

PENTASTOMIDA—PENTATEUCH

... offers 3,700,000 sq. ft. of usable air-conditioned floor space provides work space for about 30,000 persons, military and civilian. Built of structural steel and reinforced concrete, with limestone facing, the entire structure cost \$83,000,000.

The Pentagon consists of five concentric pentagons or "rings" with ten spokelike main corridors connecting the whole. (See WASHINGTON, D.C., for photograph.) With only five floors, plus mezzanine and basement, the height of the building is short compared with its horizontal dimensions. A huge concourse larger than two American football fields provides a shopping centre for Pentagon workers. Beneath the concourse are bus and train terminals. Parking areas adjacent to the building can accommodate over 8,000 cars. A heliport for the Pentagon was added in 1956. (H. C. T.)

PENTASTOMIDA (LINGUATULIDA) are a small group usually considered a class) of wormlike, bloodsucking arthropods which live as internal parasites of vertebrates. The body of the adult is externally ringed—and in many species looks like a thick string of beads—though there is no true internal segmentation. The alternate name Linguatulida or "tongue worms" is descriptive of the linguiform or tongue-shaped body of other species. Although some authorities consider the pentastomes a separate phylum, certain characteristics point to their very close arthropod relationship: (1) jointed legs in the embryo; (2) moulting or molting in the larval stage; and (3) the presence of breathing pores scattered over the body.

The name Pentastomida refers to the five openings arranged in a crosswise line on the head; the centrally located one is the chitinous mouth, and the other two flanking pairs are the openings of pockets or sacs containing protractile hooks. The body is elongate and cylindrical in most species, a few being flattened and somewhat flattened. Adjoining a short head region is a long abdomen (from about 1/2 to 6 in. in length) marked with a variable number of superficial rings that do not represent true body segments and devoid of appendages. Although reproductive, nervous and digestive systems are present, there are no organs of circulation or excretion. Mouth parts are anterior and the digestive canal extends posteriorly. Sexes are separate and the females are several times larger than the males.

These bloodsuckers usually attach themselves to the blood vessels of their adult stage within vertebrates, the blooded vertebrates upon which the adult hosts feed. Some live in the air passages of their host whereas nymphs are frequently found encysted in the liver of their host. Development is usually combined and involves a change of host.

The number of known species is about 50, and they are not restricted to a single host.

Railiatiella furcocerca is a common parasite of snakes in the eastern hemisphere. *Reighardia stercoris* is a parasitic of gulls in the Mediterranean. In America, *Xericocentrus* is often found in the air passages of snakes.

Linguatula serrata, usually found in dogs, wolves and several mammals, and *Armillifer armillatus* have been occasionally found in man. The eggs of *L. serrata* are scattered in sneezing.

The larvae develop in the viscera of the intermediate host—rabbit, rat or sheep. After several molts the nymphal

can serve both as an intermediary and as a final host.

The adult of *Armillifer armillatus* is a common parasite in the lungs of large snakes in the eastern hemisphere. Pythons often become infected by devouring an infected mammal. In man, infection takes place by swallowing eggs scattered over vegetables or in water. The encysted larvae settle in various organs, and a heavy infection may lead to grave disturbances and may even result in death.

Pentastomida are divided into two orders: (1) the Cephalobaenida, with two families and four genera (*Cephalobaena*, *Railiatiella*, *Reighardia*, etc.); and (2) the Porocephalida, with two families and 14 genera (*Porocephalus*, *Linguatula*, etc.). These two orders are distinguished by the structure of their reproductive and nervous systems, the Cephalobaenida being the more primitive.

One of the best treatises is by R. Heymons, "Pentastomida," in Bronn's *Klassen und Ordnungen* (1935). For an extensive list of literature see Howard R. Hill, "Annotated Bibliography of the Linguatulida," *Bull. S. Calif. Acad. Sci.*, vol. 47, pt. 2 (1948). (H. R. H.)

PENTATEUCH. The name Pentateuch (from the Greek *pentateuchos biblos*, "book of five volumes") designates the first five books of the Old Testament—Genesis, Exodus, Leviticus, Numbers and Deuteronomy—which embody the Law of Moses and hence are called also TORAH. The Pentateuch consists of narratives into which collections of laws are interpolated; the narratives begin with the creation of the world and conclude with the death of Moses, just before the entrance of the Israelites into the land of Canaan. They relate the primitive history of man, the stories of the patriarchs, the exodus of the Israelites from Egypt and their journey to Canaan, and the institution of the Israelite Covenant and laws at Sinai.

Development of Criticism of the Pentateuch.—Jewish and Christian tradition until the 19th century, with a few rare and unimportant exceptions, attributed the Pentateuch to Moses. The French physician Jean Astruc suggested in 1753 that Moses compiled Genesis from two documentary sources, one of which employed the divine name Yahweh and the other the divine name Elohim. Astruc did not intend to question the authorship of Moses; but his introduction of the divine names as a criterion of documentary sources gave the impulse to the literary criticism of the Pentateuch which engaged almost every major biblical scholar of the 19th century.

The text of the Pentateuch exhibits numerous traits which indicate a complex literary origin. There are two creation accounts (Gen. i, 1-ii, 4a; ii, 4b-24). The account of the deluge (Gen. vi, 3-ix, 17) shows evidences of two accounts which have been compiled into one (the number of animals taken into the ark, the duration of the deluge, the two entrances of Noah into the ark, the blessings and Covenant pronouncements after the deluge). Ex. iv, 19 is the logical sequence of Ex. ii, 23. The expulsion of Hagar by Abraham (Gen. xvi; xxi), the call of Moses (Ex. iii; vi) and the miracles of the quail and the manna (Ex. xvi; Num. xi) are narrated twice. The wife of a patriarch is taken into the harem of a foreign ruler, or threatened with this, three times (Gen. xii; xx; xxvi). When the text is studied closely, other similar phenomena are observed. If these passages are analyzed and grouped, three strands of narrative emerge, each with distinctive characteristics of vocabulary and style, of which variation in the use of the divine names is only one.

Proceeding on these data, J. G. Eichhorn (1781) distinguished various sources in Genesis. K. D. Ilgen (1798) observed the source called Elohist could not be considered as a single source but must be divided into two. Geddes (1792), Vater (1802-05) and De Wette (1805) proposed the "theory of fragments," which assumed that there was no single document in the Pentateuch; they found in it a compilation of fragments of numerous different documents. The most important contribution of De Wette was his isolation of Deuteronomy as a distinct source. The unity of the sources, however, was too evident to be denied; and Ewald (1823) and De Wette (1840) adopted the "complementary theory," which assumed that one basic document was enlarged by



PHOTOGRAPH BY COURTESY OF J. G. EICHORN, 1913.
VENTRAL VIEW DRAWING OF HEAD OF POROCEPHALUS AND PHOTOGRAPH SHOWING HEAD OF ARMIILLIFER MONILIFORMIS EMBEDDED IN LUNG TISSUE OF PYTHON HOST.