The general criticism of the syllogism as a means of discovering truth is that it is a *petitio principii,* or begging of the question. This accusation is based to some extent on the Aristotelian “ Dictum de omni et nullo ” *(Anal. Pri.* α i. 24, b 26-30), generally stated as “ That which is affirmed or denied of any whole may be affirmed or denied of anything contained within (or ‘ any part of ’) that whole.” To take a concrete instance of a valid mood: all men are mortal, all Frenchmen are men, therefore all Frenchmen are mortal (the mood Barbara). It is argued that either there is here no real discovery *(i.e.* new truth) or the major premise is improperly used (begs the question) inasmuch as unless we knew that all Frenchmen are mortal we could not state that all *men* are mortal. The problem raised is a real one, and has been discussed by all logicians, from the time of Mill especially. In brief, the solution depends upon the view we take of the major premise, “all men are mortal.” If that judgment is taken as a mere enumeration of particulars, *i.e.* in extension, as meaning that all men have been investigated and found to be mortal, clearly it could not be used to make the new discovery that a particular group of men are mortal; the syllogism so understood is a *petitio principii.* If, however, we take the true view of the major premise, namely, that it is not a mere summary of observed particulars but the enunciation of a necessary connexion between two concepts or universals, then the conclusion assumes a different character. The “ whole ” *(omnë)* of the dictum, the major term, ceases to be taken in extension, and becomes intensive or connotative, and the infer­ence consists in subsuming the minor under (bringing it into connexion with) the major. This is the true view of the scientific or inductive universal (as opposed to that of nominalism or pure empiricism). It remains true that in fact the conclusion is contained in the premises—this is essential to the validity of the syllogism—but the inference is a real one because it brings out and shows the necessity of a conclusion which was not before in our minds.

*Hypothetical and Disjunctive Syllogisms.—*The term syllogism has been extended to cover certain forms of ratiocination which are not based on categorical propositions. The propriety of this extended use is open to question and is denied by some logicians.

*a. Hypothetical “ Syllogisms ”* are those in which one premise is a hypothetical proposition, the other a categorical. Two forms are possible (i.) *modus ponens* (which establishes the consequent set down in the major premise) : if A is B, it is C (or C is I)) ; A is B; therefore A is C (or C is D), and (ii.) *modus tollens* (which dis­proves the antecedent): if A is B, it is C (or C is D); A is not C (or C is not D) ; therefore it is not B (or A is not B). In (i.) a valid conclusion follows from the affirmation of the antecedent: in (ii.) from denying the consequent, but in neither case conversely. The distinction is of greater importance than would appear when one realizes how obvious the facts really are, and in practice it happens frequently that speakers claim with success to disprove a proposition by disproving the fact alleged in support of it, *or* to establish a hypothesis by showing that facts agree with its consequences.

*b. Disjunctive “ Syllogisms ”* are those in which one premise is a disjunctive proposition, the other a categorical proposition which states or denies one of the two alternatives set forth. Again two forms occur: (i.) *modus ponendo tollens* which by the affirmation of one alternative denies the other (A is either B or C; A is B; therefore it is not C : *or* either A is B, or C is D ; A is B ; therefore C is not D : *or* either A or D is C ; A is C ; therefore B is not C) ; (ii.) *modus tollendo ponens* which by the denial of the one, establishes the validity of the other alternative (A is either B or C ; A is not B ; therefore it is C : *or* either A or B is C ; A is not C ; therefore B is C : *or* either A is B, or C is D ; A is not B ; therefore C is D). The validity of such arguments depends upon the sense in which we understand the disjunctive proposition: we must assume that the alternatives are mutually exclusive.@@1

*Sorites.*—Finally it is necessary to mention a complex syllogistic argument known as the *Sorites* (Gr. σωρος, heap). It has been de­fined as a syllogism in Fig. 1 (see above) having many middle terms; it is really a series of syllogisms (a polysyllogism), each one proving a premise of another, the intermediate conclusions being suppressed. Its form is A is B, B is C, C is D . . . . Y is Z, there­fore A is Z. Each syllogism of the series is called a “ prosyllogism "@@2 in relation to the one that succeeds, and an “ episyllogism ” in

relation to its predecessors. Resolution of the sorites into its con­stituent elements gives the rules (*a*) that no premise except the first may be particular and *(β)* that no premise except the last may be negative.

B. the *Inductive Syllogism,* like the deductive, is first systematized by Aristotle, who described it as *ó eξ iπaγωγτjs συλλογισμοί.* Unlike the deductive it consists in establishing a conclusion from particular premises, *i.e.* of referring the major term to the middle by means of the minor. the form is “ A B C D, &c., are P; A B CD are all M; thus all M are P.” This so-called syllogism has been much criticized by modern logicians on various grounds (see Logic).

Discussions of the syllogism will be found in all textbooks on Logic, and the more elaborate syllogistic forms are discussed in the article Logic.

**SYLPH,** an imaginary spirit of the air; according to Paracel­sus, the first modern writer who uses the word, an air-elemental, coming between material and immaterial beings. In current usage, the term is applied to a feminine spirit or fairy, and is often used in a figurative sense of a graceful, slender girl or young woman. The form of the word points to a Greek origin, and Aristotle’s *σlλφr∣,* a kind of beetle *(Hist, anim.* 8. 17. 8), has usually been taken as the source. Similarly, the earth- elementals or earth-spirits were in Paracelsus’s nomenclature, “ gnomes ” (Gr. *yv6ιμη,* intelligence, γtγ>'ωσκeu', to know) as being the spirits that gave the secrets of the earth to mortals. Littré, however, takes the word to be Old Celtic, and meaning “ genius,” and states that it occurs in such forms as *sulfi, sylfi,* &c., in inscriptions, or latinized as *sulevae* or *suleviae.*

**SYLT** (probably from the O. Fris. *Silendi, i.e.* sealand), the largest German island in the North Sea, being about 38 sq. m. in area and nearly 23 m. long. It is, however, very narrow, being generally about half a mile in width, except in the middle, where it sends out a peninsula to the east 7 m. across. It belongs to the Prussian province of Schleswig-Holstein, and lies from 7 to 12 m, from the Schleswig coast. The central peninsula contains some marshland and moorland pasture, on which a few thousand sheep graze; but the rest of the island consists merely of dunes or sandhills. These attain at places a height of from ι∞ to 150 ft., and are continually shifting to the westward. The inhabitants (3500) are of Frisian origin, and the official language is German, though in the extreme north of the island, known as List, Danish is spoken. Their occupations are fishing, oyster-dredging, seafaring and wild-duck catching. The chief places are Keitum, Tinnum, Morsum, Rantum and Westerland. Westerland, one of the most frequented sea-bathing places of Germany, lies on the west side of the island, separated from the sea, which is seldom perfectly calm, by a chain of sand dunes, across which board walks lead to the beach. The island is reached by a regular steamboat service from Hoyer on the main­land to Munkmarsch, which is connected by a steam tram with Westerland. Another line of steamers runs from Hamburg to Sylt via Heligoland. During the Danish War of 1864, after suffering severely at the hands of the Danes, the island was occupied by the Prussians on the 13th of July (see Frisian Islands).

See P. Knυth, *Botanische Wanderungen auf der Insel Sylt* (Tendern, 1850); C. P. Hansen, *Das Nordseebad Westerland auf Sylt* (Garding, 1891); Meyn, *Geologische Beschreibung der Insel Sylt* (Berlin, 1876); and Kepp, *Wegweiser auf Sylt* (Tondern, 1885).

**SYLVANITE,** a mineral consisting of gold and silver telluride, AuAgTe4 containing gold 24∙2 and silver 13∙3 %; an im­portant ore of gold. Crystals are monoclinic and often very- rich in faces; they are frequently twinned, giving rise to branch­ing forms resembling written characters; on this account the mineral was early known as “ graphic gold ” or “ graphic tellurium ” (Ger. *Schriften).* It was also known as “ white gold,” the colour being tin-white with a brilliant metallic lustre. The hardness is 2 and the specific gravity 8∙2. It occurs with native gold in veins traversing porphyry at Offenbánya and Nagyág, near Déva in Transylvania (from which country it takes its name); also at several places in Boulder county, Colorado, and at Kalgoorlie in Western Australia. Sylvanite may be

@@@1 For a dilemma which includes both hypothetical and dis­junctive reasoning see Dilemma.

@@@l Where one premise of a prosyllogism is omitted (see Enthymeme), this argument is sometimes called an “ epicheirema.”