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selben betreffende arteriösen und venösen Haargefäße, nebst den darauf gegründeten Theorie von der Ernährung (Vienna, 1810); and *Disquisitio anatomico-physiologica organismi corporis humani eiusque procesus vitalis* (Vienna, 1812). His last views are presented in *Physiologie oder Lehre über die Natur des Menschen* (Vienna, 1820).

II. SECONDARY LITERATURE. A comprehensive biography of Procháška with a bibliography of his writings is V. Kruta, *Med. Dr. Jiří Procháška. Život, dílo, doba* (Prague, 1956). Philosophical aspects of his work were analyzed by J. Černý; *Jiří Procháška a dialektika v německé přírodní filosofii* (Prague, 1960). Short accounts are V. Kruta, "G. Procháška and the Reflex Theory," in *Scripta medica*, 34 (1961), 297–314; and *Epilepsia*, 3 (1962), 446–456; V. Kruta and Z. Franc, "Un ouvrage de physiologie romantique de G. Procháška," in *Castalia*, 22 (1966), 3–12; and M. Neuburger, "Der Physiologe Georg Procháška," in *Wiener medizinische Wochenschrift* (1937), 1155–1157. Procháška's place in the history of neurophysiology is discussed in G. Canguilhem, *La formation du concept de réflexe aux XVII^e et XVIII^e siècles* (Paris, 1955); F. F. Fearing, *Reflex Action* (Baltimore, 1930); M. Neuburger, *Die historische Entwicklung der experimentellen Gehirn- und Rückenmarksphysiologie vor Flourens* (Stuttgart, 1897); and J. Soury, *Le système nerveux central. Structure et fonctions* (Paris, 1899).

VLADISLAV KRUTA

PROCLUS (*b.* Byzantium, 410 [412?]; *d.* Athens, 485), *philosophy, mathematics, astronomy.*

Proclus' parents, Patricius and Marcella, were wellborn citizens of Lycia; and his father had attained eminence as an advocate in the courts of Byzantium. Proclus received his early education at the grammar school of Xanthus, a city on the southern coast of Lycia. He was later sent to Alexandria, where he began the study of rhetoric and Latin in preparation for following his father's career. But on a visit to Byzantium during these years he experienced a "divine call," as his biographer Marinus tells us (chs. 6, 9, 10), to devote himself to philosophy. Returning to Alexandria, Proclus studied Aristotle with Olympiodorus the Elder and mathematics with a certain Heron, otherwise unknown. But these teachers did not satisfy him; and before he was twenty, he moved to Athens, where the Platonic Academy had recently undergone a notable revival under the headship of Plutarch of Athens. From this time until his death in 485 Proclus was a member of the Academy, first as student, then as a teacher, and finally as its head—whence the title Diadochus (Successor) which is usually attached to his name.

Proclus was the last great representative of the philosophical movement now called Neoplatonism.

The first notable exponent of this Hellenistic form of Platonism was Plotinus, from whom the doctrine had been transmitted, through Porphyry and Iamblichus, to Plutarch and Syrianus, Proclus' teachers at Athens. During these two centuries Neoplatonism had taken on a more pronounced religious coloration and had acquired a tincture of the Eastern predilection for magic, or "theurgy," as Iamblichus called it; on the other hand, its logical structure had become more precise and systematic, and its exponents had turned increasingly to scholarly examination and exposition of the writings of Plato and Aristotle.

Proclus had an extraordinarily acute and orderly mind. Because of his religious temperament he enthusiastically espoused Neoplatonism and devoted his talents and energies to perfecting it by systematizing and extending the views of his predecessors, strengthening their logical structure, and showing in detail their derivation from the teaching of Plato, who was taken as the source and final authority. But Proclus was more than a systematic metaphysician. He had a broad interest in all products of Greek culture, in religion, literature, science, and philosophy. His literary production was tremendous. Many of his writings have been lost, but those remaining constitute a priceless source of information regarding this last stage of Greek culture; and because of their underlying philosophy they embody an impressive restatement of Greek rationalism in its last confrontation with Christian thought.

The goal of philosophy, according to the Neoplatonists, was to attain a vision of and contact with the transcendent and ineffable One, the principle from which all things proceed and to which they all, according to their several natures and capacities, endeavor to return. But this synthesizing insight was to be attained only by the hard labor of thought. Proclus believed that a prerequisite to the study of philosophy was a thorough grounding in logic, mathematics, and natural science. One of the most important of his extant writings is the *Commentary on the First Book of Euclid's Elements*, in part certainly a product of his lectures at the Academy. Proclus was not a creative mathematician; but he was an acute expositor and critic, with a thorough grasp of mathematical method and a detailed knowledge of the thousand years of Greek mathematics from Thales to his own time. Because of his interest in the principles underlying mathematical thought and their relation to ultimate philosophical principles, Proclus' commentary is a notable—and also the earliest—contribution to the philosophy of mathematics. Its numerous references to the views of Euclid's predecessors and successors, many of them otherwise

unknown to us, render it an invaluable source for the history of the science.

In the same vein but of more limited interest today is Proclus' *Hypotyposis* [Outline] of the *Hypotheses of the Astronomers*, an elaborate exposition of the system of eccentrics and epicycles assumed in Ptolemy's astronomy. This Ptolemaic system had arisen out of an effort to provide a mathematical explanation of the anomalies in the motions of the heavenly bodies as observed from the earth. Proclus approved the motives that led to its construction, and thought a knowledge of it desirable for his students; but he was understandably critical of its complexity as a whole and of the ad hoc character of its individual hypotheses. Several other writings on astronomy are attributed to Proclus: an elementary treatise entitled *Sphaera*, which appeared in more than seventy editions or translations during the early Renaissance; a paraphrase of Ptolemy's astrological *Tetrabiblos*; and another astrological essay entitled *Eclipses*, extant in two different Latin translations. Finally, his *Elements of Physics* offered a summary of books VI and VII of Aristotle's *Physics* and the first book of *De caelo*, arranged in geometrical form with propositions and proofs.

Proclus' most systematic philosophical work is his *Elements of Theology*, which presented in geometrical form, in a series of propositions, each supported by its proof, the successive grades of being that proceed from the superexistent and ineffable One downward to the levels of life and soul. The treatise *Platonic Theology*, probably a later work, presented this hierarchy of divine principles as they were revealed in Plato's dialogues, particularly in the *Parmenides*. Planned on a grandiose scale, this work either was not completed or has been imperfectly transmitted to us.

Better known is the impressive series of commentaries on Platonic dialogues: a lengthy commentary on the *Timaeus*—which, Marinus tells us (ch. 38), was Proclus' favorite—another equally long commentary on the *Parmenides*, another on the *First Alcibiades*, and still another on the *Republic*. The texts of all these have been preserved. His commentary on the *Cratylus* survives only in fragments, and those on the *Philebus*, the *Theaetetus*, the *Sophist*, and the *Phaedo* have been completely lost, as have those he is reported to have written on Aristotle. We possess only a fragment of Proclus' commentary on the *Enneads* of Plotinus, and we know of his *Eighteen Arguments for the Eternity of the World*, a tract against the Christians, only because it is extensively quoted in Philoponus' book written to refute it. His treatises *On Providence and Fate* and *On the Subsistence of Evils* were long known only in Latin translations, but

large portions of the Greek text have recently been recovered and edited.

Of Proclus' numerous works on religion, none survives except in fragments. Like Aristotle, he believed that ancient traditions often contain truth expressed in mythical form. Orphic and Chaldean theology engaged his attention from his earliest years in Athens. He studied Syrianus' commentary on the Orphic writings along with the works of Porphyry and Iamblichus on the Chaldean Oracles; and he undertook a commentary of his own on this collection, which, Marinus states (ch. 26), took five years to write. Proclus himself was a devout adherent of the ancient faiths, scrupulously observing the holy days of both the Egyptian and Greek calendars—for, he said, it behooves the philosopher to be the hierophant of all mankind, not of one people only (Marinus, ch. 19).

Proclus never married and made liberal use of his apparently ample means for the benefit of his relatives and friends. His diet was abstemious but not ascetic, although he customarily refrained, in Pythagorean fashion, from eating meat. He composed many hymns to the gods, of which seven survive, written in Homeric language and marked by literary quality as well as religious feeling. We are told that he lived in constant communication with the divine world, addressing his adoration and aspiration in prayers and ritual observances and receiving messages from the gods in dreams. His pious biographer also presents him as something of a wonder-worker who, having been initiated into the secrets of the hieratic art, practiced necromancy and other forms of divination and who was able by his arts to produce rain and to heal disease. Such beliefs, like the belief in astrology which both he and Ptolemy held, were almost universal in that age.

Proclus deserves to be remembered, however, not for these beliefs that he shared with almost all his contemporaries, but for the qualities he possessed that are exceedingly rare in any age and were almost unique in his: the logical clarity and firmness of his thought, the acuteness of his analyses, his eagerness to understand and his readiness to present the views of his predecessors on controversial issues, the sustained coherence of his lengthy expositions, and the large horizon, as broad as the whole of being, within which his thinking moved.

Proclus' thought indirectly exercised considerable influence in the early Middle Ages through the writings of the so-called Dionysius the Areopagite, whose teachings were a thinly disguised version of Proclus' doctrines. With the revival of learning in the fifteenth century and the desire of Renaissance thinkers to throw off the yoke of medieval Aristote-

lianism, Proclus' Platonism had a great vogue in the Florentine Academy and strongly influenced Nicholas of Cusa and Johannes Kepler. Modern criticism has tended, rather hastily, to discredit his interpretation of Plato; and with the decline of interest in speculative philosophy, his writings have fallen into neglect. But it is fair to say that the wealth of learning and insight in his works does not deserve to be neglected, and that the constructive philosophy they contain still awaits adequate appraisal and appreciation by modern philosophers.

BIBLIOGRAPHY

I. ORIGINAL WORKS. *Procli philosophi Platonici opera inedita*, Victor Cousin, ed., 2nd ed. (Paris, 1864), contains text of *Commentary on the Parmenides*, French trans. by A. Chaignet, 3 vols. (Paris, 1901–1903).

Separate eds. of other texts are: *Commentary on the First Alcibiades of Plato*, L. G. Westerink, ed. (Amsterdam, 1959), English trans. by William O'Neill (The Hague, 1965); *Commentary on the Timaeus*, Ernst Diehl, ed., 3 vols. (Leipzig, 1903–1906), French trans. by A. J. Festugière, 5 vols. (Paris, 1966–1968); *Commentary on the Republic*, Wilhelm Kroll, ed., 2 vols. (Leipzig, 1899–1901), French trans., by A. J. Festugière, 3 vols. (Paris, 1970); *Elements of Physics*, Albert Ritzenfeld, ed., with a German trans. (Leipzig, 1911); *Hypotyposis*, Charles Manitius, ed., with a German trans. (Leipzig, 1909); *Commentary on the First Book of Euclid's Elements*, Gottfried Friedlein, ed. (Leipzig, 1873), German trans. by Leander Schönberger (Halle, 1945), French trans. by Paul ver Eecke (Bruges, 1949), English trans. by Thomas Taylor, 2 vols. (London, 1792), and Glenn R. Morrow (Princeton, 1970); *Commentary on the Cratylus*, G. Pasquali, ed. (Leipzig, 1908); *Elements of Theology*, E. R. Dodds, ed., with an English trans., 2nd ed. (Oxford, 1963); *Platonic Theology*, H. D. Saffrey and L. G. Westerink, eds., with a French trans. (Paris, 1968), English trans. by Thomas Taylor (London, 1816); *Providence and Fate and Subsistence of Evils*, Helmut Boese, ed. (Berlin, 1960); and *Hymns*, E. Vogt, ed. (Wiesbaden, 1957), Thomas Taylor, ed., with an English trans. (London, 1793).

For a complete list of Proclus' writings, with a bibliography of eds. and translations of individual items during the modern period to 1940, see Rosán (below), 245–254.

II. SECONDARY LITERATURE. An ancient biography is *Vita Procli*, by his pupil and successor Marinus, J. F. Boissonade, ed. (Leipzig, 1814), repr. in Cousin, *Procli . . . Platonici opera inedita*. See W. Beierwaltes, *Proklos* (Frankfurt am Main, 1965); Rudolf Beutler, "Proklos (4)," in Pauly-Wissowa, *Real-Encyclopädie der klassischen Altertumswissenschaft*, XXIII (1957), 186–247; Raymond Klibansky, "Ein Proklus-fund und seine Bedeutung," which is *Sitzungsberichte der Heidelberger Akademie der Wissenschaften*, 19, no. 5 (1929); Laurence J. Rosán, *The Philosophy of Proclus* (New York, 1949); A. E. Taylor, "The Philosophy of Proclus," in *Proceedings of the*

Aristotelian Society, 18 (1918), 600–635; Friedrich Ueberweg, *Grundriss der Geschichte der Philosophie*, I, *Die Philosophie des Altertums*, 12th ed., Karl Praechter, ed. (Berlin, 1926), 621–631; Thomas Whittaker, *The Neo-Platonists*, 2nd ed. (Cambridge, 1928), 155–184, 231–314; and E. Zeller, *Die Philosophie der Griechen*, 5th ed., III, sec. 2 (Leipzig, 1921), 834–890.

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PROCTOR, RICHARD ANTHONY (*b.* Chelsea, London, England, 23 March 1837; *d.* New York, N.Y., 12 September 1888), *astronomy*.

Proctor acquired an immense popular reputation by virtue of his lucid presentation, both in books and in lectures. He was familiar not only with what was visible through the telescopes of the time but also with astronomy in a literary context. As an astronomer he was prone to speculation, and frequently he was wildly mistaken.

Proctor was the youngest son of William Proctor, a well-to-do solicitor. His father's death in 1850, followed by a protracted lawsuit, left the family in difficult circumstances. Proctor was a bank clerk (1854) until he was able to attend London University (1855) and then St. John's College, Cambridge (1856), where he studied theology and mathematics. He married before his degree examination in 1860, in which his results were disappointing (twenty-third wrangler); he then began to study for the bar, but the death in 1863 of the first of his many children turned him toward astronomy and mathematics as distractions. His first article was on colors in double stars (*Cornhill Magazine* for 1865); and his first book, privately published, was *Saturn and His System* (1865).

With the failure in 1866 of a New Zealand bank in which his money was invested, Proctor turned to a precarious and badly paid literary career. His popular articles were frequently rejected, and his early books barely met their printing costs. His best-selling *Half-Hours With the Telescope* (London, 1868), written for a fee of £25, reached twenty editions by the time of his death. One of his most widely read works was *Myths and Marvels of Astronomy* (1877), an entertaining collection of astronomical lore.

Proctor taught mathematics for some time at a private military school in Woolwich. After 1873 he went on several lecture tours of America and Australasia. His first wife died in 1879, and in 1881 he married an American widow, Mrs. Robert J. Crawley, and settled at St. Joseph, Missouri, her hometown. He moved to Orange Lake, Florida, in 1887 but died the following year in New York City, perhaps of yellow fever, on his way to England on business.

Proctor long served as an officer of the Royal