Olson and Massa

Applied Acoustics


By HARRY F. OLSON, E.E., Ph.D. and FRANK MASSA, B.S., M.Sc.
Acoustical Research Engineers, RCA Victor Company, Inc.

228 Illustrations. 444 Pages. Cloth $4.50

THIS is the first American book to deal entirely with acoustical engineering principles. Every type of electro-acoustic transducer in widespread use to-day is fully treated, including the theory, construction, test and operation of each system. Experimental data, photographs and sketches are used profusely to augment physical concepts. The presentation will serve the needs of anyone interested in development or application of acoustic and electro-acoustic apparatus, specifically the following groups:

The Acoustical Engineer:—
Complete derivation of fundamental equations—analyses of combinations of acoustical and electrical elements—horn theory—acoustical measurements, etc.

The Radio Engineer:—
Microphones, loud speakers, ear phones—behaviour of loud speakers in various baffles and cabinets—resonance—amplifiers—testing audio channels—making frequencies—power handling, etc.

The Broadcast Engineer:—
Microphones, characteristics, applications—design of studios—reverberation—sound proofing—reverberation control—placement of microphones for balance—lapel microphones, etc.

The Sound Motion Picture Engineer:—
Theatre type loud speakers—power requirements—directional sound collection and dispersion—location of apparatus—open air theatres—uniform sound distribution—studio pickup—newsreel—remote pickup, etc.

The Student:—
A complete textbook of engineering acoustics—modern laboratory measurement methods—design of apparatus—testing—new concepts in architectural acoustics—noise measurement—tables, coefficients, etc.

P. BLAKISTON'S SON & CO., Inc. 1012 Walnut St., Philadelphia, Pa.
**A REPORT TO THE**
**TERMITE INVESTIGATIONS COMMITTEE**
**TERMITES AND TERMITE CONTROL**

A Book Intended Primarily for Biologists, Architects, Engineers, Contractors, Building Inspectors, and Users of Wood

A Discussion of the Biology of Termites, and an Account of the Termites of the United States, Mexico, the Canal Zone, the West Indies, Hawaii, and the Philippine Islands, with Recommendations for Prevention and Control by Methods of Construction and the Use of Chemically Treated and Unpalatable Woods.

Price $5.00

(900 pages, 131 figures and illustrations in text)

N.B.—Thousands of dollars have been expended upon the necessary research and the preparation of the material of this volume, but none of this expense has been added to the publication cost. Thus it is possible to sell the book at this reasonable price. Any profits accruing from the sales of this book will go toward further research on termites.

Charles A. Kofoid, Ph.D., Sc.D., Editor-in-Chief
Professor of Zoology, University of California

Published by
UNIVERSITY OF CALIFORNIA PRESS
BERKELEY :: CALIFORNIA

---

**An Atlas of Infant Behavior**
(In Two Volumes)

By Arnold Gesell, M.D.,
Director of the Clinic of Child Development, Yale University

This Atlas provides a first systematic delineation of the early development of human behavior patterns. It is illustrated with over 3000 action photographs based on cinema and stenographic records collected during a period of seven years.

Volume I
In collaboration with Helen Thompson, Ph.D., and Catherine Strunk Anamtruda, M.D.

Normative Series. This volume portrays the growth of posture, locomotion, prehension, and adaptive behavior at lunar month intervals through 56 weeks of age. The normal infant's characteristic reactions in 25 different behavior situations are depicted in successive chronophotographs enlarged from individual 16 mm. cinema frames. Time values and detailed accompanying text reconstruct the behavior patterns in dynamic sequence for objective, analytic study. The infants were photographed nude to increase the scientific values of the delineations.

Volume II
In collaboration with Alice V. Kelihler, Ph.D., Frances L. Ilg, M.D., and Jessie Jervis Carlson, Ph.D.

Naturalistic Series. This volume portrays the behavior of similar normal infants under the natural conditions of domestic life; feeding, bath, play, sleep, parent-child relationships, and social situations involving other children and adults. The basic photographic data consist of extensive 35 mm. records. Both volumes are bound in a special steel spring format, 12 x 2 x 12 inches which permits convenient manipulation of the loose leaf contents for seriated, comparative study. The comprehensiveness and systematic arrangement of both text and illustrations will make the Atlas serviceable as a reference book and research aid in varied fields of the biological sciences, including genetic psychology, ethnology, embryology, and neurology. The edition is limited and the use of a full-tone, gelatine engraving process will make reprinting impossible.

Two Volumes Publication in June. Price $25.00

---

**The Journal of Nutrition**

Published monthly by The Wistar Institute of Anatomy and Biology beginning with No. 1 of Vol. 7, issued on January 10, 1934.

This journal will continue its same high scientific standard under the editorial management of an internationally known group of biochemists and nutrition experts.

The Journal of Nutrition is the official organ of the American Institute of Nutrition.

Two volumes of 600 pages each will be published during a year. Price per volume $5.00 domestic, $5.50 foreign.

Address subscriptions to

The Wistar Institute of Anatomy and Biology
SPENCER Laboratory Lamps

Here is a typical university installation of the new Spencer Laboratory Lamp No. 372. Seventy of these lamps were installed in this college laboratory. Their merit in such laboratories is due to:

1. A single lamp provides efficient illumination for at least four microscopes.
2. No direct light can reach the eyes of the observers.
3. No additional illumination is needed in the laboratory.
4. The illumination approximates daylight...micro-specimens are observed in their true color values.
5. The beautiful crystal black enamel finish is alcohol and reagent proof.
6. Size is 17" high, shade 17" wide, globe 10" diameter.

Spencer No. 372 Laboratory Lamp...complete, heavy stand, special inside frosted globe, 150 watt daylight bulb, metal shade and 8 feet of silk cord with switch...$22.50

Spencer Bakelite Substage Lamp

An improved substage lamp combining low price with Spencer Quality. Made of bakelite which does not heat up as does metal. Construction gives improved ventilation.

- Spencer Lamp No. 385-A with the blue glass ground on one side...$3.00
- Spencer Lamp No. 385-B with daylight glass substituted for blue glass...$3.75
- No. 386 110 Volt Bulb...25c

LAMP PRICES SUBJECT TO QUANTITY DISCOUNTS, OF COURSE
**WHEREVER Exact Temperature Histories Are Important—**

**CENCO-DeKHOTINSKY OVENS and INCUBATORS**

are selected because of their Perfect Heat Distribution and Precision Temperature Regulation.

Because temperature uniformity is the most difficult factor to control in oven design and manufacture, various makers avoid statements as to this specification insofar as possible.

We emphasize this factor because it is the principal one on which the selection of sizes and types of ovens should be made for the sake of economy and accurate work.

Oven size and capacity have no meaning without this specification, for in many ovens only the shelf area directly at the thermometer bulb may be used with assurance.

Size B. Inside dimensions, 14¾ by 12 by 11¾ inches.

<table>
<thead>
<tr>
<th>9830</th>
<th>For 110 volts</th>
<th>$140.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>9831</td>
<td>For 220 volts</td>
<td>140.00</td>
</tr>
</tbody>
</table>

Size C. Inside dimensions, 19¾ by 17 by 14 inches.

<table>
<thead>
<tr>
<th>9830</th>
<th>For 110 volts</th>
<th>$220.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>9831</td>
<td>For 220 volts</td>
<td>220.00</td>
</tr>
</tbody>
</table>

Ask for Bulletin No. 7S

---

**AJAX CORELESS INDUCTION FURNACES**

Accurately duplicate in production analyses of pilot melts made in the laboratory.

Ajax Electrothermic Corporation
Trenton, New Jersey

G. H. CLAMER, President & Gen. Mgr.
E. F. NORTHUP, V. Pres. & Technical Adviser

---

**SCIENCE—ADVERTISEMENTS**

INDUCTION FURNACES

Accurately duplicate in production analyses of pilot melts made in the laboratory.

Ajax Electrothermic Corporation
Trenton, New Jersey

G. H. CLAMER, President & Gen. Mgr.
E. F. NORTHUP, V. Pres. & Technical Adviser

---

**JAGABI**

RHEOSTATS

OUR improved type Jagabi Rheostats are appealing especially to those users of fine-adjustment current-regulating devices who are primarily influenced by design, quality of workmanship, ruggedness and performance. There are four sizes and 76 different ratings—carried in stock.

Please write for new Catalog 1370-S.

JAMES G. BIDDLE CO.
ELECTRICAL and SCIENTIFIC INSTRUMENTS
1231-15 Arch Street, Philadelphia, Pa.

---

**WHEREVER** Exact Temperature Histories Are Important—

CENCO-DeKHOTINSKY OVENS and INCUBATORS

are selected because of their Perfect Heat Distribution and Precision Temperature Regulation.

Because temperature uniformity is the most difficult factor to control in oven design and manufacture, various makers avoid statements as to this specification insofar as possible.

We emphasize this factor because it is the principal one on which the selection of sizes and types of ovens should be made for the sake of economy and accurate work.

Oven size and capacity have no meaning without this specification, for in many ovens only the shelf area directly at the thermometer bulb may be used with assurance.

Size B. Inside dimensions, 14¾ by 12 by 11¾ inches.

<table>
<thead>
<tr>
<th>9830</th>
<th>For 110 volts</th>
<th>$140.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>9831</td>
<td>For 220 volts</td>
<td>140.00</td>
</tr>
</tbody>
</table>

Size C. Inside dimensions, 19¾ by 17 by 14 inches.

<table>
<thead>
<tr>
<th>9830</th>
<th>For 110 volts</th>
<th>$220.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>9831</td>
<td>For 220 volts</td>
<td>220.00</td>
</tr>
</tbody>
</table>

Ask for Bulletin No. 7S

CENTRAL SCIENTIFIC COMPANY
LABORATORY APPARATUS and CHEMICALS
NEW YORK—BOSTON—CHICAGO—TORONTO—LOS ANGELES
The telephone was invented in this country and it has reached its highest development here. There are six times as many telephones in relation to population in the United States as in Europe and the service is better.

This high efficiency did not just happen. It is the result of American initiative and a sincere desire to serve the public. Back of it all you see the value of the structure and the fundamental policies of the Bell System.

This system functions in the best interests of the telephone user because it combines and unifies the essentials of efficient telephone communication—research, engineering, manufacture, supply and operation. There is no pulling at cross-purposes or waste through an overlapping of activities. Everything is co-ordinated to give you the best telephone service at the lowest possible cost.

The general plan of the Bell System is the cumulation of more than fifty years' experience, resulting in one policy, one system and universal service.
NEW SHIELDED BRIDGE
FOR POWER FACTOR OF DIELECTRICS UP TO 50 KC.

This assembly for rapid, precise measurement is entirely new. It gives the user a number of important advantages that cannot be had in any other a-c bridge that we know of. It is used for measuring phase angle of small (A.S.T.M.) samples of insulating oil, ceramics, and other dielectrics; for calibrating other instruments; for studying specific inductive capacity. Measurements are reproducible to within a few parts per million; settings are constant to within limits imposed by changes in ambient temperature, humidity, etc.

Limit of error in capacitance measurements is 1 m.m.f. Conductance limits are as follows:

<table>
<thead>
<tr>
<th>Conductance Error in per cent:</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 x conductance error</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Actual Power Factor</td>
</tr>
<tr>
<td>Factor</td>
</tr>
<tr>
<td>0.0001</td>
</tr>
<tr>
<td>0.0001</td>
</tr>
<tr>
<td>0.01</td>
</tr>
<tr>
<td>0.01</td>
</tr>
</tbody>
</table>

* A change of 0.01 in the resistance box represents a conductance of 0.0001 micromho, which for a 100 μF sample at 1 Kc. corresponds to a power factor of 0.00016.

Consists of the Campbell-Shackelton Shielded Ratio Box, and other a-c instruments recently announced. Method of assembly and shielding of leads are important contributions to the usefulness of those instruments. Easily used by anyone accustomed to precise instruments. Reasonably priced for quality $895.00.

Further information on request. Address Section S
New McGraw-Hill Books

Textbook of Systematic Botany

New second edition

By D. B. Swingle, Professor of Botany, Montana State College. McGraw-Hill Publications in the Agricultural and Botanical Sciences. 270 pages, 6 x 9, $2.25.

Presents in logical sequence the principles of plant taxonomy and nomenclature and discusses representative families of plants. The book has been completely revised; much of the material has been entirely rewritten; and the organization has been improved. A number of new, original illustrations have been added.

Elements of Astronomy

New third edition


This well-known elementary guide to astronomy has for eight years held a unique position in the field as a thorough, non-technical presentation of the facts of astronomy and the principles and methods used in modern astronomical investigations. As before, the treatment is largely non-mathematical, and the general plan, which proved so successful in previous editions, has been retained. The later chapters have been in part rewritten, and all material has been revised in the light of recent developments.

Kinetic Theory of Gases

New second edition

By Leonard B. Loeb, Professor of Physics, University of California. 678 pages, 6 x 9, $6.00.

This well-known text develops the classical ideas of the kinetic theory in a simple, accessible manner, combining them with the recent experimental and theoretical advances in the subject. A third of the book has been completely rewritten. The classical treatment remains essentially the same, but the sections dealing with the more recent developments have been revised and brought up to date, especially the chapters on specific heats, the equation of state, the distribution law, etc.

Earth, Radio and the Stars

By Harlan True Stetson, Research Associate in Geophysics, Harvard University. A Whittlesey House Publication. 336 pages, 54 x 8, $3.00.

Brings together recent developments in astronomy and its related fields in an effort to suggest a more intimate relationship between man and his cosmic environment. A large part of the book is based on the author's own researches during the past six or seven years towards a synthesis of geology, meteorology, radio engineering and astronomy into a new science—cosmocology.

Principles of Animal Biology

New fourth edition


The basic aim of this standard text, representative of the so-called "principles" course, is to present a body of principles which may be brought under such topics as morphology, physiology, ecology, taxonomy, geographical distribution, paleontology, and evolution. The present revision is by far the most extensive that the book has yet received, and covers all recent investigations and changing emphases in various branches of the subject.

Laboratory Directions in Principles of Animal Biology

New fourth edition

By A. Franklin Shull. With the collaboration of George A. Larue and Alexander G. Ruthven. 100 pages, 6 x 9, $1.00.

As before, this carefully organized series of laboratory directions stresses the important generalizations of biology. Shifting values dictated by laboratory experience, modification of terminology in accord with prevailing practice, the need for more specific indication of principles illustrated, the discovery of additional or better material for study in some of the exercises have contributed to the necessity for revision.

Send for copies on approval

McGRAW-HILL BOOK COMPANY, INC.
330 West 42nd Street, New York

The World List of SCIENTIFIC PERIODICALS


The Second Edition, complete to the end of 1933, contains the full titles of approximately 36,380 publications publishing the results of scientific research, standard abbreviations of the titles and indications of over 183 Libraries in which the periodicals are filed.

The issue of the Second Edition has been made possible by a grant from the Royal Society of London and by the voluntary efforts of many persons. The control and ownership of The World List are in the hands of a Corporation under the Companies Acts 1908-1917, and any profits will be kept towards the cost of future Supplements or Editions.

(Miss) GRACE E. GAY, Secretary.

ASCORBIC ACID
MERCK
CRYSTALLINE VITAMIN C — NATURAL
(C6H8O6)

FOR Vitamin C investigations by clinicians and research workers, Ascorbic Acid (Crystalline Vitamin C — Natural) of definite purity is now available in the following forms:

ASCORBIC ACID—MERCK, CRYSTALS
(Crystalline Vitamin C)

ASCORBIC ACID—MERCK, TABLETS of .01 Gm. (Crystalline Vitamin C)

Ascorbic Acid-Merck (Crystalline Vitamin C), when administered, orally or subcutaneously, at the rate of .5 Mgm. daily protects guinea pigs (315-325 Gm. body weight) against experimental scurvy.

In nursing infants, 0.01 Gm. (1 tablet) gives the same antiscorbutic protection as 15-30 cc of fresh orange juice.

Ascorbic Acid-Merck (Crystalline Vitamin C) is supplied as follows:

Tablets of 0.01 Gm.:—tubes of 10 tablets
Crystals:—0.1 Gm. in sealed tubes

Further Information will be furnished upon request.

MERCK & CO. Inc., Rahway, N. J.

Giemsia Stain
manufactured by
Dr. K. Hollborn & Sons
formerly Dr. G. Grueblers
Chem. Lab. founded 1880
manufacturers of
Gruebler
Original—Hollborn—Stains
Giemsia

is the only Giemsia Stain made acc. to and tested by Dr. G. Giemsia

Send for list 102H

Sole Agents in U. S. and Canada
Pfaltz & Bauer, Inc.
300 Pearl St., N. Y. C.