZED IRON  
TRADE MARK

for all Galvanized Iron Painting

*—the only paint that sticks to Galvanized  
Iron without preliminary treatment*

Galvanum Paint is the only protective coating that can be applied directly to galvanized iron and that will stick. It needs no preliminary acid treatment to take off the zinc. It requires no priming coats, or weathering or acid wash. All unnecessary costs are eliminated. Galvanum Paint therefore is lowest in cost of application.

Galvanum Paint lasts from 7 to 15 years and gives perfect protection all the time. This has been proved under every sort of treatment. Galvanum Paint has successfully withstood the severest and most trying tests.



*Galvanum is equally successful on new as well as old galvanized iron which has been previously painted. Supplied in a wide range of attractive shades and special colors.*

## Forty-one Years of Paint Engineering Service

Goheen Paint Engineers have, since 1888, perfected a series of scientific, specific purpose paints designed to meet the special requirements of the large industrials, public utilities, railroads and mining interests, for every exterior and interior surface. When you specify or requisition Goheen Paints, you are assured of quality plus engineering service, controlled by experts from the raw material to the finished product.

# GOHEEN CORPORATION

OF NEW JERSEY

NEWARK, N. J., U. S. A.

*Paint Engineers Since 1888*

A STANDARD PAINT FOR EVERY PURPOSE



## RAYMOND-WHITCOMB



### NORTH CAPE CRUISES

☐ Two summer cruises over a Raymond-Whitcomb route—devised and developed by Raymond-Whitcomb—to Iceland, the North Cape, Norway, Sweden, and Denmark. They are more complete this year than ever before, with visits to a dozen Norwegian Fjords, Trondhjem and Bergen, all four Scandinavian capitals, ruined Visby, Helsingfors in Finland and Reval in Esthonia, and an optional side trip to Leningrad and Moscow. They are equally suited for a complete holiday voyage (five weeks from New York to Southampton) or an unusual prelude to European travel—for the rates provide for return at any time.

☐ Two identical cruises on sister ships . . . Sailing June 26 on the S.S. "Carinthia," and on June 29 on the S.S. "Franconia."

### ROUND THE WORLD CRUISE

☐ On the S.S. "Columbus"—the largest, most luxurious and fastest liner ever to sail around the world. A comprehensive World Cruise in three and one-half months—half a month shorter in the time spent at sea than any other round the world cruise. Sailing on January 21, 1930.

Send for Raymond-Whitcomb Cruise Booklets

## RAYMOND-WHITCOMB

126 Newbury Street, Boston, Mass.

New York, 606 Fifth Avenue; New York, 225 Fifth Avenue.  
Boston, 165 Tremont Street; Philadelphia, 1601 Walnut St.  
Chicago, 176 N. Michigan Ave.; Detroit, 421 Book Bldg.  
Los Angeles, 423 West Fifth St.; San Francisco, 230 Post St.

Agents in the principal cities

## TRAVEL IN EUROPE



### THERE ARE NO TRAVEL-CARES FOR RAYMOND-WHITCOMB CLIENTS

☐ For Raymond-Whitcomb has reserved hotel rooms for them; has secured their railroad and steamship tickets; and has also attended to all the countless details of the journey . . . This is the ideal way to travel. Raymond-Whitcomb will help plan a trip and will make the complete arrangements, on any standard desired, for the whole tour.

☐ Trips so planned with the assistance of Raymond-Whitcomb can be carried out absolutely as they were intended to be carried out—for they are based on an exact knowledge of the steamship lines, railroads and hotels . . . With all reservations made, the traveler is free to enjoy every minute.

Bring your travel problems to Raymond-Whitcomb

### LAND CRUISES IN AMERICA

☐ Special trains built for Raymond-Whitcomb that are unequalled in comfort. Special routes through the West. ☐ Round trips of unequalled completeness to California, Alaska, Hawaiian Islands, North Rim of Grand Canyon, Colorado, the Canadian Rockies and the National Parks.

Send for Raymond-Whitcomb Travel Booklets

## RAYMOND-WHITCOMB

126 Newbury Street, Boston, Mass.

New York, 606 Fifth Avenue; New York, 225 Fifth Avenue.  
Boston, 165 Tremont Street; Philadelphia, 1601 Walnut St.  
Chicago, 176 N. Michigan Ave.; Detroit, 421 Book Bldg.  
Los Angeles, 423 West Fifth St.; San Francisco, 230 Post St.

Agents in the principal cities



# The TECHNOLOGY REVIEW

*Relating to the Massachusetts Institute of Technology*

PUBLISHED MONTHLY FROM NOVEMBER TO MAY,  
INCLUSIVE, AND IN JULY

EDITORIAL AND BUSINESS OFFICES, ROOM 11-203  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
CAMBRIDGE A, MASSACHUSETTS

VOLUME XXXI

NUMBER 7

## *Contents for May, 1929*

THE TABULAR VIEW . . . . .	388
AIRSHIPS REDIVIVOUS . . . . .	393
<i>American and German initiative is rapidly bringing the dirigible into its own</i>	
By JEROME C. HUNSAKER	
AIR TRANSPORTATION . . . . .	397
<i>America assumes the lead in commercial aviation</i>	
By DANIEL C. SAYRE	
IMPROVING THE AIRPLANE . . . . .	400
<i>Some recent developments in aeronautical design</i>	
By MANFRED RAUSCHER	
EINSTEINIANA . . . . .	403
<i>Facts and fancies about Dr. Einstein's famous theory</i>	
By NORBERT WIENER	
THE TREND OF AFFAIRS . . . . .	405
THE INSTITUTE GAZETTE . . . . .	409
BOOKS . . . . .	436
<i>Nature versus Nurture, By HERVEY W. SHIMER;</i>	
<i>Aeronautics in Plain Language, By BRADLEY JONES,</i>	
<i>'10; and other reviews by The Review Staff</i>	
NEWS FROM THE CLASSES . . . . .	412
NEWS FROM THE CLUBS . . . . .	433
THE COVER: From an etching, "Amalfi," By SAMUEL CHAMBERLAIN, '18	

H. E. LOBDELL, '17 . . . . . Editor  
J. R. KILLIAN, JR., '26 . . . . . Managing Editor  
J. D. CRAWFORD, '27 . . . . . Assistant Managing Editor  
R. T. JOPE, '28 . . . . . Circulation Manager  
J. J. ROWLANDS . . . . . Contributing Editor

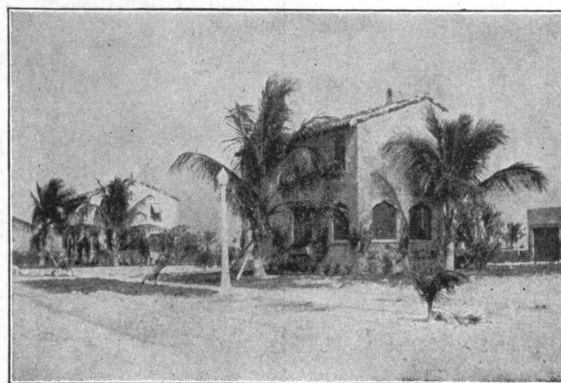
Published monthly on the twenty-seventh of the month preceding the date of issue, at 50 cents a copy. Annual subscription \$3.50; Canadian and foreign subscription \$4.00. . . . . Published for the Alumni Association of the Massachusetts Institute of Technology, Alexander Macomber, '07, President; George E. Merryweather, '96, Harold B. Richmond, '14, Maurice R. Scharf, '09, Vice-Presidents. . . . . Editorial Office, Room 11-203, Massachusetts Institute of Technology, Cambridge A, Mass. Published at the Rumford Press, 10 Ferry Street, Concord, N. H. Entered as Second Class Mail Matter at the Post Office at Concord, N. H. . . . Copyright, 1929, by The Technology Review. . . . Three weeks must be allowed to effect changes of address. Both old and new addresses should be given.

THE TECHNOLOGY REVIEW IS ON SALE  
IN NEW YORK BY BRENTANO'S, 1 W. 47TH STREET  
AND IN BOSTON BY SMITH AND McCANCE,  
5 ASHBURTON PLACE

# CONDEX

THE

## "Simplex Park Cable"



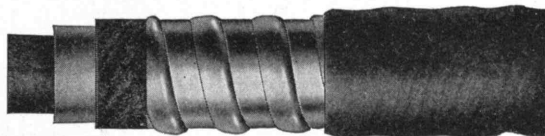
### *Keeps Street Lighting Systems in Service*

Many a city has been given a fine appearance and the name of being a live up-to-date place, merely by the studied application of "White Way" or Boulevard Lighting. Such lighting systems build goodwill for the city and goodwill for the Utility that serves the city.

CONDEX, the parkway cable with the overlapping, interlocking form of steel tape "armor" is specially made for this type of service. The "armor" is applied to form a flexible steel conduit which offers great resistance to crushing and assures complete coverage at all times.

Distribution superintendents who have used CONDEX know that the cost of installation is low, because of the ease with which it may be laid. No conduits are necessary and very little digging is required.

CONDEX Park Cable is ideal on series lighting circuits for municipal street lighting, white way installations, and for park or play-ground illuminating systems.



CONDEX installations properly made are practically permanent. Write for sample and further information.

## SIMPLEX WIRE & CABLE CO

MANUFACTURERS

201 DEVONSHIRE ST., BOSTON

BRANCH SALES OFFICES

CHICAGO, 564 W. Monroe St. SAN FRANCISCO, 390 Fourth St.  
NEW YORK, 1323 B'way CLEVELAND, 2019 Union Trust Bldg.  
JACKSONVILLE, 1010 Barnett Nat'l Bank Bldg.

---

---

# “STARS IN THE SKY”

*Distributors for  
Travel Air  
Keystone-Loening  
Wright Parts  
Dealer and  
Service Station*



*Another  
Star  
Selects  
“Travel Air”*

*Wallace Beery and His Travel Air Type 6000  
“The Limousine of the Air”*

IN commuting, irrespective of distance, whether it be over American deserts or to the great North West, through boundless space with an ever new route to be traversed, for business or pleasure, the “Highways of the Sky” are never obstructed.

Wherever the utmost in safety, performance, speed with comfort is desired, “Travel Air” is a name of paramount importance to the most exacting purchasers.

“Travel Air” has contributed to commercial aviation since its very inception and is truly the “Standard of Aircraft Comparison.”

For those who go “down to the sea in ships” we offer the famous line of Loening Amphibians, tried and proven in our government military forces.

May we tell you more?

## East Coast Aircraft Sales Corporation

94 AMES BUILDING, BOSTON, MASS.

Hubbard 6682

(Field)

BOSTON AIRPORT, BOSTON, MASS.

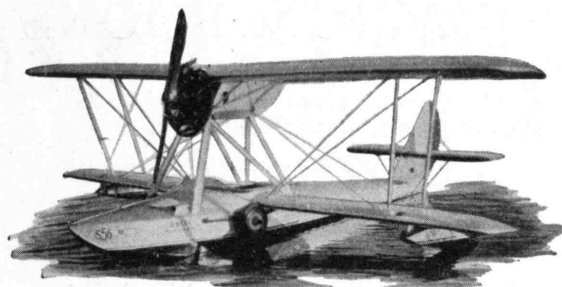
## THE TABULAR VIEW

**M**ATHEMATICS, murder, and the technique of the scientific detective story were treated divertingly by Dr. Norbert Wiener in The Review for March. In a more professional mood he returns this month to present an illuminating commentary on the seductively abstruse Einstein theory that has been so widely noted in the public prints. Dr. Wiener not only disposes of some current misconceptions about the work of the great German, but he places it in proper perspective with other current work in mathematical physics. ¶ The Editors, despite the disapproving gestures that are sure to come from Drs. WIENER and MANUAL S. VALLARTA, '21, wish to point out that this article on Einsteiniana is the result of a coup achieved by these two workers, which consisted of discovering and publishing (simultaneously with the German Wigner) certain deficiencies in the January Einstein paper — deficiencies recognized by Einstein and discussed by him in a recent letter to them. Because of this background the article assumes added importance, and incidentally suggests that mathematicians, in real life as well as in Van Dine novels, at times find excitement and romance in their work.

**T**HE remainder of The Review's articles this month and all of its Trend of Affairs section are devoted to aviation and its related activities. All of this material has been contributed, and The Editors are deeply grateful, by recognized authorities or careful students in their respective fields. Taken in the whole, these contributions constitute for the laity a valuable and dependable survey of the true state of American aviation. It should be added that the collection and presentation of this material could not have been made without the advice and assistance of members of the Institute's Department of Aeronautical Engineering, particularly Professor CHARLES H. CHATFIELD, '14, and DANIEL C. SAYRE, '28. ¶ It is mete and natural that the majority of our contributors on aeronautics are Technology men, for it was at the Institute that the first regular course in aeronautical engineering was established, and it is at the Institute now that America's largest and most important school of aeronautical engineering is to be found. It is also mete that the author of the leading article in this issue, JEROME C. HUNSAKER, S.M. '12, was in charge of the Institute's first course in aeronautics and received the first Doctor's degree awarded in that field. His article on airships derives directly from his present work as Vice-President of the Goodyear-Zeppelin Corporation (PAUL W. LITCHFIELD, '96, forthcoming President of the Alumni Association, is President). Between the time he left the Institute in 1916 until he assumed his present position, several years ago, he was, as an officer in the Construction Corps of the Navy, detailed to the Aircraft Division, the Bureau of Construction and Repair, and the design section of the Bureau of Aeronautics. Shortly before going with the Goodyear-Zeppelin Corporation he was with the Bell Telephone Laboratories. He is a member of the National

*(Concluded on page 390)*

*"With an Amphibian—wherever you are,  
a forced landing can be a SAFE landing"*



## A Twelve Years' Distinguished Service Record

**K**KNOWN the world over, because they have flown the world over, Savoia-Marchetti flying boats and amphibians are in production at the new factory of the American Aeronautical Corporation, Port Washington, Long Island.

Many striking accomplishments of several years ago, attesting the endurance and dependability of these ships, remain today unmatched.

The vast experience in designing successful ships for difficult requirements, the thorough painstaking construction, characteristic of European methods, and the selection of materials that have actually withstood the most rigorous service, give these flying boats a preëminent position.

### Two world-renowned achievements of Savoia-Marchetti Planes

Commander de Pinedo's sixty-thousand-mile flight around the world, crossing the Atlantic in both directions and touching six continents.

Commander Arturo Ferrarin's 4417-mile non-stop flight from Rome to Brazil in July, 1928, in a Savoia-Marchetti S-64.

### American Savoia-Marchetti types now available

S-56, 3-seater Baby Amphibian  
S-62, 6-passenger Cabin Flying Boat or Amphibian  
S-55, twin-hull, 14-passenger, tandem-motored Flying Boat

# AMERICAN SAVOIA MARCHETTI

American Aeronautical Corp'n  
730 Fifth Avenue New York



## M. I. T. AVIATION BOOKS

The two books listed here have grown out of work given at Massachusetts Institute of Technology.

*Chatfield and Taylor's*

**THE AIRPLANE AND ITS ENGINE**  
\$2.50

By Professors Chatfield and Taylor of Massachusetts Institute of Technology.

*Warner's*

**AERODYNAMICS**  
\$7.50

By Professor Warner of Massachusetts Institute of Technology; Former Assistant Secretary of the Navy for Aeronautics.

*For Sale by*

TECHNOLOGY BRANCH  
**HARVARD COÖPERATIVE SOCIETY**  
76 Massachusetts Avenue  
Cambridge, Mass.

## CONSOLIDATED INSTRUMENTS

### In the Vanguard of Aeronautical Progress

THIS handsome, compactly grouped instrument panel, custom built for Fairchild planes, illustrates the striking results obtainable through Consolidated's new custom panel service. It further exemplifies the ever higher efficiency standard that aeronautical instruments are achieving. Second to none in their modernness, accuracy, and durability, and justly regarded as steady nerves of the plane, Consolidated instruments are standard equipment on 90% of the country's aircraft.



The instruments in the panel, reading left to right from top to bottom, are: clock, altimeter, air speed indicator, turn bank indicator, tachometer, running light switch, oil pressure gauge, temperature gauge, fuel pressure gauge, landing light switch, fuel shut-off cock, and ignition switch.

Write for booklet

Fairchild Custom Panel  
**CONSOLIDATED INSTRUMENT CO. of AMERICA, Inc.**  
305 East 47th Street, New York City

*Subsidiary Companies*

Julien P. Friez and Sons, Inc., Baltimore, Md.  
Molded Insulation Co., Mt. Vernon, N. Y.  
Aircraft Control Corp., Philadelphia, Pa.  
Western Sales Manager  
M. E. Hulse, 5391 Broadway, Oakland, Calif.

## THE TABULAR VIEW

(Continued from page 389)

Advisory Committee for Aeronautics, and wears the Navy Cross. ¶ Mr. Sayre, who prepared the article on air transportation, became an Instructor in the Department of Aeronautical Engineering in 1927, prior to obtaining his S.B. degree, long delayed. For many years he had been interested in air transportation. He was one of the founders and promoters of the Boston Airport Corporation and he still follows this work academically if not professionally. ¶ MANFRED RAUSCHER came to the Institute from Switzerland. He received his degree of S.B. in Mathematics in 1926, and his S.M. in Aeronautical Engineering the following year. Since 1927 he has acted as assistant in the Department of Aeronautical Engineering.

THE Trend of Affairs section includes contributions from Captain EMORY SCOTT LAND, '07, (C.C.) U.S.N., Vice-President of the Daniel Guggenheim Fund for the Promotion of Aeronautics; ELISHA LEE, '92, Vice-President of the Pennsylvania Railroad; GERARD H. MATTHES, '95, Consulting Engineer; and GEORGE J. MEAD, '16, Vice-President of the Pratt and Whitney Aircraft Company.

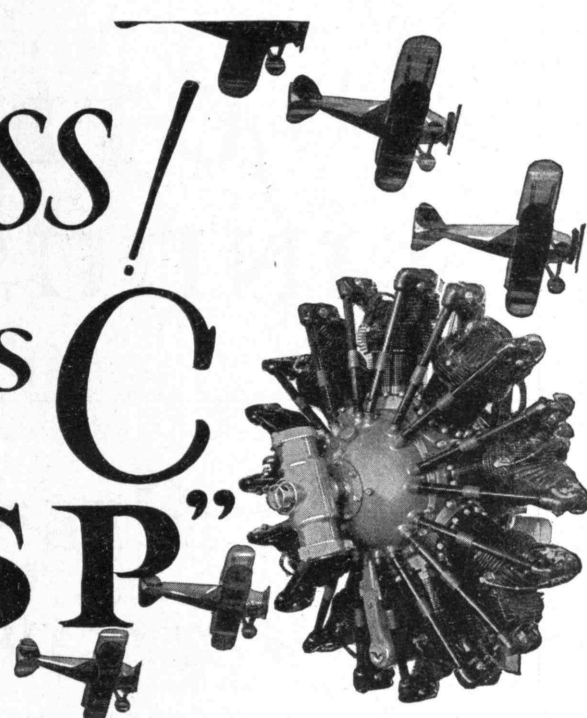
HERVEY W. SHIMER prepared the review of "Anthropology and Modern Life," by Franz Boas. He is Professor of Paleontology in the Institute's Department of Geology. After three years at Gettysburg College he went to Lafayette College where he received the degrees of A.B. and A.M. In 1904 he received a Ph.D. from Columbia, and in 1916 an honorary Sc.D. from Gettysburg. He came to the Institute in 1903.

SPACE limitation forced the Editors to omit several additional items on aeronautics scheduled for this issue. Among these is a pertinent article on airplane engine design by Major CHARLES H. BIDDLECOMBE, formerly of the Royal Flying Force and now with the Wright Aeronautical Corporation. It is hoped that this may be presented in a subsequent issue. Two other contributions, one on airplane instruments by J. LEOPOLD, President of the Consolidated Instrument Company, and another on gliders by HARRY KARCHER, '25, Aeronautical Engineer with the Ford Motor Company, were also omitted with reluctance. ¶ The Editors are indebted to Major IRA LONGANECKER, of the Army Air Corps, for his cooperation in supplying photographs for this issue.

THE etching on the cover is the second to be presented this year from the work of SAMUEL CHAMBERLAIN, '18. "Amalfi" succeeds "Plaza San Martin — Segovia," published in November, 1928. Covers of The Review for the years of 1925-26 and 1926-27, and "A Side Street in Beauvais," published in February, 1928, are examples of his work, well-known to its readers. The Editors are indebted to Professor WILLIAM EMERSON for the loan of "Amalfi."



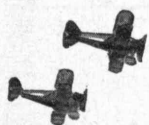
# PROGRESS/ *the Series C* "WASP"



Millions of miles of flying with the "Wasp" engine in commercial, Naval and Military operations, under all possible conditions, ranging from the frigid temperatures of Northern Canada to the other extreme of torrid tropical conditions, has created an invaluable fund of experience.

With this background and without radical departure from previous practice, our Engineering Department has developed and thoroughly tested the Series C "Wasp." This model has even better performance characteristics, greater dependability, and longer life than its predecessors.

We thoroughly believe that the Series C "Wasp" is the nearest approach to mechanical perfection yet obtained in any aeronautical engine. We invite you to inspect it at the Detroit Show.



THE  
**PRATT & WHITNEY AIRCRAFT CO.**  
HARTFORD CONNECTICUT

Manufactured in Canada by the Pratt & Whitney Aircraft Co., Ltd., Longueuil, Quebec; in Continental Europe by the Bavarian Motor Works, Munich.



# Wasp & Hornet ENGINE S

# — UTILITIES — INDUSTRIALS

---

Organization

Financing

Design

Construction

Management

Reports

Appraisals

---

## STONE & WEBSTER

INCORPORATED

