teologia dommatica. The system of theological doctrine developed dogmatically; that is, by a method whose ultimate appeal is not to reason, but to authority, either that of Scripture or of Scripture and tradition combined.

The basis of dogmatics in the Roman Catholic Church is a union of Scripture and tradition, while in the reformed churches, as a rule, the authority of tradition is rejected, and the dogma rests on the sole authority of Scriptures.

Literature: see THEOLOGY. (A.T.O.)

Theophany [Gr. Θεός, God, + φαίνεσθαι, to appear]: Ger. *Theophanie*; Fr. *théophanie*; Ital. *teofania.* (1) General: the revelation of himself which the Deity makes through his works.

(2) Special: God's revelation of himself in Christophanic form: in the Old Testament, in the Shechinah; in the New, in the incarnation, birth, baptism, and second coming of Christ. See CHRISTOPHANY.

In the general sense, the whole world may be regarded as a theophany or manifestation of the divine. In the special sense, God always appears in the person of the Son. (A.T.O.)

Theophrastus of Eresus. (cir. 370–288 B.C.) A Greek philosopher, pupil of Aristotle, for thirty-five years head of the Peripatetic School after the latter's death. See PERIPATETICS.

Theorem [Gr. θεώρημα]: Ger. *Theorem, Lehrsatz*; Fr. *théorème*; Ital. *teorema.* A demonstrable theoretical proposition. (C.S.P.)

Theory (in science) [Gr. θεωρία, a contemplation, speculation]: Ger. *Theorie*; Fr. *théorie*; Ital. *teoria.* A general principle or formula propounded for the purpose of explaining phenomena, as the 'theory of gravitation,' or the Newtonian theory.

In modern nomenclature it is confined to principles the truth of which has at least a large measurement of plausibility, in contradistinction to a hypothesis, which is propounded as a tentative explanation, the truth of which is to be verified or disproved by subsequent research. (S.N.)

The whole aim of science is to find out facts, and to work out a satisfactory theory of them. Still, a theory does not necessarily lose its utility by not being altogether true. It must be intelligible and diagrammatical, or it has no title to the name *theory.* The facts to which it refers are not necessarily facts of experience; they may be relations of pure mathematical forms. A theory is properly a result of systematic scientific consideration, not of mere casual suggestions; and thus the word bears a somewhat eulogistic implication in contrast to 'view.' Theory is opposed to fact; the latter meaning, in this connection, that which is forced upon us by perception; while theory is the part of science which is contributed by the intellect and confirmed by experiment. Theory is also opposed to practice; because a theory is a scientific product, and a pure, or theoretical, theory has regard to science alone, and is often in conflict with the practical theory, which ought preferably to be the guide of immediate action. But the latter is as truly a theory as the former, and ought equally (when practicable) to be a product of scientific examination. That which science recommends for its own use in a secular investigation may be different from what it prescribes as a basis for instant action.

Every theory has its beginning in hypothesis. For, except perhaps in pure mathematics, the presumptive adoption of a hypothesis is the only possible way of framing a judgment concerning things beyond perception; unless we consider instinctive judgments as an exception. Neither is the situation essentially otherwise in pure mathematics. A mathematical theory supposes a broad conception of the forms to which it relates. This is known to be true of them only by a process of demonstration, which in many cases has to wait for several years for its accomplishment, and in all cases must be subsequent to the first beginnings of the theory. It may be that a quasi-induction has created a belief in a mathematical theorem before it has been demonstrated. But a valid and genuine induction is not possible in pure mathematics, for the reason that genuine induction essentially relates to the ratio of frequency of a specific phenomenon to a generic phenomenon *in the ordinary course of experience.* Now in pure mathematics, which deals with figments of our own creation, there is nothing at all to correspond accurately to a course of experience. Suppose we find, for example, that in a complicated development there is a certain regular relation among the first terms. If there is no obscure demonstrative insight which assures us that this *must* be, it is quite possible that, as the series goes on, a state of things may intervene which interferes with that relation, and if so, the proportion of terms that will accord with that formula will presumably be very far from 1 : 1. There is, therefore, no security of the nature which belongs to induction, that as the instances

are multiplied the observed ratio will indefinitely approximate to the true ratio. This sort of induction, therefore, has no other validity than such as belongs to a hypothesis which suits the facts as far as we yet know them. If it is to be called an induction, it is a degenerate induction differing very little from hypothesis. It may properly be said, then, that even a pure mathematical theory is developed out of hypotheses.

No theory in the positive sciences can be supposed to satisfy every feature of the facts. Although we know that the law of gravitation is one of the most perfect of theories, yet still, if bodies were to attract one another inversely as a power of the distance whose exponent were not 2, but 2·000001, the only observable effect would be a very slow rotation of the line of apsides of each planet. Now the lines of apsides all do rotate in consequence of perturbations, which virtually do alter slightly the sun's attraction, and thus such an effect would probably only produce slight discrepancies in the values obtained for the masses of the planets. In very many cases, especially in practical problems, we deliberately go upon theories which we know are not exactly true, but which have the advantage of a simplicity which enables us to deduce their consequences. This is true of almost every theory used by engineers of all kinds. The most extraordinary departure from the known facts occurs when hydrodynamics is applied, where the theory is in striking opposition to facts which obtrude themselves upon every spectator of moving water. Nevertheless, even in this case, the theory is not useless.

In all the explanatory sciences theories far more simple than the real facts are of the utmost service in enabling us to analyse the phenomena, and it may truly be said that physics could not possibly deal even with its relatively simple facts without such analytic procedure. Thus, the kinetical theory of gases, when first propounded, was obliged to assume that all the molecules were elastic spheres, which nobody could believe to be true. If this is necessary even in physics, it is far more indispensable in every other science, and most of all in the moral sciences, such as political economy. Here the sane method is to begin by considering persons placed in situations of extreme simplicity, in the utmost contrast to those of all human society, and animated by motives and by reasoning powers equally unlike those of real men. Nevertheless, in this way alone can a base be obtained from which to proceed to the consideration of the effects of different complications. Owing to the necessity of making theories far more simple than the real facts, we are obliged to be cautious in accepting any extreme consequences of them, and to be also upon our guard against apparent refutations of them based upon such extreme consequences.

Whewell makes a great point of the relativity of the distinction between theory and fact. This is an important point that ought not to be overlooked. Every fact involves an element supplied by the mind, which if not, properly speaking, theory, is analogous to theory. On the other hand, serious errors of logic will result from not taking account of the difference between the intellectual elements already involved in the perceptual facts and scientific theories. A theory is a result subject to criticism, meaning by criticism, not the consideration of whether or how far an object is beautiful, useful, or the like, but the passing of a judgment as to whether the object *ought* to be as it is or as it is proposed to make it. If this judgment is adverse, the theory can and will be altered; and it will not be maintained by anybody until it is put into a shape to withstand his criticism. But it is perfectly idle, in this sense of the word, for anybody to criticize what he cannot help; and, like other idle and unamiable practices, it is also highly pernicious. Now all the subconscious work of the intellect in framing a percept and a perceptual judgment is beyond our control, and therefore not subject to logical criticism. It simply has to be accepted. Kant, perhaps, did not sufficiently appreciate this when he undertook to study the critic of such mental forms as space, time, unity, reality, &c.; but, after all, his deduction of the categories is merely in outcome that knowledge cannot be had on other terms; that is, that they are inevitable. Perceptual judgments, therefore, are, for the purposes of logical criticism, absolute facts without any admixture of theory. If a theory does not square with perceptual facts it must be changed. But the impressions of sense from which it is supposed that the percepts have been constructed are matters of theory. If the percepts were proved not to square with the impressions of sense, it would not at all be the percepts that would have to be reformed, for they cannot be reformed; it would be, on the contrary, that theory, that the percepts are constructed out of impressions of sense, that would have to be modified. (C.S.P., C.L.F.)