

Two Stage-Large Capacity-High Vacuum

DUO-SEAL[®] VACUUM PUMP

FASTER PUMPING

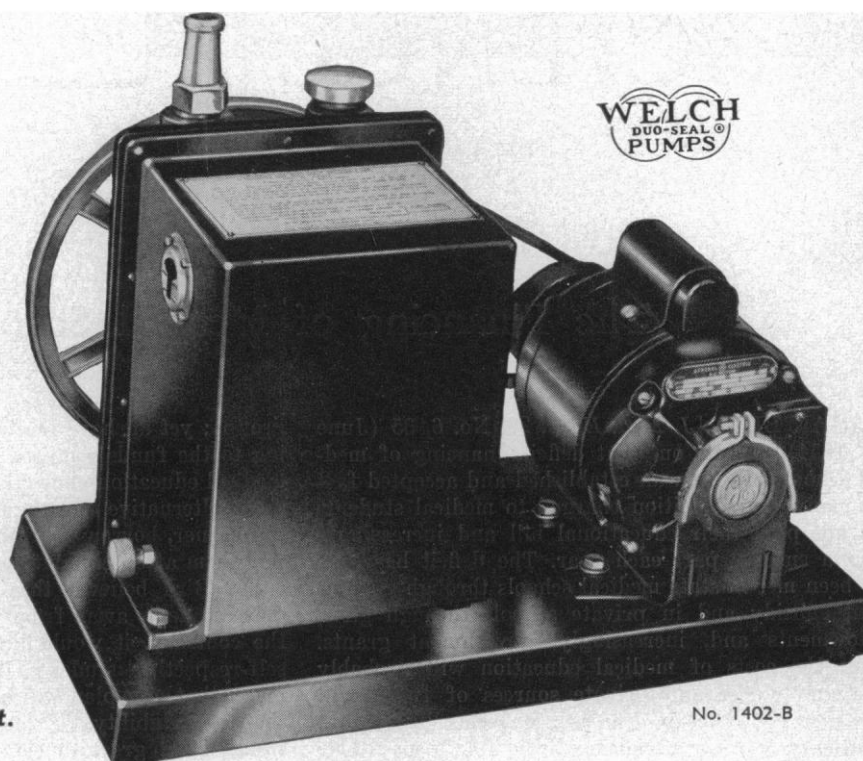
QUIET OPERATION

VISIBLE OIL LEVEL

COMPACT DESIGN

Overall dimension for pump and motor
15½" high and 11"
wide x 19⅝" long

*Available for
Immediate Shipment.*



This new two-stage Duo-Seal pump is constructed with the same care and precision as its fore-runners in the Duo-Seal line. The extremely quiet operation, so much appreciated in the other models, is also characteristic of this unit.

A positive oil seal prevents the oil from backing into the exhaust line. Oil may be changed in a few minutes due to the conveniently located oil drain.

1402. DUO-SEAL TWO STAGE VACUUM PUMP. Pump unit only, not mounted on a base, but with a 10 inch grooved pulley, a supply of oil, and directions for use.
Each \$225.00

1402B. DUO-SEAL PUMP, MOTOR-DRIVEN. A No. 1402 Pump mounted on a base with a ½ H.P. 115-volt A.C. motor. Complete with pulleys, belt, and cord.
Each \$295.00

1405C. BELT GUARD ONLY for 1402B Duo-Seal Pump. **Each \$15.00**

*Manufacturers of
Scientific Instruments and
Laboratory Apparatus*

W. M. WELCH SCIENTIFIC COMPANY

DIVISION OF W. M. WELCH MANUFACTURING COMPANY

ESTABLISHED 1880

1515 SEDGWICK STREET, DEPT. E CHICAGO 10, ILLINOIS, U.S.A.

versity of Birmingham, reviews "D-Glucuronic acid in metabolism" in the second of these chapters. The origin, site, and kinetics of D-glucuronide synthesis are among the topics considered. A comprehensive tabulation of biosynthetic D-glucuronides is included.

T. Mori, Tokyo University, in a chapter entitled "Seaweed polysaccharides," reviews the present state of our knowledge of these compounds, with emphasis on the need for further work in this field. The remaining two chapters consist of a discussion of "The substituted sucrose structure of melezitose," by E. J. Hehre, Cornell University, and a detailed compilation of the "Composition of cane juice and cane final molasses," by W. W. Binkley and M. L. Wolfrom, Ohio State University.

This volume represents a valuable addition to the literature of carbohydrate chemistry.

MILTON PAUL GORDON

Sloan-Kettering Institute for Cancer Research,
New York

Crystal Growth and Dislocations. Ajit Ram Verma. Academic Press, New York; Butterworths, London, 1953. 182 pp. Illus. \$5.

One of the most dramatic episodes in the development of our understanding of the nature and significance of imperfections in crystals was initiated by the proposal of F. C. Frank, in 1949, that the presence of screw dislocations could account for the previously baffling growth rates of crystals. Frank's paper was soon followed by Griffin's experimental observation of the predicted growth figures on natural single crystals of beryl. These two papers led to a whole series of studies of spiral growth figures, so that now this field represents one of the major successes of dislocation theory.

In the present monograph, Verma reviews these developments, in which he himself played a major part. In the first two chapters, the author summarizes the problems of accounting for the observed growth behavior of crystals as they appeared before Frank's proposal of the screw-dislocation growth mechanism. In the third chapter, the dislocation concept is introduced, and Frank's growth mechanism is described.

The rest of the monograph is devoted to descriptions of the various experimental methods of observing growth patterns on crystals and of the observations that have been made. So much of this material has been widely scattered in the literature that the present connected account is extremely helpful. The text includes a large number of illustrations from the author's own work, many of which have not been published before.

Crystal Growth and Dislocations fills in a very satisfactory way the need for an account of the studies of dislocations and crystal growth.

T. A. READ

Department of Mining and Metallurgy,
University of Illinois

New Books

Elements of Food Engineering. vol. II, *Unit Operations*. Milton E. Parker. Reinhold, New York, 1954. vi + 360 pp. Illus. \$8.50.

Medicine and Science. Lectures to the Laity, No. XVI. Iago Galdston, Ed. International Universities Press, New York, 1954. 159 pp. Illus. \$3.

Modern Learning Theory. A critical analysis of five examples. William K. Estes *et al.* Appleton-Century-Crofts, New York, 1954. xv + 379 pp. \$5.

Linear Transient Analysis. vol. I, *Lumped-Parameter Two-Terminal Networks*. Ernst Weber. Wiley, New York; Chapman & Hall, London, 1954. xiv + 348 pp. Illus. \$7.50.

Handbuch der Pflanzenkrankheiten. vol. II, *Die Virus- und Bakterienkrankheiten*, pt. 1, *Viruskrankheiten*. E. Köhler and M. Klinkowski. O. Appel and H. Richter, Eds. Paul Parey, Berlin, ed. 6, 1954. 784 pp. Illus. DM. 150.

The Anatomy of the Migratory Locust. F. O. Albrecht. Athlone Press, London; John de Graff, New York, 1953. xvi + 118 pp. Illus. \$6.

Astrophysics: Nuclear Transformations, Stellar Interiors, and Nebulae. Lawrence H. Aller. Ronald Press, New York, 1954. x + 291 pp. Illus. + plates. \$12.

Industrial Inorganic Analysis. Roland S. Young. Wiley, New York; Chapman & Hall, London, 1953. viii + 368 pp. Illus. 36s.

Electronics for Everyone. Monroe Upton. Devin-Adair, New York, 1954. xiii + 370 pp. Illus. \$6.

Evolution as a Process. Julian Huxley, A. C. Hardy, and E. B. Ford, Eds. Macmillan, New York; Allen & Unwin, London, 1954. 367 pp. Illus. \$4.25.

Medical Uses of Cortisone. Including hydrocortisone and corticotropin. Francis D. W. Lukens, Ed. Blakiston, New York, 1954. xiii + 534 pp. Illus. \$7.50.

Rare Metals Handbook. Clifford A. Hampel, Ed. Reinhold, New York, 1954. xiii + 657 pp. Illus. \$12.

Traité de Génétique. vols. I and II. Ph. L'Héritier. Presses Universitaires, Paris, 1954. 518 pp. Illus. Paper: vol. I, F. 1500; vol. II, F. 900.

Student Personnel Work as Deeper Teaching. Esther Lloyd-Jones and Margaret Ruth Smith, Eds. Harper, New York, 1954. xii + 361 pp. \$5.

Isotopic Tracers. A theoretical and practical manual for biological students and research workers. G. E. Francis, W. Mulligan, and A. Wormall. Athlone Press, London; John de Graff, New York, 1954. xvi + 306 pp. Illus. \$7.

The Struggle for Existence. Umberto D'Ancona. Trans. by Anne Charles and R. F. J. Withers. Brill, Leiden, Netherlands, 1954. xi + 274 pp. Illus.

Irrigated Soils. Their fertility and management. D. W. Thorne and H. B. Peterson. Blakiston, New York, ed. 2, 1954. xii + 392 pp. Illus. \$6.50.

Educators Guide to Free Films. Mary Foley Horkheimer and John W. Diffor. Educators Progress Service, Randolph, Wis., ed. 14, 1954. xiv + 566 pp. Paper, \$6.

Archaeology in the Field. O. G. S. Crawford. Frederick A. Praeger, New York, 1953. 280 pp. Illus. + plates. \$8.50.

Human Physiology. W. B. Youmans, Macmillan, New York, 1954. xiv + 481 pp. Illus. \$6.

Theoretical Physics. Mechanics of particles, rigid and elastic bodies, fluids, and heat flow. F. Woodbridge Constant. Addison-Wesley, Cambridge, Mass., 1954. xiv + 281 pp. Illus. \$6.50.

Adhesive Bonding of Metals. George Epstein. Reinhold, New York, 1954. ix + 218 pp. Illus. \$2.95.

Miscellaneous Publications

- Harvard's View of the Controversy over the Arnold Arboretum.** McGeorge Bundy. Arnold Arboretum, Jamaica Plain 30, Mass., 1954. 16 pp.
- Instituto de Pesquisas Veterinárias Desidério Finamor.** Secretary of Agriculture, Industry, and Commerce, Rio Grande do Sul, Brazil, 1952. 82 pp. Illus.
- Les Latérites de Gimbi (Bas-Congo).** Série Scientifique No. 60. G. Waegemans. L'Institut National pour l'Étude Agronomique du Congo Belge, Brussels, 1954. 27 pp. Illus. F. 25.
- Die Totenstarre der Darmmuskulatur.** Sitzungsberichte der Deutschen Akademie der Wissenschaften zu Berlin, Klasse für Medizinische Wissenschaften, 1952, No. 1. E. Mangold and E. Schuster. 39 pp. Illus. DM. 4
- Die Währungsgesetze beim Viehhandel vom Standpunkt der Forensischen Veterinärmedizin.** 1952, No. 2. Johannes Dobberstein. 20 pp. DM. 2
- Zur Statistik der Geschwülste bei Tieren.** 1951, No. 3. Johannes Dobberstein. 50 pp. DM. 4.30
- Maldonit and Neue Beobachtungen am Bühl-Eisen.** Klasse für Mathematik und Allgemeine Naturwissenschaften, 1952, No. 5. Paul Ramdohr. 24 pp. Illus. DM. 2.40. Akademie-Verlag, Berlin, 1953.
- The Making of Sweden.** Allan Kastrup. American-Swedish News Exchange, New York 20. 128 pp. Illus.
- Annual Report, 1952.** Central Laboratories for Scientific and Industrial Research, Hyderabad, India, 1954. 57 pp.
- White-Tailed Deer Populations in Illinois.** Biological Notes No. 34. Lysle R. Pietsch. Natural History Survey Div., Urbana, Ill., 1954. 22 pp. Illus.
- Microlepidoptera of New Guinea, Results of the Third Archbold Expedition.** Pt. 3. Verhandelingen der Koninklijke Nederlandse Akademie van Wetenschappen, Afd. Natuurkunde, vol. 49, No. 4. A. Diakonoff. North-Holland Publ. Co., Amsterdam, 1954. 164 pp. Illus.
- Prospects for Atomic Power.** Sir James Chadwick. Univ. of Toronto Press, Toronto 5, Ontario, 1954. 12 pp. Illus. 75¢.
- Annual Report of the Director of the Department of Terrestrial Magnetism, 1952-1953.** Carnegie Institution of Washington, Washington 15, 1953. 45 pp. + plates.
- Histochemische Methoden.** No. 2. Walther Lipp. R. Oldenbourg, Munich, 1954. 24 pp. DM. 6.
- Classified Guide to the Frederick Winslow Taylor Collection.** Elizabeth Gardner Hayward. American Soc. of Mechanical Engineers, New York 18. 45 pp. Illus. \$3.
- Report on "Omnibus," 1953-1954.** TV-Radio Workshop. Ford Foundation, New York 21, 1954. 24 pp. Illus.
- Ferns and Fern Allies of New Mexico.** Univ. of New Mexico Pub. in Biology, No. 6. Howard J. Dittmer, Edward F. Castetter, and Ora M. Clark. Univ. of New Mexico, Albuquerque, 1954. 139 pp. Illus. \$1.
- Washington Conference on Radio Astronomy—1954.** Reprinted from *J. Geophys. Research*, vol. 59, No. 1, 1954. 52 pp. Illus.
- Le Régime des Précipitations sur les Hautes Fagnes.** Contrib., No. 12. L. Poncelet. Institut Royal Météorologique de Belgique, Brussels, 1954. 11 pp. Illus.
- Pesticide Situation for 1953-54.** Commodity Stabilization Service, U.S. Dept. of Agriculture, Washington, 1954. 13 pp. Illus.
- Geology of Lassen's Landscape.** Paul E. Schulz. Loomis Museum Assoc., Mineral, Calif., 1952. 98 pp. Illus. 55¢.
- Agriculture of Liberia.** Clayton R. Orton. U.S. Foreign Operations Administration, Washington, 1954. 111 pp. Illus.
- Chemical Study of the Peats of Quebec.** Pts. 3-5. P.R. No. 282. J. Risi et al. Dept. of Mines, Quebec, 1953. 40 pp. Illus. + plates.
- Annals of the Astrophysical Observatory of the Smithsonian Institution.** vol. 7. L. B. Aldrich and W. H. Hoover. Smithsonian Institution, Washington, 1954 (Order from Supt. of Documents, GPO, Washington 25). 184 pp. Illus. + plates. \$1.75
- Amending the Atomic Energy Act of 1946, as Amended, and for Other Purposes.** Rept. No. 2181 (to accompany H.R. 9757). Joint Committee on Atomic Energy, Washington 25, 1954. 138 pp.
- Highway Finance, Selected References, 1950-1953.** Highway Research Bd. Bibliog. 16. Natl. Acad. of Sciences-Natl. Research Council, Washington 25, 1954. 65 pp. 75¢.
- Wood Preservation in India (Past, Present and Future).** Indian Forest Bull. No. 168. A. Purushotham, J. N. Pande, and Y. G. Jadhav. Manager of Publications, Delhi, 1953. 73 pp. Illus. + plates. 5s. 6d.
- Bibliography and Index of Literature on Uranium and Thorium and Radioactive Occurrences in the United States.** Pt. 3: Colorado and Utah. Bull., vol. 65. Margaret Cooper. Geological Soc. of Amer., New York 27, 1954. 124 pp. 50¢.
- Estabilidad Total y Vibraciones Aproximadamente Periódicas.** vol. 2, No. 7. Jose L. Massera. Instituto de Matemática y Estadística, Montevideo, Uruguay, 1954. 14 pp.
- Farm Woodland Management in the Southern Appalachians, an 8-Year Summary.** Sta. Paper No. 41. Robert A. Campbell. Southeastern Forest Expt. Sta. Asheville, N.C., 1954. 9 pp. Illus.
- Caves of the Reserve Area.** Fieldiana: Anthropology, vol. 42. Paul S. Martin, John B. Rinaldo, Elaine Bluhm. Chicago Natural History Museum, Chicago, 1954. 227 pp. Illus. \$5.
- Report on the Foundation's Activities for the Year Ended January 31, 1954.** Wenner-Gren Foundation for Anthropological Research, New York 21, 1954. 83 pp.
- Growth Response in Allegheny Hardwood Forests after Diameter-Limit Pulpwood Cuttings.** Sta. Paper No. 68. A. F. Hough. 18 pp. Illus. *Use of Plant Indicators as an Index to Site Quality.* No. 69. Marinus Westveld. 5 pp. Northeastern Forest Expt. Sta., Upper Darby, Pa., 1954.
- La Scintillation des Etoiles.** Pub. Ser. B, No. 8. J. Van Isacker. Institut Royal Météorologique de Belgique, Brussels, 1953. 110 pp. Illus.
- One Hundred and Fourth Registration Report of Births, Marriages, Divorces, and Deaths for 1951.** State of Connecticut Public Document No. 9. State Dept. of Health, Hartford, 1953. 246 pp.
- Eighth Annual Report, 1952-1953.** South African Council for Scientific and Industrial Research, Pretoria, Union of South Africa. 154 pp. Illus.
- A Half Century of Alfalfa in Wisconsin.** Bull. 502. L. F. Graber. Extension Service, College of Agriculture, Univ. of Wisconsin, Madison, 1953. 128 pp. Illus.
- Becas Para Latinoamericanos en los Estados Unidos.** Union Panamericana, Washington 6, 1954. 95 pp. 50¢.
- Neurosecretion.** Symposium held 11-18 May 1953, Naples. Pubblicazioni della Stazione Zoologica, vol. 24, supplemento (In English, German, French and Italian). Stazione Zoologica, Naples, 1954. 98 pp. \$1.