of the disciplines which study the brain, will find that *Frontiers of Brain Research* gives him an excellent overall picture of current research on brain structure and function. He will also find many stimulating ideas about future developments—what questions may be asked, what techniques may be used in seeking answers.

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Humboldt Biography

Alexander von Humboldt. L. Kellner. Oxford University Press, New York, 1963. viii + 247 pp. Illus. $5.75.

The subject of this biography, Alexander von Humboldt, 1769–1859, explorer, scientist, and confidant of kings, was a complex person whose strength and weakness as a scientist are revealed in his work on terrestrial magnetism, one of his many specialties. The author of this new Humboldt biography, a lecturer in physics at Imperial College, London, makes the sturdy little German a vivid, noble, impressive, and appealing person.

Humboldt was the first persistent student of geographic and other variations in the intensity of terrestrial magnetism, the discoverer of magnetic storms, and the inventor of the geomagnetic terms *isogonics, isoclines*, and *isodynamics*. His friend Gauss, in 1838, published a mathematical model that fitted the regional magnetic variations and seemed to eclipse Humboldt's contributions. However, Humboldt's well-planned precise observations led to several important developments, of which that by Gauss was no doubt the greatest.

Humboldt was the prince of compilers. His culminating publication was *Kosmos, Entwurf einer physischen Weltbeschreibung*, vol. 1 (1845), vol. 2 (1847), vol. 3 (1850), vol. 4 (1858), vol. 5 (1862), and atlas (1861). It includes eloquent summaries of mid-19th century knowledge of astronomy, geography, geology, and geophysics; the atlas is especially valuable.

Humboldt, a notable explorer, spent 5 years (1799–1804) exploring northern South America and Mexico with Bonpland; in these explorations he covered 6000 miles, mostly on foot. He kept diaries, plotted route maps, collected and described plants, recorded plant and animal assemblages, determined rocks and geological structures, made excellent sketches, and carried out hundreds of determinations of latitude, longitude, barometric pressure, and geomagnetic orientation and intensity. He also climbed the Ecuador volcano, Chimborazo, to 19,170 feet, a world-record height for 30 years. Much later, in 1829, under Russian auspices, he visited the Urals and central Asia.

Humboldt, who was born in Berlin and spent approximately his last 30 years there as the king's chamberlain, had sympathized with the French Revolution, and he marched with the people in 1848. He worked with and for poor miners in both hemispheres and used the remnants of his patrimony, beyond the costs of his expensive American explorations and publications, in helping needy persons, including the young Agassiz. His best years, 1804 to 1827, were spent in Paris with liberal-minded French scientists, notably Arago and Gay-Lussac. When he died, a nearly penniless bachelor, Humboldt shocked everyone by leaving his 11,000 books and his other personal possessions to his servant.

Kellner involves the reader in this absorbing story, all the way.

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Note

Freshwater Teleost

Teleost embryology can benefit greatly from comparative studies, and this publication, **Stages in the Development of Ictalurus nebulosus** (Syracuse University Press, Syracuse, N.Y., 1962. 8 pp. 16 plates. $4.95), by Philip B. Armstrong, should do much to add yet another species to those that have earned the attention of investigators in this field. The brown bullhead, or horned pout, is a widely distributed freshwater teleost that can be maintained in aquaria. Its eggs are relatively large (about 3.0 mm in diameter) and hatch in about 8 days at room temperature. According to Armstrong, the eggs are readily dechorionated and reasonably hardy under laboratory conditions. The portfolio of illustrations, by Julia Swope Child, which show the normal stages of development, consists of 16 plates printed on lacquered hardboard. The 89 drawings are clearly executed and well reproduced. An accompanying booklet contains diagnostic descriptions of the 53 defined stages and also furnishes suggestions for collecting adults and for raising the eggs in the laboratory.

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New Books

Mathematics, Physical Sciences, and Engineering

Asphalts and Allied Substances. Their occurrence, modes of production, uses in the arts, and methods of testing. vol. 5, *Methods of Testing: Fabricated Bituminous Products*. Herbert Abraham. Van Nostrand, Princeton, N.J., ed. 6, 1963. 450 pp. Illus. $15.

Copolymers of Alpha-Olefins. A symposium, American Chemical Soc. (Washington, D.C.), March 1962. Herbert N. Friedlander, Ed. Interscience (Wiley), New York, 1962. 95 pp. Illus. Paper.

Encyclopaedic Dictionary of Physics. vol. 7, *Stellar Magnitude to Zwitter Ion*. J. Thewlis, R. C. Glass, D. J. Hughes, and A. R. Meetham, Eds. Pergamon, London; Macmillan, New York, 1962. 876 pp. Illus.

Fundamental Theory of Structures. D. Allan Firmage. Wiley, New York, 1963. 346 pp. Illus. $8.50.

Ionic Solution Theory. Based on cluster expansion methods. vol. 3. Harold L. Friedman. Interscience (Wiley), New York, 1962. 273 pp. Illus. $13.50.

Organic Syntheses. vol. 42. Wiley, New York, 1962. 128 pp. Illus. $4.25.

Polyurethanes. Chemistry and technology. pt. 1, *Chemistry*. J. H. Saunders and K. C. Frisch. Interscience (Wiley), New York, 1962. 384 pp. Illus. $14.

Quantum Theory of Molecules and Solids. vol. 1, *Electronic Structure of Molecules*. John C. Slater. McGraw-Hill, New York, 1963. 501 pp. Illus. $12.50.

Readings in Mathematical Programming. S. Vajda. Wiley, New York, 1962 (reprint). 138 pp. Illus. $4.25.

Subsets of the Plane: Plane Analytic Geometry. Howard E. Taylor and Thomas L. Wade. Wiley, New York, 1962. 105 pp. Illus. Paper, $1.95.

Symbolic Languages in Data Processing. Proceedings of the symposium organized and edited by the International Computation Centre (Rome), March 1962. Gordon and Breach, New York, 1962. 863 pp. Illus. $34.50.

Yearbook of Astronomy, 1963. J. G. Porter and Patrick Moore, Eds. Eyre and Spottiswoode, London, 1962; Norton, New York, 1963. 222 pp. Illus. Paper, $3.50.