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THE INTERNAL SENSES-FUNCTIONS OR POWERS?

PART I

FASHIONS in thinking in philosophy and psychology are, like fashions in women's hats, unpredictable yet oddly compelling. Fashions in thinking last a little longer but the reasons for their rise are often no more understandable than the reasons for their dying out. As examples we might take the spate of Realisms: Neo-Realism, Critical Realism, Physical Realism, etc., that appeared in the learned reviews of the Twenties and are nowadays seldom mentioned; or the New Look flurry in the psychology of perception in the Fifties which has given way to a kind of amphibious existentialism.

The result of these currents in the stream of thought has been the formation of sloughs or bayous which remain quietly unvisited and unexplored. These " backwaters," though often small, are nonetheless interesting as well as navigable and will repay investigation, if only by confirming the notion that profit is where you find it.

When one looks over the literature on philosophical psychology that has been published in the last twenty years, one finds that there is a notable absence of discussion concerning the nature and function of the powers we call the interior senses. Except in the usual run of textbooks, we find but little even in the journals. And in the textbooks exactly the same things are being said that were said by John of St. Thomas and before him. In positive psychology, these sensory functions are dealt with, though under different names, e.g., sense consciousness, memory, imagination. There is a wealth of literature, for instance, on projective techniques which do tap the products of interior sense functioning. But most psychologists consider projective tests as " perceptual." The meaning attached to the term " perception " is so wide and the term so global that the information about interior senses contained in these researches is like metal in any ore; it requires more labor in extracting than was used in gathering the ore.

No professedly systematic treatise of the whole subject has appeared since Gaffney's "The Psychology of the Internal Senses." [1] There have been several monographs on particular aspects: Ryan, "The Role of the Sensus Communis "; [2] Klubertanz, "The Discursive Power ".[3] Gaffney's little book shows no development of thought or doctrine beyond St. Thomas. He intended it as compilation of empirical findings justifying the contention that the interior senses, distinct from the external senses and the intellect, are separate powers. Gaffney's data, though verifiable in common observation and experience, are not scientifically precise. New findings have to be considered and many of his conclusions must be revised. In spite of its fine literary style, the book remains a first approximation to the precise account contemporary research could make possible.

[1] M. J. Gaffney, *The Psychology of the Interior Senses.* Herder, St. Louis, 1942.

• E. J. Ryan, *The Role of the "Sensus Communis" in the Psychology of St. Thomas Aquinas.* Messenger Press, Carthage, 0., 1951.

[3] G. P. Klubertanz, *The Discursive Power*. The Modern Schoolman, St. Louis, 1952.

Klubertanz' monograph is a historical study of ancient texts dealing with the Vis Cogitativa, and goes no further than establishing the historical antecedents and, in their light, a proper interpretation of St. Thomas' texts concerning this power. It does not profess to increase our detailed knowledge about the interior senses. That St. Thomas was amazingly astute in his synthesis of ancient opinions about the interior senses is illuminating; that what he has to say can be made a remarkably heuristic point of departure for synthesizing contemporary findings about these functions is perhaps quite true; but few are writers that have undertaken to show how that can be done.

Ryan's monograph on the Sensus Communis deals with a special problem: the precise doctrine of St. Thomas on the nature and function of the sensus communis with special reference to what is the *object* (obiectum formale) of this sense. This, too, is a historico-textual study. Both Ryan's and Klubertanz's studies are important but propaedeutic.

Several articles in various philosophical reviews have dealt with the interior senses in the 1940's. In one of them, Fearon [4] discusses the point that the Imaginatio or Phantasia is active together with the sensus communis and completes the experience of sensation when the external senses are functioning. He cites a number of " accepted " authors to show how opinions differ rather widely, and proposes some arguments to establish his point. His principal argument is based on a surprising misunderstanding of the nature of the *species impressa.*

Brennan [5] argues the case much more convincingly and correctly. He shows, in fact, that the notion of the imagination operating during external sensation has been a staple of Thomistic tradition in psychology. For one thing, it is required for a fully systematic account of intellectual concept formation. However, there are a few details wherein we differ; these will be indicated in the second part of this paper.

[4] A. D. Fearon, The Imagination. *The New SchalasticiS'In, XIV (1940), 181-195.*

[5] R. E. Brennan, The Thomistic Concept of the Imagination. *The New Scholasticism, XV (1941), 149-1f11.*

Peghaire's [6] study disentangles two fundamental obscurities about the whole subject: first, some scholastic confusion of the *vi8 ae8timativa* with "instinct," and second, the unsolved problem whether the interior senses are distinct powers or simply functions of the same sensory power. The discussion of the *vi8 cogitativa* as a human power is masterly. To summarize it or even indicate its main points here would be beyond the scope of this paper. What we intend to do is to test the solution by considering whether we can find distinct sensoria for the interior senses.

Peghaire does not look on an attempt of this sort as very promising. He says:

". . . although according to St. Thomas' own teaching the faculty does not exist for the organ but the organ for the faculty, still, one of the signs by which we know that the faculties are different is precisely the fact that the organs are different. But the argument for diverse organs taken from the discarded physiology of the Middle Ages not even the most enthusiastic Thomist at this time will press very far." [7]

And in a note:

" **If** mistakes were made it was the scientist and not the philosopher who was to blame. Six hundred years from now, what will our great-grand-nephews think of the scientific data of today over which thinkers take such great pride? " [8]

Pace tali8 viri, we think recent neurological research has arrived at enough knowledge of brain function to enable us to join sensory activities to their proper sensoria in the brain. Even in his day, St. Thomas was wise enough to take one notion from the Arab physicians, namely, that the vis aestimativa is in the central chamber of the brain, and leave the rest well enough alone. We doubt that in 2550 A.D. neurology will have advanced so far that Twentieth Century concepts will be thought as primitive as Algazel's now are.

• J. Peghaire, The Forgotten Sense. *The Modetrn School17U!n,XX (1943), 1fJ3-140; fJ10-fJfJ9.*

[7] *Ibid,* p. 134.

[8] *Ibid.,* p. 135.

Recently, a two volume work," Emotion and Personality" [v] has appeared that reviews an immense amount of very recent neurological investigations of brain function and connects it up with psychological functions. The information provided in this work seemed amenable to further development in connection with what we know of the nature of the internal senses and enable us to work out a *consistent* and *empirically based* scientific theory of sensoria for the internal senses. This is not pure speculation, mind you, but it is something not yet found in books, whether in psychology, neurology or philosophy. We would like to propose it to philosophers and psychologists to " try on for size."

Gaffney, in his treatment of the vis aestimativa, identifies it completely with instinct and does not mention any functions that distinguish the vis cogitativa in man from the vis aestimativa in brutes. If, as happens in his book, such a sense is *called* a faculty but *described* as a function, this distinction could not be expected. The general argument used by Gaffney to establish the existence of a faculty named instinct (vis aestimativa) in brute animals is a detailed analysis of relatively complex and readily identifiable behavior sequences aimed at individual and species survival. These action chains and individual links in the chain are usually referred to as " instinctive activites." For example. the whole series of actions by which a mud-dauber gathers and prepares clay, builds out of it the hollow cylinder in which it lays its egg, stocks it with anaesthetized spiders to serve as food for the larvae when it hatches, can be called an instinctive action- and so, too, can the individual actions of chewing the clay or stinging the spider.

But the analogy that serves as the basis for the inference that there must be a faculty directing the organization of these actions to serve a definite purpose for species survival, is taken from the type of human activity that is intelligently

• M. B. Arnold, *Emotion and Personality. i'l* vols. Columbia University Press, 1960.

directed to a definite goal that is called *rational.* And the argument-implicit but really assumed-seems to run thus: just as there is a faculty called reason that accounts for the goal-directedness of rational actions, so there must be a faculty called *instinct* that accounts for the goal-directedness of actions that have species or individual survival value. Reason (or intelligence) cannot account for the directedness of brute actions because brutes do not have reason. Consequently, they must have a similar faculty on a lower level. Since goal-directed action involves perception of means-ends relations in concrete and individual sense objects, this faculty must be a sense.[10]

Exposing the bare bones of this hidden assumption shows a lack of rigor in Gaffney's argument. As a matter of fact, this assumption is not confined to Gaffney's article. As a review of the traditional treatment of instinct in scholastic textbooks will show, it is implicit in many theories proposed to explain instinctive actions.[11] There is another source of confusion in the ambiguity of the term " function " as it can be used in diverse contexts. When we say that seeing is a sense function, we expect that there is a sense power that performs it; since reasoning is an intellectual function, that there is an intellectual power that exercises it; since walking is a motor function, that there is a motor power (contractile muscles) that performs it. And where we find functions (instinctive ac-

[10] Gaffney, *op. cit.*, pp. *155-253.*

[11] See D. J. Mercier, *Psychologie*, 11th ed., Louvain, 1923, vol. I, p. 281; M. Maher, *Psychology*, 9th ed., New York, 1933, p. 93; P. Smith, *Psychologia Speculativa*, Rome, 1939, p. 167. *Sed contra*, T. J. Gannon, Psychology, New York, 1954, p. 222; R. E. Brennan, *Thomistic Psychology*, New York, 1949, p. 143.

Perhaps the authors are beguiled into this confusion by the way St. Thomas explains the fact that a sense senses an unsensed intentio by ascribing it to " an instinct of nature." In none of the passages can St. Thomas be interpreted as saying that this sense is "an instinct." St. Thomas means only that the reason why animals can judge usefulness and the like is that nature constructed them like that. As anyone can see in reading St. Thomas, for him the psychological apparatus for " instinctive behavior" comprises external and internal senses, appetite and movements.

tions like comb-building) we expect that there is a power that accounts for it.

But we must remember that we also use the term " function " to denote actions that cannot be attributed to a single power. Modern psychologists speak of learning as a psychological function but in the process of learning, sense and intellect, appetite and will are all occupied to achieve "learning." So, too, we speak of nutrition as a " function " but in this whole complex, teeth and throat and stomach, intestines and blood stream are involved and operative. So in the complex called " instinct " we discover perception, appetite, emotion, body movements, coordinated actions, not to speak of complex internal physiological states. Instinct cannot be the functioning of a single faculty. [12]

It would seem more proper, then ,to consider" instinct" an abstraction used to designate the fact that a certain series of actions does in effect achieve individual or species survival, without requiring any awareness in the animal of the general goal of these activities or their character as means to that end. Nonetheless, the very efficacy of these constellations in achieving this goal, in the ordinary run of things, does argue to the existence of a sense function that enables the organism to discriminate the useful from the useless in the perceived environment. This kind of discrimination is necessary for the organism, otherwise survival would be a matter of sheer chance and coincidence. No constant or enduring pattern of behavior would ever emerge in any individual or species, unless one prefers to say that such constant patterns are perceived because only those animals of a species survive which have that pattern of action, rather than saying that the animal survives because its actions are patterned that way. But quite apart from this consideration, we know that animals do have sensory perceptions. And among these perceptions there are discriminations that trigger appetite. The whole business of training animals for experimentation in conditioning is based on

[12] See Peghaire, *op. cit.*, p.

this fact. Even training for sense discrimination experiments is based on it.

Now the perception that triggers appetite cannot have for its content simply the qualities that are the proper objects of the external senses (color, sound, even smell or taste), for these simply bring into awareness the materials to be discriminated. The food pellet is sought, not because it has a certain kind of size, color or smell, but because the object having these qualities is perceived as desirable (need satisfying or in a very general sense, useful). Unless this was true, how could we use *deprivation* as a dimension for *drive?* The quality of the object that constitutes its usefulness or desirability is not perceptible to the external senses. Nor, for that matter, is it perceptible in any constellation of sense qualities, whether directly perceived or imagined. There must be a sensory power that can perceive the useful or pleasurable or harmful or useless. This power must be distinct from the external senses. And it must furnish *practical* knowledge and not merely what could, on the sense level, be termed noetic or speculative.u

It seems clear enough that the estimative sense is a power distinct from the exterior senses. We have hinted above that it is also distinct from imagination and memory and the kind of " sense consciousness " that simply reports an object according to its sense qualities. Yet something more than these summary statements seems required to establish the character of the estimative sense as either a power or a function or both. This, of course, could lead to simply continuing the " classic " controversy about the distinction between the interior senses. There is no need to review that, however. Peghaire [14] does it in his article and leaves the question open except for showing that there must be at least two interior senses: one, the object of which is the act and content of the exterior senses as they report the *rationes sensatae* of sense objects, with the twofold function of registering and retaining them. The other, the ob-

[13] *Ibid.,* p. U6.

[14] *Ibid.,* p. IS5.

ject of which is the *rationes insensatae,* both in the objects of sense and the acts of the senses.

The contention seems clear enough. Sensus communis and imagination, if we use a strict denotation of these terms, both deal with sense objects as they are reported by the exterior senses. Both internal senses report or represent these objects simply as objects: the sensus communis when the objects are present and actually perceived; the imagination in recall, even though the images may be dissociated from the objects that originally gave rise to them and now conflated to represent other things not experienced in this way. The functions of receiving and storing these species can very well be two functions of the same power. The argument St. Thomas uses to prove that these are two powers is not conclusive.[15] The appraisal of things (even acts of sensation) as useful or desirable is not the function of a sense the object of which is restricted to the *sensibilia propria* (and, we might add, *sensibilia per se).* It is true, of course, that we can imagine a useful object, but its usefulness is not a "function" (to give the term a mathematical supposition) of the sense qualities. These *rationes insensatae:* usefulness, pleasurability, harmfulness, desirability, suitability in a wide meaning, are not qualities perceived by the external senses. Hence, they cannot be found in the acts of the sensus communis or the imagination.

All these qualities *(intentiones insensatae)* are concrete relations of the object to the perceiving subject. These relations are perceived by animals. In fact, the perception of these relations is a necessary condition for acts of the appetite and emotion. There must be a power that can perceive them, and this power must be a sense. For its object, it has all those qualities of sense-perceived objects that can properly be called *relations to the subject. Pastness* is one of these relations. To know somethings as past (or previously experienced) is a function of this power also. It would be enlightening to examine this aspect further.[16] It would throw light on the "wonders of

[15] *Ibid.,* p. 184-185.

[16] *Ibid.,* p. 184.

animal intelligence " that sometimes are adduced as evidence that animals high on the evolutionary scale have reasoning powers and " insight " only different in degree from human intelligence. St. Thomas evidently had this aspect in mind when he associated the *vis memorativa* with the estimative power rather than with the imagination.

But we must leave that for another time. What we propose to do in this article is to study the neural circuits involved in the activites of the vis estimativa and vis memortiva to discover whether we are dealing with two separate powers or with two functions of one and the same power. The estimative power is a sense. As a sense it must have an organ. Its organ is supposed to be the brain. But recent neurological research has shown that the brain, functioning as the organ of psychological activity, is far from manifesting "mass action," the classical conception derived from the crude experiments of Lashley; rather, it functions in complicated neural circuits. Some of these circuits have been identified. These circuits or systems can be called organs just as much as the visual or the auditory system. But before we discuss neurology, let us summarize the psychology of the sensory functions.

The usual philosophical analysis found in treatises on sensation in rational psychology is quite explicit about the role of the stimulus object, the need for a *species impressa*, the faculty plus species as adequate causes of formal sensation. But the discussion usually is restricted to the exterior senses. About the only discussion of the interior senses as such is the controversy about *species expressa* as distinct from the *action* of sensing. It might be useful to spell out more explicitly the function of the *species impressa* in the operation of the interior senses.

To begin with the sensus communis, let us take for granted that this is the *ji1·st* interior sense operating both in time and by nature when exterior sensation begins. Let us assume also that the "matter" worked on by the sensus communis is

both the act and the content of exterior sensation.[17] Let us be neutral, too, about the term *act,* taking it to mean both (or either) the operation and what is *produced in the operation,* should there be a product distinct from the operation. A definite stand on that question is not necessary for our discussion.

The act (or acts) of the exterior senses produces a *species impressa* in the sensus communis, the way the stimulus produces it in the external senses.[18] This species is at least a *virtual intentional image* of the act *and the object* of the act. When the species come from more than one sense but refer to the same object, the sensus communis knows the many simultaneous acts as sensing the same object.

The act of the sensus communis produces a species impressa in the imagination (phantasia). To say this we must assume that the imagination and the sensus communis are separate faculties. We assume this on the grounds that (1) senses do not reflect upon themselves; and sense awareness of imagining entails no sense awareness of sensus communis functions. (2) When we imagine seeing, for instance, we do not imagine a *function* but a content, even in organic sensations (when imagining we are angry we imagine the organic sensations that accompany anger). Disposed by the species, the imagination forms its own intentional image of the object according to the species produced by the sensus communis. During an actual external sense experience this image lacks the vividness necessary for explicit awareness but is present.[19]

The species produced in the imagination remain as *virtual intentional images* and can be reactivated without the presence of the object (v.g., the visual object or visual sensation) or can be variously joined together. This is the type of operation we usually refer to as imagining, whether it is simple recall or "creation"; but simple recall does not seem to hap-

[17] Ryan, *op. cit.,* p. ISO ff.

[18] Physically and physiologically it is by means of action currents in the neurones of the sense organ. This is one of the special meanings of the term " mediate " when we say, for instance, that the optic tract mediates the sensation of vision.

[19] See Fearon, *ap. cit.;* Brennan, *op cit.* (1941).

pen in dreams, for the dream scenes are usually fantasy images.

In its operation, imagination seems to return upon the sensus communis, for we are aware of imagining-though there are times when imagining is mistaken for external sensation. What are the causes or reasons for this hallucination need not be discussed just here. But besides this " return " upon the sensus communis, the imagination produces a species impressa on the *vis aestimativa* (we are dealing with the vis aestimativa and not the vis cogitativa because we are considering aspects in which the two are alike and leave aside those aspects proper to the vis cogitativa or ratio particularis). The sensus communis also produces a species impressa in the vis aestimativa which represents the object in such a way that the vis aestimativa can make an intentional image of it as good or bad, useful or harmful and the like. The problem here is: whence comes this virtuality?

This problem cannot be solved by an analysis of the nature of the function. Previous authors simply profess it is beyond them [20] or infer that these species are innate. [21] We will discuss this aspect in the second part, for we believe much light can be thrown on it by the neurological structure of the vis aestimativa and the peripheral neurones associated with it. There seems to be some evidence that at least some species for the vis aestimativa can come from the operation of the external senses. Organic pain and pleasure are closely allied to sense operations and have been considered *sensibilia per se* almost in the same way as the proper sensibles. Now pain varies directly with the intensity of stimulation of the organ or tissue, whether that tissue has sensory neurones properly so-called or not. And pain is judged as bad, by a connatural tendency in sensitive nature. An object or stimulus that causes pain is perceived as bad, not because badness is sensibile per se, but because it is perceived, as painful. We can call the sensory element of pain, *sensibile per se* and the " ratio insensa-

[20] Peghaire, *op. cit.*, p. 188.

[21] *Summa Theol.* I, q. 78, a. 4; In Lib. III De Anima, Lect. 5.

ta " bad, nocivum, *sensibile per aliud.* This usage can explain those of the vis aestimativa that are learned and also those innate judgments that are modified by experience.

The judgment of the vis aestimativa must somehow be retained to provide a foundation for learning. As most authors mentioning the matter say, sense knowledge is ultimately practical. The vis aestimativa provides these sensory practical judgments; and the retention of knowledge in memory is connected with vis aestimativa functions. When things are remembered, they are known always with their "insensate" characteristics and so are known as past as well as useful, harmful, etc. If we say that the memorial power is related to the vis aestimativa as the sensus communis is related to the imagination, we could say that the vis *judges* usefulness etc. and the memorial *images* it. The vis determines the memory to act and so to revive the judgment as an image. What seems to be the sequence here is that the imagination in recall determines the vis, the vis knows the imaged object as past and determines the memorial power to revive the earlier judgment of useful, harmful and the like.

In this connection it might be well to say a word about the difference between *'l'epetition* and *habit.* The sensus communis can and does become habituated to make sense constructs more quickly, easily and well as it exercises itself on present sense acts and objects. This " habit " implies that some *disposition* of the faculty remains .after each act that by repetition becomes a habit. This disposition of the sensus communis is different from the species it produces in the imagination, determining it to act. The disposition produced in the imagination enables it to act; and in acting, a disposition is produced to construct its images more quickly and more easily on repetition. So also, the vis aestimativa can acquire a habit of *recognizing* the *intentiones insensatae* more quickly and easily; and in the memory, of *reviving* the judgment of good, bad, etc. Repetition merely makes it possible for the disposi-

[22] Brennan, The Thomistic Concept of Imagination. p. 158.

tion to develop into a habit. This disposition seems to be mediated by the facilitation of neural activity produced by repetition. The disposition enabling the imagination and the memory to repeat spontaneously former acts is something different from this and is strictly a property of these powers. The imagination and the memory have the *power* to repeat their acts; the sensus communis and vis aestimativa do not. But repeated acting improves the functioning of all four.

J. A. GASSON, S. J.

Jesuit House of Studies
Mobile, Alabama

THE INTERNAL SENSES-FUNCTIONS OR POWERS?

PART II

We will now try to show that the internal senses have definite brain structures as sensoria and that a correlation of what our psychological analysis has shown about these senses with the knowledge derived from the results of neurological research can help us better to understand the functioning of the inner senses and also the functioning of the brain. The brain functions outlined here were arrived at by an extensive study of the available very recent research evidence. While we are presenting a *theory* of brain function, it is the only one available that integrates the reported facts in a consistent way. Indeed, it is the only theory available today. We will show that it fits in well with the traditional teaching of philosophy on the internal senses, which may be an additional reason for saying that it fits all known facts.

According to St. Thomas, the sensus communis is a sensory power that has as its formal object the activity and content of the external senses. Now let us see what the sequence is that starts from the external senses and ends with the act of seeing objects. First, the sensory receptors are acted on by specific energies possessed by sense objects. This action has psychological as well as physical and physiological effects. For instance, light produces an optical image of the viewed object on the retina. The retinal cells react with action currents that travel along the optic nerve to the optic tract and the lateral geniculate bodies, the thalamic relay station for visual impulses. From there, relays go to the afferent plexus, one of six cortical layers in the visual area. Normally, the physiological activity up to this point disposes the visual sense *to see.* This disposition, the psychological effect of visual stimulation, is the visual *species impressa.* The act to which it disposes the visual sense is the actual visual sensation. If the physiological

process stopped at this point, there would be an experience of light and color, but not of seeing things as we ordinarily know them. If we are to see objects, the afferent nerve impulses must connect with the cortical cells in the remaining five layers [1] of the sensory area. All these cells form an intricate network in which every cell is connected with several other cells. When these connections function the sensus communis apparently begins to operate; the effect of its act is the *experience of seeing a visual object.*

Accordingly, the sensorium of the sensus communis seems to be the feltwork of cortical connections between the afferent and the efferent layers, both in the sensory and the adjoining association cortex. Though the sensus communis is one power, it is specified by its acts; and its acts are the intentional representations of the activity and content of different sense modalities. For this reason, we should not be surprised to find that the visual cortex is necessary for perceiving visual objects, the auditory cortex for perceiving direction and pattern of sound, the cortex of the somatosensory area for perceiving an object by touch, etc. The unity of the sensus communis is preserved by the connection of every cortical sensory area with every other such area, both via short and long association fibers. The primary sensory cortex seems to mediate the perception of objects, but the adjoining association cortex seems to make possible the retention of sense impressions. There are relays from the sensory thalamic nuclei distributed both to the primary sensory areas and to the adjoining association areas. For this reason, we are inclined to postulate two *functions* of the sensus communis: one of *constructing* its intentional image (mediated by the primary areas), the other that of *retaining* it (mediated by the association areas).

St. Thomas ascribes the retention of the sensory construct produced by the sensus communis to the imagination, assum-

[1] The neocortex, which includes sensory, motor and association cortex, has six layers of cells. The cells receiving afferent fibers are usually in the fourth (internal granular) layer, while the afferent fibers arise from the fifth (pyramidal) layer.

ing that the power that receives something cannnot retain it. It seems, rather, that the power that retains the sensory changes may not be the same power that *revives* them. If the species of the sensus communis are preserved, they must be preserved as changes in the cortical cells (called " engrams " by neurologists), not in the primary sensory areas but in the corresponding association areas. The physical character of these changes we do not know, but they could very likely be analogous to the magnetic realignment of electrons on a recording tape rather than to engraved characters which the term engram seems to suggest.

Speaking more abstractly, from the background of philosophical psychology, what is preserved is a *species impressa* or a *species intentionalis,* reduced from being in act to being *virtualiter* in the faculty, at least as a disposition. This is a virtual intentional image. When the image of the object is revived, as happens in the act of imagination, it is not the act of the sensus communis that is repeated but an act of the imagination. For this repetition a formal intentional act must have been retained as a virtual image, and this virtual image raised to a state of actually determining the imagination to act. However, the species of the sensus communis that is preserved (see above) seems to be identical, at least as a representation, with the species of the imagination that is revived. The question is now: are they one species or numerically distinct?

Imagination, taken here as the image-making power, can draw on the species prepared by the sensus communis and so can either represent an image of a past situation (in recall) or recombine such past impressions in new and original ways (fantasy). When the imagination functions in *recall,* neural impulses from the association areas seem to be relayed to the nearest limbic area and from there via the hippocampus and fornix to the hypothalamus and midbrain, and back to the sensory thalamic nuclei. These nuclei, the relay stations for afferent impulses from the receptors to the sensory and asso-

ciation cortex, have three separate cell layers, one apparently connected with the primary sensory, the other two connected with the sensory association cortex. (See Fig. l) In recall, neural impulses from the hippocampus seem to switch into the

Fig. 1. CIRCUITS MEDIATING SENSE EXPERIENCE AND RECALL

Sensory impulses travel via thalamic sensory nuclei to cortical sensory and association areas, mediating sensory experience. Associated impulses are relayed to limbic areas (25, 32, 24, 31, 23, 30, and hippocampal gyrus), mediating appraisal. This appraisal of something seen, heard, felt, etc. initiates the spontaneous recall of similar things which is mediated via hippocampus, thalamic sensory nuclei and the various cortical association and limbic areas. Motor impulses travel via ventral thalamic nuclei to frontal motor and association areas (see Fig. 3) and are similarly registered and recalled.

———— Reception and registration. ------ Recall. Arrows indicate the direction of conduction. Short arrows indicate the connections for appraisal and recall.

I visual system. II auditory system. III somesthetic system (including taste). IV motor system. V olfactory system. Arabic numerals represent Brodmann areas.

A cortical auditory area. B brain stem. HIPP hippocampus. LAT GEN lateral geniculate nucleus. MG medial geniculate nucleus. OLF B olfactory bulb. S septal area. VA anterior ventral nucleus. VM ventromedial nucleus. VL ventrolateral nucleus. VL ventrolateral nucleus. VPL ventroposterolateral nucleus. VPM ventroposteromedial nucleus.

projection to the sensory association cortex and so reactivate the pattern of changes preserved in that area in exactly the same way as it was laid down. When this happens, the imagination reproduces the original images in the original temporal sequence.

When the imagination functions in *fantasy* (and dreams), the active brain circuits include relays from association areas to limbic areas as before, but from there connect with the amygdaloid nuclei, a structure in the temporal lobe close to the hippocampus but not directly connected with it. The amygdala then sends relays via the stria terminalis to the thalamic association nuclei and the cortical association areas (see Fig.

Both the " recall " and the " fantasy " circuit function con-

Fig. !'l. CmCUITS MEDIATING FANTASY AND MEMORATIVE PowER

Identification of an object by recalling similar things (relays from association cortex to limbic areas and from there via the hippocampus-fornix circuit to the brain stem and thalamic sensory nuclei back to the sensory association cortex) and remembering their effects on us (relays from association cortex to limbic areas and from there via the hippocampus-fornix circuit to the anterior thalamic nuclei, the cingulate byrus and other limbic areas) results in imagining possible effects of this thing on us and possible ways of coping with it (relays from limbic areas via amygdala to thalamic association nuclei and cortical association areas).

I-IV circuits serving fantasy: I visual, II auditory, III somesthetic, IV motor, V olfactory imagination. VI circuit serving the memorative power.

AM amygdala. AT anterior thalamic nucleus. B brain stem. CING cingulate gyrus. DM dorsomedial thalamic nucfeus. H habenula. HIPP hippocampus. M mammillary body. OLF olfactory bulb. PULV pulvinar. S septal area. STRIA TERM stria terminalis.

tinuously during waking, and are inactive in deep sleep. During light sleep, the "fantasy" circuit seems to function while the" recall" circuit seems to be blocked, probably because the hippocampus is one of the first structures affected in both sleep and anesthesia. Without automatic recall, the imagination functions only in fantasy, which accounts for dreaming. Recent research has shown that light sleep is accompanied by dreaming even when the sleeper does not remember his dreams.

We hold with St. Thomas that there are two powers, the sensus communis and the imagination, which help us to know the object. But it seems that the sensus communis has two functions, one to construct the object from sense qualities, the other to preserve it and so determine the imagination to act. The imagination, in tun1, seems to have two functions, the one recall, the other fantasy. Both sensus communis and imagination are diversified by their acts which concern each and every sense modality. In spite of this diversity of acts, the unity of the sensus communis is preserved by the feltwork of interconnections in its sensorium, the sensory and association cortex. The unity of imagination corresponds to the unity of the structure which receives neural impulses from every association area and relays and distributes them back to these areas in a more or less circuitous way: the amygdala in fantasy, the hippocampus in recall.

The other two internal senses specified by St. Thomas can be described in a similar way. The estimative sense has as its formal object goodness or badness, suitability or unsuitability, utlity or the lack of it: the *rationes insensatae.* Now we know that among the things that are appraised as good or bad, suitable or unsuitable, can be (1) a sense impression, a muscle movement, (S) an object, or (4) an action. Sense impressions are experienced via the external senses through their organs, the different sensory receptors with their neural connections to the sensory thalamic nuceli and the sensory cortical areas. In cases where we appraise single sense impressions or movements (a bright light, an intense sound, a hard pressure,

a painful movement) as bad, unsuitable, the species impressa of the estimative sense can be produced by the raw sense data as received from the external senses. On the other hand, when an object or an action is appraised as good or bad, suitable or unsuitable, the species impressa is produced by the act of the sensus communis: the sense impressions that have been combined into an object, the single movements that have been combined into actions. This functioning of the estimative sense on sense impressions as well as on objects would suggest that the sensorium of the estimative sense must include connections that reach the thalamus from the periphery as well as connections from the thalamus to the cortex.

But serious difficulty is apparent immediately: There is nothing in the sense qualities as apprehended by the external senses or even as apprehended by the sensus communis that would allow the perception of suitability. It is for this very reason that the formal object of the estimative sense is said to be *rationes insensatae.* But if they are not sensed, where do these rationes come from? This question has always been a problem. Brennan, for instance, says:

" How are we to explain the origin of these insensate forms which act as prudential criteria, so to speak, by which the animal knows whether an object, here and now impinging on the exterior senses, is something useful or harmful? Obviously, not from experience, since Aquinas explicitly says that such forms do not originate by perception. The only alternative is innatism." [2]

Supposing all the species of the rationes insensatae to be innate, philosophers found it easy to identify the estimative sense with "instinct."

Now there is no doubt that some experiences of good and bad are innate. Something sweet is appraised by the newborn babe as good to swallow, whether it is milk or saccharine solution. A moving object of a certain size is appraised by the duckling as good to follow, whether it is a duck, a man, or

• R. E. Brennan, The Thomistic Concept of Imagination. *New Scholasticism, XV (1941), p. 158.*

merely a moving block of wood. If we consider swallowing or following an instinct, we cannot explain how this instinct could be set in motion by an artificial object (saccharine solution, a moving block of wood). What seems to be innate is not the impulse to action (to swallow, to follow, etc.); it is the appraisal of sweet liquid as good to swallow, of moving objects as good to follow. This appraisal results in a tendency to act act (appetite) which brings about action. Similarly, ducks have an innate aversion to flying shapes with short necks, rather than having an instinct to escape from predatory birds; the ewe has an innate aversion to a certain shape with a particular smell and behavior, rather than having an instinct to flee from a wolf.

From these innate appraisals of good or bad can be formed appraisals of objects that are not amenable to such innate judgment. So the rat learns that the pressing of a bar brings food, and appraises the bar eventually as good to press. Animals may even learn to correct innate sense estimates. So the kitten brought up with a pet rat learns that this rat is good to be with, and even when the rat darts in front of the kitten, it will appraise the rat, but not as good to catch and kill, as before, as good to play with. Normally, anything of a similar size that moves quickly is the occasion for an appraisal that this is good to catch and, eventually, to kill.

In some, at least, of these innate appraisals we can trace the way in which they are achieved. We know that we can appraise sensations and muscular movements as well as objects and actions. In fact, we have indicated above that even the innate appraisal of some *thing* as good or bad is based on the appraisal of a sense quality or a complex of such qualities (shape plus motion, shape plus smell, etc.) One basis on which we can appraise something as good or bad is the intensity of stimulation. The more intense a sense impression, as compared with the optimum, the more unpleasant it will be until it becomes actually painful. A light touch may be pleasant but increased pressure is no longer pleasant and gradually becomes actively

unpleasant and finally painful. Now the intensity of sensations is not sensed per se: the visual sense does not apprehend the intensity of light or color, nor does the sense of touch apprehend the intensity of pressure. What is sensed (sensibile per se) is the pressure, and the pressure has an effect on the body that depends on its intensity. This effect is not *sensible per se* but *sensibile per aliud.* If there are organs that are affected by stimulation intensity, these organs could mediate the experience of good or bad, suitable or unsuitable, etc. We have shown in a recent book [3] that there is a neural system (which we have called the estimative system) that has fine nerve endings as peripheral receptors which are affected according to the intensity of sensory stimulation. This system includes relays to the medial thalamus and the cortical limbic areas and is intimately connected with all the sensory systems at peripheral, midbrain, thalamic and cortical levels.

We suggest that the sheer apprehension of a sense impression or a simple muscle movement as good or bad requires the functioning of this system of fibers, including the nerves from the receptors to the medial thalamus and the relays from there to the afferent cells of the limbic cortex [4] (anterior and posterior cingulate gyrus, retrosplenial and hippocampal gyri, septal area and island of Reil in the temporal lobe). This would be analogous to the apprehension of sense qualities which requires the functioning of the different sensory systems including sensory nerves from the receptors to sensory thalamic nuclei and relays from there to the sensory cortex.

Even the immediate appraisal of an object as good or bad, i. e., of an object that can be so appraised without the help of memory (hot food, a warm bath, a rose) may depend on apprehending the intensity of one of its sensory qualities (the quality of contact with hot food, of warmth in the bath, of

• M. B. Arnold, *Emotion and Personality.* !'I vols. Columbia University Press, 1960.

• The limbic cortex consists of three layers of cells in which the receiving (granular) layer is completely separate from and superimposed on the efferent (pyramidal) layer.

scent in the rose). What the sense impression does to the organism seems to be the cause of the species impressa in the vis aestimativa. There seems to be good reason for saying that in some instances the *rationes per se insensatae* do become *rationes per aliud sensatae,* and this *aliud, sensibile per se.* Thus the vis estimativa seems to have functions that resemble the functions of an external sense. Its perceptions (e. g., pain) are not a function of any external sense; even touch. Organic pain is really a feeling that is the result of the functioning of the vis aestimativa. This is what we call the external estimative sense. How the *rationes insensatae* can be found in the perception of the sense complexes we mentioned above (shape plus motion, etc.) has not been worked out as yet.

The internal senses that complete this external function of the vis aestimativa are the *internal estimative sense* and the *vis memorativa* of St. Thomas.[5] Just as the sensus communis uses the species impressa produced by the external senses to give us the likeness of the object, so the internal estimative sense uses the species impressa delivered by the external estimative sense to appraise the effect of this object on us. Whatever the intensity of stimulation provided by an object, this intensity is part and parcel of this object in its relation to us. We know the object as it affects us; and this knowledge is mediated by the simultaneous functioning of the internal vis aestimativa and the sensus communis.

To identify the object as something we have encountered before and to remember its effects on us in the past, the imagination and the memorative power in addition are required. We have suggested before that the sensory and association cortex is the neural system of the sensus communis. The changes in the cortical cells produced by the sensus communis seem to be preserved in the association cortex and result in a

[5] Brennan, *op. cit.,* argues that no external sense experience is complete until both sensus communis and the imagination have functioned on the same object. Accepting this position, we can say that the experience of sensory evaluation is complete when the internal vis aestimativa and the vis memorativa act upon what is reported by the external estimative function.

disposition to see visual, hear auditory, feel tactual images whenever the imagination activates these dispositions, either in recall or fantasy. When we are visualizing something, we are aware of making pictures· of past or possible events and are also aware of the content of our activity, these pictures themselves: it is the sensus communis that makes it possible for us to know that we are either recalling an actual happening or making a fantasy picture. But the sensus communis cannot help us to realize the event or action pictured as either *past* or possible, nor to be aware of something actually sensed, as *present.* For these appraisals the internal estimative sense is needed.

The neural system of the internal estimative sense seems to be the feltwork of connection in the *limbic cortex,* from afferent to efferent layer, analogous to the sensus communis which has as sensorium the feltwork of cortical connections between afferent and efferent layers in the sensory and association cortex. The connections of the limbic areas are received from the medial thalamus (with afferent relays from the receptors of the external estimative sense) and also from the association and sensory cortex. This means that the internal estimative sense derives the species impressa not only from the senus communis and the imagination, but also from the external estimative sense. The unity of the estimative sense is accounted for by the interconnections of every modality-specific limbic area with every other such area via long and short association fibers.

The fact that both circuits serving the imagination go from the sensory and association cortex to the limbic areas and only from there are relayed to the amygdala (in fantasy) or the hippocampus (in recall), to be redistributed to every association area, seems to mean that every object has to be appraised first as " good to know " before it will be attended to further and thought about. When something is seen, for instance, the act of the sensus communis disposes the imagination to act in such a way that it is not only seen in actuality but also as

a picture in the imagination. This happens as soon as the sensus communis knows the act and content from the external senses and consequently, to put it neurologically, as soon as cortical relays from the afferent cell layer have connected with the other layers in the cortex. But when the object is not present, or not present in precisely the way we want to think about it, the appraisal by the vis aestimativa has to initiate an action-tendency which is an impulse to recall or imagine this object. This is done when neural impulses from the sensory cortex reach the limbic areas. It depends upon this appraisal which of the circuits mentioned above will be activated.

St. Thomas, replying to an objection, says:

" Ad tertium dicendum quod sicut una potentia oritur ab anima, alia mediante, ut supra dictum est, ita etiam anima subiicitur alii potentiae, mediante alia. Et secundum hunc modum, phantasticum et memorativum dicuntur passiones primi sensitivi." [6]

(To the third we say: Just as one power arises from the soul through the medium of another, so the soul is subject to a potency through the medium of another. It is in this way that the imagination and memorative power are called passions of the first sensitive.)

This would imply that the imagination could depend upon the sensus communis and be so to speak, a further development of it, just as the vis memorativa is a further development of the vis aestimativa. Now it is interesting to see how exactly this view is borne out by the way in which the brain structures serving these powers are arranged. The imagination, for instance, is mediated by the "recall" circuit which starts from the sensorium of the sensus communis, the association cortex, and runs via the hippocampus and sensory thalamic nuclei back to it, while the " fantasy " circuit has the same starting point but runs via the amygdala and the thalamic association nuclei to different patterns in the same sensorium. Analogously, the neural substrate mediating the action of the vis memorativa is a circuit starting out from the limbic cor-

[6] *Summa Theol.* I, 78, a. 4, ad S; ed. Leon. V, p. *255.*

tex, the sensorium of the vis aestimativa and also coming back to it. When something seen, for instance, is appraised, neural impulses run from the posterior hippocampal gyrus (the visual limbic area), via the hippocampus and fornix to the mammillary body in the hypothalamus and from there are returned via the anterior thalamic nucleus back to the hippocampal gyrus (and are also distributed to the other limbic areas).

The act of the memorative power is the reviving of an earlier appraisal. A very few objects or situations can be appraised immediately, either on the basis of intensity (e.g., a hot iron) or on the basis of innate rationes insensatae (e.g., flying shapes with short necks, appraised as bad by the duckling). Most appraisals have to be made by remembering what this thing has done to us in the past. This effect of things on the body can be reduced to an appraisal of somatic pleasure or pain, i.e., to an appraisal of stimulation intensity. The animal and, still more, the child, can be trained to avoid something dangerous without ever having experienced its effects; but only master or parent can train them. Both animal and child have experienced punishments as well as rewards from them before training by a mere command is effective. To appraise something that is merely seen in the distance and can as yet give us neither pleasure nor pain, we must remember its past effects and imagine its possible effects. To do so, we need a visual image but also, and primarily, a revival of a past appraisal. This is a memory in the form of a mere judgment of good or bad, suitable or unsuitable, because that is the modality of the estimative sense. This revival of past appraisals is the work of the memorative sense. Since this power has the same relation to the vis aestimativa as the imagination has to the sensus communis, its species impressa is produced by the estimative sense, just as the species impressa of the imagination is produced by the sensus communis. There is only one circuit serving the memorative power because we can only revive past appraisals, we cannot make possible appraisals; two circuits

are necessary for the imagination because we can imagine both past and possible events.

Very often, an appraisal is revived without the corresponding visual, auditory or tactual image. In such cases, there may be a vague, ill-defined apprehension, tension or irritability in situations we cannot remember having experienced before. Or there may be a sense of well-being we cannot account for. In such cases we experience emotions that have their origin in a revived appraisal of good or bad though we are not aware that it is a revival. In the same way, we have no direct awareness of the functioning of the vis aestimativa but simply experience the feelings or emotions that result from it. Through the vis aestimativa we know only the functioning of sensory powers that can be appraised as good or bad, past or present, that is, of powers with neural systems that come in contact with the sensorium of the vis aestimativa. So we are aware that recalling something may be difficult, unpleasant, that thinking is hard work, that seeing, hearing, touching, is pleasant or unpleasant. All these activities are served by systems that are connected with the estimative system. But we are not aware of the act of the sensus communis as pleasant or unpleasant because the sensorium of that sense (the interconnections between afferent and efferent layers in the sensory and association cortex) is not connected with the corresponding layers in the limbic cortex. We are not aware of the sensus communis, the vis aestimativa and the vis memorativa in their acts: the sensus communis cannot know its own acts-no sense power can reflect on itself; and it cannot know the acts of the estimative and memorative powers because the neural interconnections between the afferent and efferent layers (the sensorium of the sensus communis) have no relays to the sensorium of the estimative sense.

The memorative power provides for a revival of past appraisals; and this revival can be as little judged by the vis aestimativa as could the original appraisals. We are not aware of such a revived appraisal as referring to the past because

the judgment that something is past also belongs to the estimative sense which cannot judge its own acts. When the sensory image is recalled as well, it can be judged as past, and the object it represents as good or bad. Many psychologists have noted the phenomenon of seemingly irrational emotions, of feelings that seem to be" objectless." Freud explained them as the result of repressed impulses. But this explanation does not account for such emotions when the situation that aroused them can be recalled without difficulty, though the connection between what was experienced then and is experienced now has never been realized. We can explain the emotion reexperienced today as the result of a revived appraisal of an old traumatic incident, whether or not that incident was actually recalled; this explains the emotion and explains also cases where the original incidents have never been repressed.

In conclusion, to round out our correlation of brain function with the functioning of the interior senses, we want to emphasize that these senses are active not only in sensation but also in preparing and guiding movements. The vis aestimativa, for instance, is necessary for all voluntary action and even for some reflexes. There are reflexes that are touched off by sensations which have to be appraised by remembering their earlier effects; and these reflexes employ voluntary movements (e.g., the blink reflex). There are others that are touched off by sensations though the reflex movement is involuntary (the pupillary reflex, knee jerk, etc.); and finally, there are reflexes that do not require any awareness of what it is that is touching them off (the pyloric reflex, the sphincter reflex, etc.). In all these cases, the neural estimative system is active but this activity is not always conscious.

We have mentioned before that the neural estimative system mediates the effect of stimulation intensity. Now we can add that it also mediates the effect of heat and cold, via its fine peripheral fibers that are connected with cutaneous receptors.[7] These fibers provide relays to the motor nerves of the

[7] Arnold, *op. cit.,* vol. 2, p. 190.

involuntary muscles in the blood vessels. These vessels contract (during cold) or relax (during heat) and so constitute the effector link of a segmental reflex. The flushed bodily state is sensed as warmth; the contrary state is sensed as cold. These states are later appraised as pleasant or unpleasant, according to the stimulation intensity. It would seem reasonable to suggest that other segmental reflexes also may be mediated by the peripheral fibers of the estimative system which register the effect of stimulation and initiate muscle movement via the appropriate motor nerves.

Reflexes that are touched off by sensations (pupillary reflex, knee jerk) also require that the effect of such sensations be gauged in some way, this time by thalamic relays from estimative system receptors rather than by peripheral estimative fibers. When it comes to the blink reflex, it has been found that this is established some considerable time after birth; in fact, when animals are put in a dark room right after birth and kept there until they are several months old, it takes weeks after they have been allowed to live again in a normal environment before they show the blink reflex. This means that they have to experience the pain of having the eyeball come in contact with something and to gauge the direction of movement of this thing as it approaches their eyes before they will close them spontaneously. Obviously, this requires not only the estimative sense but the memorative power, and consequently the functioning of the cortical portion of the estimative neural system; and with it, the normal activity of the sensus communis and the imagination, mediated by the sensory and association cortex, The activity of these powers is also required for all voluntary movement.

There is one point about voluntary movement that deserves special mention. Such movements always imply a patterning of muscle action which depends on a knowledge of the object and the direction in which it can be reached. I must know that a ball can be caught with one or both hands; that in walking, movements in one direction will take me toward my

goal, in another, away from it. Neurologists have talked about a " body scheme " within which individual movements can be projected. This means essentially that we can imagine possible movements and can preserve the disposition to repeat movements made in the past. We actually find that the same circuit we have identified as the neural system for fantasy also connects the sensory and association cortex via the amygdala with the premotor and prefrontal cortex (the motor association area). (See Fig. To imagine a movement, the imagination must receive the species impressa from the kinesthetic sense. When the movement is imagined, neural relays go from the somatosensory cortex via the limbic cortex of the posterior cingulate gyrus to the amygdala and from there are relayed via the dorsomedial thalamic nucleus to the frontal association area. When the movement is imagined or actually carried out, the cortical cells are changed in such a way that a disposition to move in the same way is preserved. When the same movement is repeated, this disposition is strengthened and will constitute a habit or skill.

When something is appraised as good, a tendency to action (appetite) is aroused which, in man, may be a will impulse as well as an emotional tendency. The neural substrate for the emotional tendency is a complicated circuit which connects the limbic cortex (sensorium of the vis aestimativa) via the hippocampus and fornix with the midbrain and cerebellum where the neural impulse is amplified and patterned according to the limbs and muscles needed for this particular action. (Fig. 3) From there, relays go via the ventral thalamus to prefrontal, premotor and motor areas. The relays to the motor association cortex seem to mediate the experience of wanting to move in a particular way (premotor cortex) and also register the movement about to be made (prefrontal cortex). The " traces " so made in the cortical cells are preserved and can be activated by the imagination via a circuit from the limbic cortex to the hippocampus, ventral thalamic nuclei and motor association cortex (in recall). They will also be activated by actual movements that are repeated.

Fig. 3. THE CIRCUIT MEDIATING EMOTION AND ACTION

When something is appraised as good (via relays to the limbic cortex), a tendency to action is aroused which is mediated by relays from limbic cortex via the hippocampus-fornix to brain stem and cerebellum. From the cerebellar roof nuclei (dentate, fastigial, interposited) the organized action pattern is relayed: (a) via ventral thalamic nuclei to the frontal lobe, connecting with corticobulbar and corticospinal tracts and mediating the felt tendency to action as well as the intended movement; (b) via globus pallidus to extrapyramidal pathways, exciting the autonomic nervous system and organizing background motions; (c) via globus pallidus to hypothalamic neurosecretory nuclei, initiating the secretion of appropriate hormones.

--- ---- Relay from hippocampus to cerebellum. Relay from cerebellum to frontal lobe. Relay from cerebellum to extrapyramidal and hypothalamic effectors. ==== Corticospinal tract.

D dentate nucelus. F fastigial nucleus. GP globus pallidus. H hypophysis. HYP hypothalamus. In interposited nucleus. INF OL inferior olive. M mammillary body. OT optic tract. R red nucleus. RF brain stem reticular formation. S subtantia nigra. VN ventral thalamic nuclei.

When the intention to move is formed, whether by a deliberate will impulse or an emotional tendency, that intention must be translated into nerve impulses that will activate the required muscles in exactly the right sequence and pattern. We imagine the direction and way in which we want to move, but the movement has to be carried out by a host of individual muscles. In computer terminology, we could say that the imagination provides the task and another power has to do the actual programming of the muscles required for it.

It is possible to speculate which power could do that. We are not aware of the programming but we are conscious of moving, of wanting to move and even of moving more easily the second time. This awareness requires a knowledge function which can only be the sensus communis. The programming of muscles also requires a power that " knows " the muscles and their functional interrelation. Apparently, this knowledge is mediated by connections from the somesthetic cortex to the motor cortex. On the assumption that the sensorium of the sensus communis is the feltwork of cells and connections between afferent and efferent layers in the neocortex, we could infer that these intermediate layers of the motor and motor association cortex also belong to the sensorium of the sensus communis. Motor imagination would provide the species impressa, and the connection from the " imagination " circuits to the afferent layer of the motor association cortex would mediate it. The act of the sensus communis would be knowing the act and content of the motor imagination and also, constructing a motor pattern for individual muscles (analogous to constructing an object from sensory elements). This pattern could then activate the pyramidal cells in the efferent layer of the motor cortex and would be communicated to the motor nerves which will activate the muscles in the prescribed sequence.

Philosophical analysis shows us that we are aware of felt tendencies to move and enables us to attribute this awareness to the sensus communis. But it will not allow us immediately

to conclude thqt there must be a direct involvement of the sensus communis in the motor cortex. It is not usual in philosophical analysis to specify in detail the way in which we are aware of appetitive activity (which is a tendency toward an object) and the way in which we know the tendency to move the members of the body in a coordinated manner. However, if we follow through in reflecting on this distinction we can see that the sensus communis does not only know the sense appetite when it is acting but also the motor power (vis motrix).

What we have tried to do in this paper is to examine the concrete empirical and scientifically observable phenomena ontologically connected with a psychological process that is analysed by the Scholastics philosophically. Peghaire does not seem to expect much from such an enterprise. He says:

"As a faculty, the cogitative does not fall within the scope of positive science. As for its operation, it is so easily confused on the one hand with that of the imagination and memory, by which it is always helped, and on the other with that of the intellect, behind which it hides, as it were, that minds with a bias for observed facts would naturally fail .to single it out." [8]

It seems to us that a " bias for observed facts " could very well have seen the cogitative sense as a faculty falling within the scope of positive science, and the sensus communis as a power necessary to integrate sense impressions and translate intentions into actual muscular movements. Positive science without understanding is not much good, certainly. But to broaden the figure, is *intellectus* without *scientia* any better? Both are all of a p1ece.

MAGDA B. ARNOLD

Loyola University
Chicago, IUinois

[8] J. Peghaire, A Forgotten Sense, the Cogitative, according to St. Thomas Aquinas. *Modern Schoolman, XX (1943), 123-140, 210-229,* p.

NEUROLOGICAL ASPECTS OF THE SENSE POWERS OF MAN

THE philosophic interest in organic faculties usually extends only to the fact of organic involvement on the part of these faculties and the consequent conclusion that the material organic part forms a unified principle of operation in conjunction with its informing faculty/ The primary philosophic concern is with the nature and intrinsic intelligibility of this organic structure. The philosopher of human nature is generally content to establish the fact that the material organ and its informing faculty form a *principium conjunctum operationis.* Each faculty has its proper material organ-on the strictly philosophical level nothing further is called for.[2] However, it is possible to fill out the picture in terms of specific structures from recent scientific contributions in neurophysiology.

The argument cannot be presented in clear-cut terms for two reasons. First, the state of neurological evidence is by no means complete. Certain facts are almost immediately evident (relation of the eye to vision), but other facts are somewhat more tenuous and even highly controverted. Evidence related to vision and hearing has been well established for some time, but the evidence concerning taste, smell and touch, as well as the function of the internal senses has been more

[1] St. Thomas' classic text is Summa, I, 77, 5. For a modern presentation of the argument, see G. P. Klubertanz, S.J., *The Philosophy of Human Nature* (New York: Appleton-Century-Crofts, 1958), pp. 116-118.

[2] For a discussion of the aims and methods of the philosophy of human nature as contrasted with those of scientific psychology, see Klubertanz, *ibid.,* pp. 885-401. A further discussion can be found in T. W. Guzie, S.J., *The Analogy of Learning* (New York: Sheed and Ward, 1960), pp. !'27-47. The distinctions are relevant to our investigation in terms of the relation of the philosophy of human nature to physiological psychology and particularly to neurophysiology and neuroanatomy. Another point of view can be found in .T. A. Weisheipl, 0. P., *The Dignity of Science* (Washington, D. C.: The Thomist Press, 1961), particularly pp. xxvi-xxix.

or less clarified only quite recently; consequently, the evidence is more tenuous in these latter areas. Second, even where the neurological £acts are clear-cut and unambiguous, there is still considerable room £or questioning their philosophical implications. The doctrine o£ specific nerve energies has been known since the early nineteenth century (1838) but it is still not clear whether the optic nerve is part o£ the organ o£ sight or whether the specific response to non-specific stimulation [3] is due to the specific nature o£ the visual center. I shall presume in this discussion that all those parts whose removal would interrupt a given £unction are component, integral parts o£ the organ in question.

I shall concern myself here only with anatomical structures. Discussion o£ physiological £unction would take us too £ar afield and would involve too many highly disputed and technical issues. We shall attempt tentative reconstructions o£ the neurological circuits £or the external senses (sight, hearing, taste and touch), and the internal senses (common or unifying sense, memory or imagination, estimative sense, and memorative power). The designation o£ specific organs does not mean that the entire organ is actually involved in a given system. Usually there is question o£ particular cells groupings or particular fiber tracts, which form only part o£ the designated anatomical structure.

Vision

The optical system is quite well established. Light stimulus breaks down rhodopsin (visual purple) which is contained in the retinal neurons (rods) into retinene and protein. This photochemical change sets up an electrical impulse. Similar changes seem to occur in daylight vision through the breakdown o£ iodopsin (contained in the cones). The electrical impulse is carried £rom the rods and cones o£ the retina to a secondary layer o£ bipolar neurons in the retina. The bipolar

[3] For example, pressure on the eye produces visual effects; consequently, the stimulus need not be specific-in this instance, color.

neurons transfer the impulses to large ganglion cells whose axons collect at the blind spot of the retina and leave the retina as the optic nerve. The fibers of the ganglion cells which form the optic nerve are arranged in groups which correspond to the quadrants of the retina from which they arise. Fibers from the upper and lower temporal quadrants of the retina are found in the upper and lower lateral hal£ of the optic nerve; fibers from the nasal quadrants are found in the medial hal£ of the nerve. Through the whole visual pathway, this point-to-point localization of fibers from the different retinal areas is maintained. The nerves lead back to the base of the brain and cross in the optic chiasm. Fibers from the temporal quadrants of the retina remain on the same side, but fibers from the nasal quadrants cross to the optic tract of the opposite side. The optic tract passes as a compact bundle of fibers backwards between the tuber cinereum and the anterior perforated substance, turns around the cerebral peduncle and terminates in the lateral geniculate body. The lateral geniculate body is the primary visual center and the majority of the optic fibers terminate in it. A few pass on to the superior colliculi, which are the chief centers of visual reflexes.[4] The tertiary neutrons of the lateral geniculate bodies send their axons through the posterior extremity of the internal capsule. They then sweep backward to the area striata of the occipital cortex (Brodmann's area 17), which surrounds the calcarine fissure in the extreme posterior portion of the cortex. See figure 1.

Hearing

The vibratory stimulus of sound is received in the inner ear through the mechanical transmission of the ear drum and the small bones of the middle ear. The vibrations are trans-

• The superior colliculi of mammals receive impulses from the retina (through the optic tracts), from the visual area of the occipital cortex, and from the spinal cord by way of the sp}notectal tract. It relays impulses to the medulla through the tectobulbar tract, to the spinal cord through the tectospinal tract, and to the eye muscles by way of the oculomotor nucelus. See figure 1.

mitted to fluid medium of the cochlea (endolymph) and through this medium to the tiny hair cells of the organ of Corti. Vibratory stimulus of these hairlike projections sets up the nerve impulse which is transmitted by slender fibers to the cochlear branch of the auditory nerve (cranial nerve VIII). The nerve fibers from the hair cells terminate in the spiral ganglion of the choclea. The central processes of the hi-

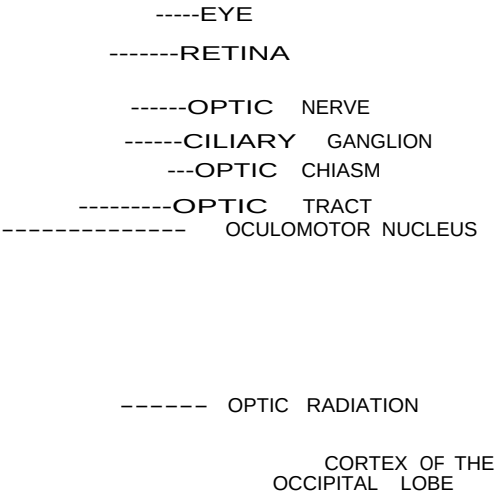

FIGURE 1. The Visual System.

polar cells of the spinal ganglion emerge from the base of the internal auditory meatus as the cochlear branch of the auditory nerve. As it reaches the lower border of the pons, the nerve divides into two groups, one group ending in the dorsal cochlear nucleus and the other in the ventral cochlear nucleus. Both of these nuclei contain secondary neurons. Those from the ventral nucleus cross medially to form the trapezoid body and then cross with fibers from the opposite side to ascend in the lateral lemniscus.[5] Fibers from the dorsal cochlear nucleus

[6] Some of the fibers from the ventral nucleus send collateral fibers to the nucleus of the trapezoid body and to the superior olive. Fibers from these centers carry

pass medially into the floor of the fourth ventricle as well defined striae medullares (striae acousticae). They cross to the opposite side and join with the fibers from the ventral nucleus in the lateral lemniscus. Some fibers from the dorsal nucelus join the lateral lemniscus of the same side. The fibers of the lateral lemniscus ascend in the reticular formation of the pons and terminate in the inferior colliculus, the medial

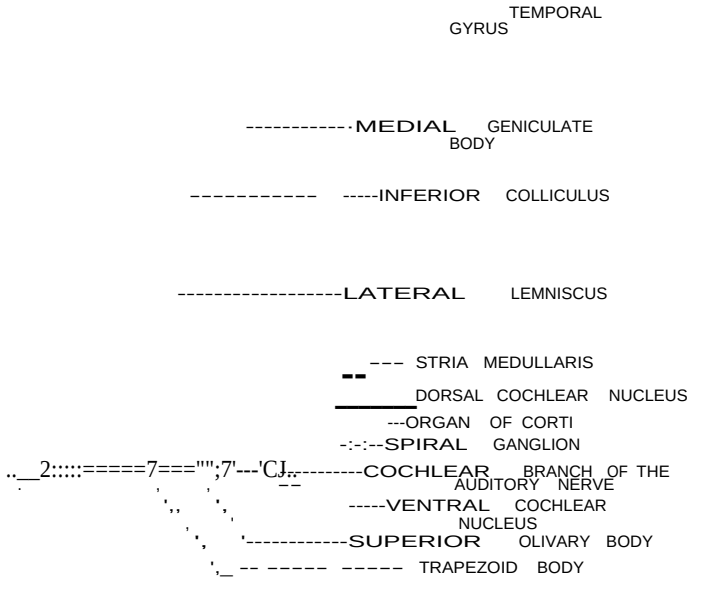

FIGURE The Auditory System.

geniculate bodies and the substantial nigra. The medial geniculate body is the primary subcortical auditory center.[6] The tertiary neurons in the medial geniculate body ascend in the

impulses by the medial longitudinal fasciculus to the nuclei of the oculomotor, trochlear, abducens and spinal accessory nerves. This permits coordination of hearing with motor movements of the head.

• It has been reported that stimulation of the superior and middle temporal gyri excite the limbic cortex of the posterior insula. This is important for appraisal of sounds emotionally. See K. H. Peibram and P. D. MacLean, "Neuronographic Analysis of Medial and Basal Cerebral Cortex, II. Monkey," *Journal of Neu1·o· physiology,* XVI (1953), 324-340.

posterior limb of the internal capsule (external to the fibers of the optic radiation) and find their way to the superior temporal gyrus of the cortex (Brodmann's area 41, Heschl's gyrus). See figure 2. The system maintains a point-to-point localization with the receptive cells of the organ of Corti so that there is a point-for-point projection in the auditory cortex, similar to those observed in the visual system.

The inferior colliculus serves as the center for auditory reflexes in much the same fashion as the superior colliculus functions in the visual system. It likewise connects with nuclei of the brain stem and spinal centers by descending tracts. The function of the substantia nigra has not been determined, although it is known to receive fibers from both superior and inferior colliculi.

Smell

The olfactory cells are contained in the olfactory epithelium of the roof of the nasal cavities. Stimulation of the hairlike projections on the outer ends of the olfactory cells sets up an impulse which is carried by the axons of these cells, through the bony cribiform plate· to which the epithelium is attached, to the secondary neurons of the olfactory bulb. These so-called mitral cells form the glomeruli of the olfactory bulb and send axons backward to form the olfactory tract. The olfactory tract continues on to the olfactory trigone, just before the anterior perforated substance. There the axons of the mitral cells separate into two distinct bundles: the lateral olfactory stria and the medial olfactory stria, and the intermedial olfactory stria. The lateral stria sends a few fibers to the olfactory trigone and the anterior portion of the anterior perforated substance; but most of the fibers pass into the uncus at the anterior end of the hippocampal gyrus of the cortex. Since the lateral stria carries the major portion of the olfactory fibers, the hippocampal gyrus may be considered the primary terminus of the olfactory fibers.[7] Fibers in the medial olfactory stria

• The lateral striae send many collaterals into the plexiform layer of the sub-

terminate in the parolfactory area and in the subcallosal gyrus.[8] The intermediate olfactory striae send fibers to the anterior perforated substance and some to the uncus. The hippocampal gyrus is continuous with the cingulate gyrus by way of the isthmus. The primary cortical center for smell is the uncus and the anterior part of the hippocampal gyrus (pyri-

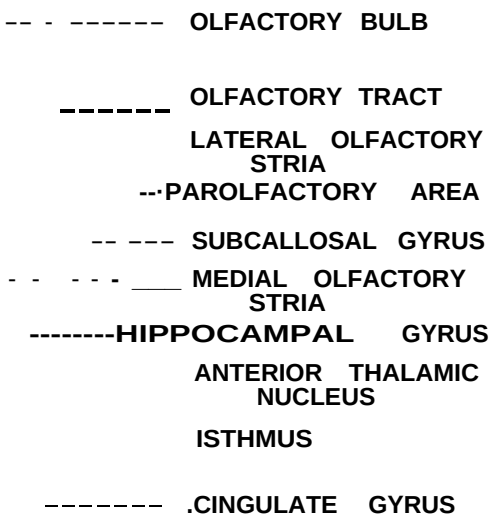

FIGURE 3. The Olfactory System.

frontal cortex over which they pass en route to the uncus. These axons give rise to projection fibers to the lateral hypothalamic area, sending other collaterals to the stria medullaris and the thalamus. Some fibers extend back to the tegmentum of the mesencephalon. See H. Gray, *The Anatomy of the Human Body*, 26th edition (Philadelphia: Lea and Febiger, 1955), p. 962.

[8] We have presented the major sensory pathways. The olfactory trigone and anterior perforated substance, together with adjacent parts of the septum pellucidum, are primary olfactory centers for olfactory reflexes. The mitral cells also send branches to the subcallosal gyrus. These centers send fibers to lower centers of the brain stem and spinal cord (tuber cinereum, mammillary bodies). The lateral olfactory striae are associated with the lateral olfactory gyri, which are derived from the pyriform area but are indistinguishable from the gray substance of the anterior perforated substance. Similarly the medial striae are associated with the medical olfactory gyri. The subcallosal gyrus is continuous with the medial olfactory gyrus.

form area). The olfactory system is quite complex and the function of many of the involved structures has not been satisfactorily determined. Together they constitute the rhinencephalon or " olfactory brain," which represents a more primitive type of brain structure. Man has inherited this complex structure from phylogenetic prodecessors in whom the sense of smell was very highly developed. The human sense of smell has deteriorated and the complex system has come to function in connection with emotional behavior. We shall see more of this later. Enough has been said for the moment to satisfy the demands of the olfactory system as such. See figure 3.

Taste

The taste buds contain the receptors of the sense of taste. They are located predominantly on the surface of the tongue, but also in the mucous membrane of the soft palate, fauces, epiglottis and in the region of the larynx. The impulses produced by the simulation of these buds are conveyed by the facial, glossopharyngeal and vagus nerves-three of the cranial nerves. Taste buds on the anterior two-thirds of the tongue send impulses through the chorda tympani branch of the facial nerve (cranial nerve VII) .• The fibers from the mucous membrane of the soft palate and the posterior part of the nasal cavities pass to the sphenopalatine ganglion, though the greater superficial petrosal nerve to the geniculate ganglion. Passing through this ganglion, the fibers form part of the larger intermediate nerve which leads to a sensory nucleus in the upper portion of the solitary tract in the brain stem. Similarly, taste buds from the rest of the tongue send impulses through the peripheral process of the glossopharyngeal nerve (cranial nerve IX). These fibers pass through the inferior petrous ganglion and terminate in a nucleus in the lower part of the solitary

[9] A small proportion of taste fibers may take an alternate route through the chorda tympani to the otic ganglion, and then by way of the internal sphenoidal and greater superficial petrosal nerves through the geniculate ganglion. See C. H. Best and N. B. Taylor, *The Physiological Basis of Medical Practice* (Baltimore: Williams and Wilkins, 1955), p. 999.

tract. Taste sensations are also carried by the anterior laryngeal branch of the vagus nerve (cranial nerve X) from the epiglottis and the laryngeal area. These fibers terminate in the so-called gustatory nucleus in the upper and medial portions of the solitary tract. The axons of the fibers from all three nerves terminate on secondary neurons in the ·nuclei of the

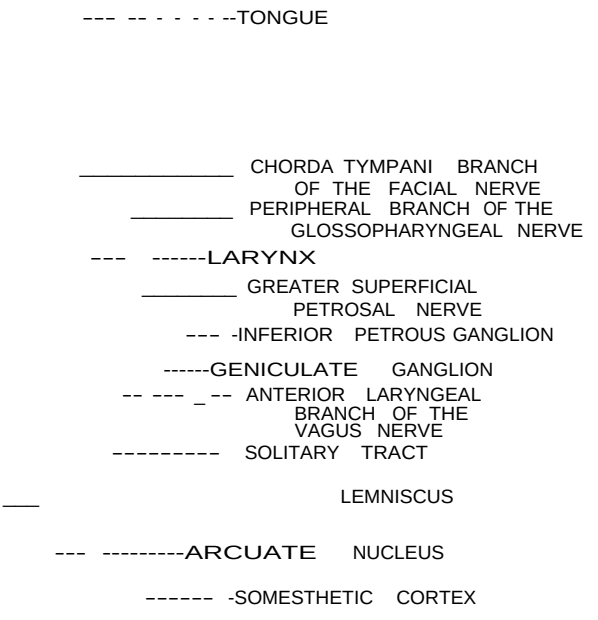

FIGURE 4. The Gustatory System.

solitary tract. The fibers of these neurons cross to the opposite and ascend in the medial lemniscus of the opposite side to the arcuate nucleus of the thalamus. Tertiary neurons of the thalamus convey the taste impulses to the lower portion of the somesthetic area of the cortex. Available evidence indicates that the cortical taste area is a small area in the orbital surface of the parietal lobe, in the posterior operculum (Bradmann's area 43).[10] See figure 4.

[10] T. C. Ruch, H. D. Patton, and V. E. Amassian, "Topographical and Func-

Touch

Under the rubric of " touch " we refer to a group of sense powers which in one way or another involve contact of the body with objects. The experiences grouped in this way include temperature sensations, pressure sensations, kinesthetic sensations, proprioceptive sensations, and sensations of pain. In philosophical terms, however, the sense of touch is a genus of sensation with at least two species, temperature and pressure. It is possible that pain constitutes a third species.[11]

It is obvious that, since there is hardly any part of the body that is devoid of tactile sensation, the complex of nerves involved in the transmission of tactile sensations is overwhelming. We shall concentrate on the major pathways of the central nervous system.

Tactile sensations are received by specific receptors. Superficial pressure is received by vascular-nerve complexes known as glomus bodies and possible by Meissner's corpuscles. The free nerve endings may also serve to pick up pressure sensations, but they are more commonly thought of as receptors for pain; they may be both. Deep pressure sensations are picked up by the Pacinian corpuscles and sensations from the muscle-tendon junctures are received through the Golgi tendon organs. Temperature sensations are received through two terminal receptors: the Krause end bulb for cold and the Ruffini cylinder for heat. These various sensations are carried on different types of nerve fibers. Cutaneous sensations are carried on large, medullated fibers (the A-fibers) which give large impulses and rapid conduction, and on small, unmyelinated fibers (the C-fibers) which carry small, slow-traveling impulses. The A-fibers are associated with the bright pricking pain that follows immediately after injury, and the C-fibers carry the longer-lasting dull pain. Kinesthetic sensations are likewise car-

tional Determination of the Cortical Localization Patterns," *Research Publications of the Association for Research in Nervous and Mental Disease,* XXX (1952), 403-429.

[11] Klubertanz, *op. cit.,* pp. 108-110.

ried by fibers of various types. A1-fibers and A·-fibers ennervate the muscle filaments and are thereby called "stretch afferents." They are similar in structure and function, except that the A·-fibers are somewhat thicker and conduct more rapidly than the A1-fibers. B-fibers carry impulses from the Golgi tendon organs, and since the number of impulses they conduct per second is proportional to the logarithm of the tension produced by the pull of the muscles, they are referred to as " tension-recorders." And finally the C-fibers (not to be confused with the cutaneous C-fibers) are associated with Pacinian corpuscles and have smaller fibers and slower impulses than either A or B-fibers.

The sensory fibers carrying thermal and pressure sensations pass into the afferent sensory root of the spinal nerves, pass through the dorsal ganglia of the spinal cord and then divide into two branches. The medial filament of the sensory root carries pressure impulses and passes into the dorsal column of the white matter of the cord, where it contacts the two ascending tracts of the spinal cord which carry kinesthetic impulses to the hindbrain (medulla), namely the gracile column and the cuneate column. The two columns occupy a position on the dorsal part of the cord: the gracile is the more medial and the cuneate the more lateral of the two columns. See figure 6. The medial filament also conveys cutaneous pressure sensations to the ventral spinothalamic tract on the opposite side of the cord. This tract carries the pressure sensations up to the thalamic centers. The gracile and cuneate columns terminate in the gracile and cuneate nuclei of the hindbrain. Second order neurons in these nuclei send fibers to join the medial lemniscus of the opposite side of the cord. These fibersiascend in the lemnicus and terminate in the posteroventral nucleus of the thalamus. The lateral filaments form the other branch of the spinal nerve as it passes into the spinal cord. These fibers pass immediately into the dorsal horn of the central gray matter of the spinal cord. They contact the second order neurons in the gray horn and these neurons pass to the other side of

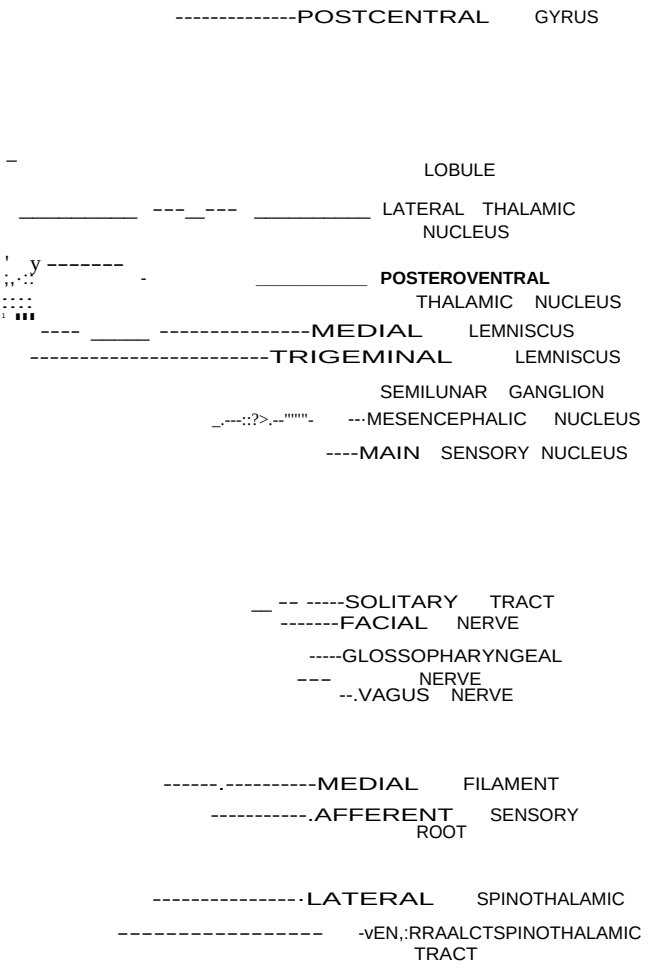

FIGURE 5. The Cutaneous Tactile System. Tactile sensations are carried from the peripheral receptors through the afferent sensory root to the spinal cord. Tactile sensations from the face and head are carried by the trigeminal, facial, glossopharyngeal and vagus nerves.

the cord and form the lateral spinothalamic tract. This tract carries impulses from thermal and pain receptors up to thalamic centers. The fibers from the lateral spinothalamic tract join with the fibers of the ventral spinothalamic tract and the gracile and cuneate tracts and terminate in the poster-oventral nucleus of the thalamus. See figure 5.

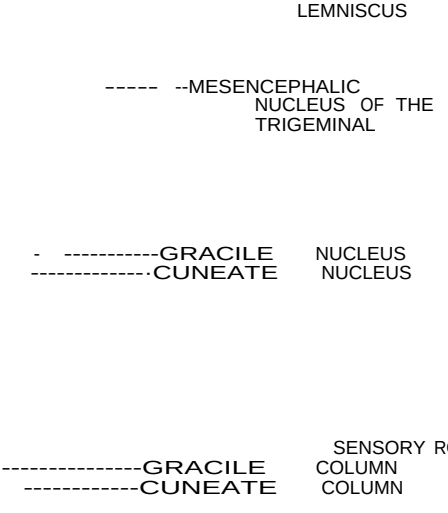

FIGURE 6. The Kinesthetic Tactile System. Peripheral sensations are carried by the afferent root to the ascending gracile and cuneate columns. Sensations from the head enter the cord through the mesencephalic root of the trigeminal nerve.

These tracts account for the major pathways by which cutaneous and kinesthetic " touch " sensations are brought from the peripheral receptor to the centers in the midbrain. These facts do not account for sensations from the region of the head. Sensations from the head region are brought to the brain by way of the trigeminal, facial, glossopharyngeal and vagus nerves. The trigeminal has three sensory roots.

The main sensory root conveys impulses of cutaneous pressure from the anterior part of the scalp, from the skin of the forehead and face,i2 from the mucous membrane of the mouth and nose, and from the cornea, conjunctiva, and dura mater. The central process of this root enters the midbrain (at the pons) in close association with the fibers of the trigeminal motor root. terminate in the main sensory nucleus of the trigeminal, which is located in the pons. The neurons of this nucleus send fibers to join with those of the spinal nucleus of the trigeminal (see below) and together they form the trigeminal lemniscus. The spinal root, to which we just referred (called spinal because it extends to the level of the spinal cord), collects impulses from the mandibular, maxillary, and opthalmic divisions of the trigeminal nerve. The neurons of the spinal nucleus give rise to fibers which cross the midline and ascend to join the fibers of the sensory nucleus in the trigeminal lemniscus. See figure 5. The third root of the trigeminal, the mesencephalic root, receives the kinesthetic impulses from the head, particularly the muscles of mastication. Its fibers join with those of the motor root of the trigeminal. The trigeminal lemniscus joins with the medial lemniscus and terminates with the other somesthetic fibers in the thalamic nucleus.

The facial nerve conveys sensations of pressure and pain from the facial muscles to the sensory nucleus of the solitary tract.[13] Fibers from the solitary tract join with those of the medial lemniscus and ascend to the thalamus. Fibers of the facial nerve reach the solitary tract through the interme<;Jia.te nerve, as we saw in the description of taste pathways of the facial nerve. The glossopharyngeal nerve (cranial nerve IX) conveys sensations of touch from the posterior third of the

[12] With the exception of an area over the angle and lower border of the mandible. See Best and Taylor, *op. cit.,* p. 997.

[13] This function is ascribed to the facial nerve by Davis, *Archives of Neurology and Psychiatry,* IX (19!i!3), !i!83; others claim that all pain is carried by the trigeminal. See Best and Taylor, *op. cit.,* p. 999.

tongue, from the mucosa of the mouth and pharynx, through the superior ganglion to the dorsal nucleus of the vagus in the lower part of the solitary tract. The fibers from this nucleus likewise join with the medial lemniscus and ascend to the thalmus. The last nerve which carries sensations of touch is the vagus nerve (cranial nerve). Its afferent fibers terminate in the dorsal nucleus and join those of the glossopharyngeal in passing to the thalamus by way of the medial lemmscus.

The fibers of the medial lemniscus, together with those of the trigeminal lemniscus, ascend to the level of the thalamus and terminate together in the posteroventral nucleus of the thalamus. The neurons of the posterovental thalamic nuclei send projection fibers to the post-central gyrus of the cortex (Brodmann's areas 1, 2 and 3), which is the primary area for somesthetic sensation. A second " associative " projection is sent to the posterior parietal lobule of the cortex by way of the lateral nucleus of the thalamus, which recives its impulses from the postero-ventral nucleus.

Unifying Sense (Sensus Communis)

The unifying sense has as its formal object sensory consciousness.H The sense faculties are not in themselves concious: they attain their respective objects but are incapable of reflective consciousness. The awareness of the operation of a given sense power is the proper object of the unifying sense. Examination of the proper objects of all the external senses brings us to the conclusion that awareness is neither a proper sensible object nor a common sensible object, and that awareness must be the proper object of a distinct internal sense power. Insofar as the unifying sense apprehends the operations of the external senses as the operations of a common subject, it serves as the principle of the primary unification of experience. From this function it derives its name. By the apprehension of the acts of the various senses,

[10] See Klubertanz, *op. cit.,* pp. 124-l!'lS.

the unifying sense likewise permits immediate recognition of the differences between various sense modalities.

The most important function of the unifying sense for our present consideration is its relation to sensory awareness. Since it is the organ of sensory awareness, the difference between waking and sleeping somehow depends on its activity or partial inactivity. Consequently, the delineation of the neural structures involved in the unifying sense will be determined by the relation of those structures to the consciousness of the organism. Unfortunately, although some evidence is available, there is little agreement on what structures of the brain are involved in the maintenance of consciousness. It seems clear that hypothalamic structures are involved. Ranson [15] was able to demonstrate by experimental lesions that there was a center for wakefulness located in the posterior portion of the hypothalamus, in the area of the mammillary bodies. In addition, Nauta [16] found that lesions immediately anterior to the mammillary bodies and including the lateral hypothalamus resulted in a condition of drowsiness intermediate between sleep and wakefulness. He also discovered that bilateral lesions in the region of the preoptic nucleus in the anterior hypothalamus produced a state of continual wakefulness which seemed to indicate the presence in that area of a sleep center, similar to the waking center in the posterior region.

At the same time, it seems that the hypothalamic centers are subject to influences from sensory pathways and from the higher brain centers. It is well known that inhibition of sensory experiences is an effective method of inducing sleep. Sensory impulses would seem to play a role in activating the waking center, although the waking center seems to function in part by self-exciting mechanisms. [17] Higher centers play an

[15] S. W. Ransom, "Somnolence Caused by Hypothalamic Lesions in the Monkey," *Archives of Neurology and Psychiatry,* XLI (1939),

[16] W. J. H. Nauta, "Hypothalamic Regulation of Sleep in Rats: An Experimental Study," *Journal of Neurophysiology,* IX (1946),

[17] C. T. Morgan and E. Stellar, *Physiological Psychology,* edition (New York: McGraw-Hill, 1950), p. 366. The findings of F. Bremer are reported. See also the work of Kleitman, *American Journal of Physiology,* 104-107 (1933).

important role. Stimulation of thalamic nuclei by a slow frequency current gives rise to a "recruiting response" which induces more and more neurons to show a similar frequency on the EEG, until finally the EEB shows the large slow waves characteristic of deep sleep.[18] It seems that this diffuse thalamic system (composed of medial nuclei and intralaminar nuclei of the thalamus with connections to the caudate nucleus and other subcortical regions) sends :fibers to all areas of the cortex by way of the thalamic reticular nuclei and the .corona radiata. When the diffuse thalamic system of a cat is stimulated with slow frequency or low intensity stimulation, the waking cat goes to sleep; if higher frequency or intensity is used, the animal is aroused from sleep.[19] According to Eccles,[20] by its projections to the cortex, the diffuse thalamic system can either increase the excitability of the cortex or reduce it. By inhibiting motor cells and depressing sensory and association areas, more and more neurons can be included in the recruiting response which finally terminates in sleep.

Apparently, the cortex is not essential to the production of sleep, but in some way it regulates the activity of hypothalamic centers. Decorticate dogs are capable of sleep, but they do not stay awake as long as normal animals.[21] Kleitman [22] tries to explain the relation of cortical and subcortical activity in the production of sleep by the activity of a hypothalamic sleep center which presides over vegetative functions and produces sleep unless inhibited by other processes. As long as the cortex can maintain its analyzing function, the functions of the sleep center are overridden. But when inter-

[18] M. A. B. Brazier, "The Action of Anesthetics on the Nervous System with Special Reference to the Brain Stem Reticular System," in J. F. Delafresnaye (ed.), *Brain Mechanisms and Consciousness* (Springfield, Ill.: C. C. Thomas, 1954).

[19] W. R. Hess, " The Diencephalic Sleep Center," in Delafresnaye, *Ibid.*

[20] J. C. Eccles. *The Neuropkysiological Basis of.* Minlt.{Oxford: Oxford Univ. Press, 1953).

[21] N. Kleitman and N. Camille, "Studies on the Physiology of Sleep, VI. Behavior of Decorticated Dogs," *American Journal of Physiology,* C 474-480.

[22] N. Kleitman, *Sleep and Wakefulness* (Chicago: Univ. of Chicago Press, 1939).

nal inhibition spreads over the cortex as a result of diminution of peripheral stimuli, the activity of the sleep center can take effect. Needless to say, the details of the sleeping process are neither well established nor universally accepted.

The unifying sense has the operations of the external senses as proper object and awareness is intimately connected with the operation of the senses in our immediate experience. Consequently, we should expect that the organ of the unifying sense should be closely connected with the circuits of the various sense systems. Arnold [23] has pointed out the connection of various sensory circuits with the diffuse thalamic system. Somesthetic impulses are brought by the spinothalamic tract, the medial lemniscus and the trigeminal lemniscus, by way of the reticular formation of the medulla to establish connections with the thalamic nucleu, including the intralaminar nuclei and the nuclei of the midline. Sound impulses are conveyed from the medial geniculate nucleus to the centrum medianum in the intralaminar nuclei. Impulses are returned from the visual area of the occipital cortex by the returning fibers of the optic radiation and reach the medial thalamus; smaller fibers are relayed from the lateral geniculate body to the thalamus. [24] Taste impulses from the solitary tract are con-

[23] M. Arnold, *Emotions and Personality, Vol. II.* (New York: Columbia Univ. Press, 1960), pp. 33-56.

[24] G. H. Bishop, "The Relation Between Nerve Fiber Size and Sensory Modality: Phylogenetic Implications of the Afferent Innervation of the Cortex," *Journal of Nervous and Mental Diseases,* CXXVIII (1959), 89-114. Bishop has shown the presence of 5 somesthetic pathways from peripheral receptors to the thalamus. He indicates a difference in the size and rate of conduction between fibers of the sensory system and those which connect with the medial thalamic nuclei.

Arnold suggests that these smaller fibers are part of a peripheral estimative system. The same is true of fibers relayed from the optic tract to the thalamus.

Arnold includes in the estimative system the ascending reticular system (including the reticular formation and the tegmentum of the lower brain stem from the lower pons to the subthalamus, dorsal hypothalamus and ventromedial thalamus), which relays sensory stimuli to the cortex by both thalamic and extrathalamic pathways. Arnold suggests that this system represents a series of relays which receive peripheral afferents from the sensory systems and project them to the limbic cortex and to the cerebral cortex by way of the reticular thalamic nuclei. See Arnold, *op. cit.,* pp.

veyed to the arcuate nucleus of the thalamus. The centrum medianum also receives fibers from the vagus nerve. Olfactory fibers from the basal olfactory areas are conveyed by way of the internal thalamic peduncle to the dorsal medial nucelus. The thalamic system radiates fibers to all areas of the sensory cortex and thus establishes contact with all sensory modalities (see figure 7).

FrouRE 7. The Unifying Sensory System. CM=Centrum medianum. H=Hypothalamus. IN= Intralaminar nucleus. M =Mammillary body. RF =Reticular formation. RN=Reticular nucleus. VP=Ventroposterior nuclei. Numbers indicate areas of the cerebral cortex in which impulses are received and associated,

Path of the sensory impulse and cortical projection.
---------=Fibers of the reticular activating system.

The unifying sense likewise serves as the primary principle of sensory unification of experience. This implies the capacity to associate and compare sensations proper to the respective sense powers. The associative power of the cortex is well demonstrated in the phenomenon of conditioning. After conditioned reflexes have been established, removal of the whole cortex will result in the destruction of all conditioned reflexes.

Partial removal of the cortex brings about a loss of conditioned reflexes, but sensory areas other than the one injured recover quite well and the injured sensory area will eventually recover to a certain extent-but not completely. Evidence of this nature indicates that the associative function underlying conditioned reflexes depends on the cerebral cortex and that the sensory functions of the cortex are centered in definite areas. However, these areas are associated with other cortical areas by means of intracerebral connective tracts of fibers, the association tracts.

Considerable interest has been generated in recent years in the reticular activating system. Direct stimulation of the reticular formation seems to produce EEG patterns similar to those observed in awaking from sleep. Likewise connections have been established experimentally with certain states of wakefulness or arousal.[25] The system is composed of ascending and descending fibers; however, we are only concerned with the ascending system which subserves the function of sensory stimulation and arousal. The system receives fibers from all the afferent sensory systems and sends fibers to the thalamus, hypothalamus, cerebral cortex and cerebellum. This system provides a second extralemniscal pathway by which sensory impulses can be transferred to higher centers. It is undoubtedly immediately concerned with sensory consciousness and the integration of sensory experience. But we are not able as yet to specify that function more explicitly.

Admittedly, the available neurological evidence is not adequate to permit the identification of the diffuse thalamic system with its cortical projections as the organ of the unifying sense. The anatomical connections are not perfectly clear and the proper physiological function of most of the structures involved is more a matter of speculation than of demonstration. Arnold[26] has organized some of these same structures into an

[26] Magoun, H. W., "The Ascending Reticular System and Wakefulness," in J. F. Delafresnaye, *op. cit.*

[28] Arnold, *Ibid.*, pp. 80-64, 185-168.

estimative system to which she ascribes the functions of awareness and appraisal (of the same object as beneficial or harmful). On the grounds of our present concern, we are distinguishing the function of consciousness from the function of appraisal. The latter function would seem to be more properly a function of the estimative sense. However, awareness and appraisal are intimately associated in our sensory experience and there is no reason why the unifying and estimative senses could not share the same anatomical (as opposed to physiological) structures. Equivalently, then, we have separated the parts of the estimative system which seem to be involved in awareness, the regulation of sleep, and the unification of sensory experiences, and have suggested that these structures might be more properly considered as constituting the proper organ of the unifying sense. Until further evidence is available, this reconstruction can serve only as a suggestion.

Imagination

Imagination is the faculty of retaining and recalling the images of sensory experience. Insofar as the imagination retains and recalls sensory experiences as they were (in the past), the imagination is referred to as memory. The imagination also has the capacity to recombine previously acquired images into newly constructed images. For purposes of this discussion, we shall refer to the retentive imagination by which images are retained and recalled, and the constructive imagination by which new images are formed from previous sensory images.[27] We shall consider each separately since the structures involved are somewhat different in each case; but we must keep in mind that we are dealing with a single faculty with a single formal object.

· Available neurological evidence seems to suggest that the organ of retentive imagination involves the hippocampus.[28]

[27] These functions and the complex combinations of imaginative functions are discussed by Klubertanz, *op. cit.,* pp. 128-134.

[28] Credit for the synthesis of neurological and experimental evidence, upon which this and the subsequent reconstructions are based, must be given to Dr.

Loss of the hippocampus in monkeys gives rise to an inability to recognize sights or sounds.[29] Similarily removal of both temporal lobes, together with the uncus, amygdala and anterior hippocampus, in human beings, gives rise to an inability to understand what is said and to read, which persists for a considerable length of time.[30] A similar case resulted in behavior quite similar to that of the monkeys; the patient recognized no one, his attention could not be held, he apparently understood little that was said to him and he seemed to have no memories.[31] Bilateral degeneration of the hippocampus results in severe memory defect, as is also the case in the well-known Korsakoff syndrome. In the latter instance, memory defect seems to be the result of destruction of the mammillary bodies which receive relays from the hippocampus by way of the postcommissural fornix. Evidence of this nature seems to implicate the hippocampus and the related structure in the memory function.

There is also definite evidence of cortical involvement in memory. It was once thought that memory and learning were a function of the entire cortex,[32] but recent evidence seems to indicate that the sense impressions of the different modalities are registered separately. Removal of the inferior edge of the temporal lobe and the preoccipital cortex is followed by loss of a visual discrimination habit.[33] The conclusion is drawn

Magda B. Arnold. We shall depend on her synthesis to a considerable extent, deviating from it only when the alignment with the sense faculty analysis requires. For material relevant to the imagination, see Arnold, *op. cit.*, pp. 56-79, 105-108.

[29] H. Kiilver and P. C. Bucy, "Preliminary Analysis of Functions of the Temporal Lobes in Monkeys," *Archives of Neurology and Psychiatry,* XLII (1938), 979-1000.

[30] A. J. Oldham, " Effects of Temporal Lobe Lesions on Behavior in Paranoid States," *Journal of Mental Science,* XCIX (1953), 580-587.

[31] H. Terzian and G. Dalle Ore, "Syndrome of Kiilver and Bucy Reproduced in Man by Bilateral Removal of the Temporal Lobes," *Neurology,* V (1955), 373-380.

[32] Psychologists usually invoked Lashley's principle of " mass action." See K. Lashley, *Brain Mechanmns and Intelligence* (Chicago: Univ. of Chicago Press,

[33] K. H. Pribram and M. Mishkin, " Simultaneous and Successive Visual Dis-

that visual memory is mediated by these areas. Visual memory involves extensive areas of the occipital, parietal and temporal association .cortex. The Brodmann area 18 seems to be concerned with recognition and area 19 with recall. Similar experimentation has shown that auditory memory is mediated by the posterior temporal cortex. Lesions in the poster-

FIGURE 8. The Memory System of the Imagination. H =Hippocampus. LG = Lateral geniculate body. MG=Medial geniculate body. S=Septal area. V=Ventral thalamic nuclei. VP = Ventroposterior thalamic nuclei. A= Auditory area of the temporal cortex. Path of sensory impression, reception and registration. --- -------=Conduction path for recall. Short arrows indicate paths completing the recall circuit. Numbers represent areas of the cortex (Brodmann's areas).

ior half of the superior temporal gyrus (area 22) and part of the middle temporal gyrus (area 21) mediate the comprehension of spoken language. Similarly, the anterior part of the superior temporal gyrus is connected with recognition of music.34 Somesthetic memory is associated with the postcentral gyrus or the supraparietal lobule or the supramarginal gyrus.

crimination by Monkeys with Inferotemporal Lesions," *Journal of Comparative Physiology and Psychology,* XLVIII (1935), 198-202.

•• J. M. Nielsen, *Agnosia, Apraxia, Aphasia; Their Value in Cerebral Localization,* 2nd edition (New York: Hoeber, 1946).

The inferior parietal lobe seems to be involved since lesions in that area (areas 39 and 40) involve a lack of awareness of the limbs of the opposite side of the body.[35] The olfactory association cortex seems to be located in the projection area of the dorsomedial thalamic nuclei, most probably in the orbital cortex. Destruction of these nuclei or transorbital lobotomy which cuts the projection fibers is followed in inability to recognize odors.[36] There is some slight evidence to suggest that the gustatory association cortex may be located in the parietal operculum of the insula.[37] Retention of motor images seems to be a function of the dorsolateral frontal association areas.[38] Impressions from the various body regions are registered in the same body plane as the motor representations in the motor cortex: the leg is represented in the superior frontal gyrus and the face in the inferior.[39] In all these areas, neighboring parts to each association area seem to be able to mediate the registration of sense impressions when the main area is damaged.

Both passive recognition and active recall involve a reactivation of the memory traces, but the experimental difference between these two processes is paralleled by a difference in the cortical areas with which they are connected. Recognition areas seem to be secondary sensory areas (area 18 for vision and area 42 for hearing) which border on the primary sensory areas. When a visual impulse, for example, arrives in the vis-

[85] *Ibid.*

[86] B. M. Wenzel, "Olfaction," in F. A. Mettler (ed.), *Psychosurgical Problems* (New York: Blakiston, 195il).

[87] M. H. Bagshaw and K. H. Pribram, "Cortical Organization in Gustation (Macaca Mulatta)," *Journal of Neurophysiology,* XVI (1953), 499-508.

[88] M. Mishkin and K. H. Pribram, "The Effects of Frontal Lesions in Monkeys, A. Variations of Delayed Alternation," *Journal of Comparative Physiology and Psychology,* XLVIII (1955), 49il-495; "B. Object Alternation,' *ibid.,* XLIX (1956), 41-45.

•• Damage to areas 8 and 9 in the middle frontal gyrus is connected with inability to write words spontaneously, although the patient is still able to copy. Similarly area 44 of the inferior frontal gyrus (Broca's area) involves the ability to speak correctly and area 45 in the same gyrus involves the ability to sing.

ual area '(area 17) the first time, it gives rise to the experience of seeing this object; when the same neutral pattern arrives in the same area, it again mediates the experience of seeing an object, but this time the second stimulation of the secondary visual (area 18) gives rise to the experience of having seen this object before. Similar secondary areas mediate the recognition experience for the other modalities. The centers for somesthetic and olfactory experience are not well established, although Arnold has suggested that area *3* is the primary area for somesthetic sensation and area 1 in the postcentral gyrus is the secondary area.[40]

It is essential to memory recall that only the relevant images be recalled and that they be recalled in the original order in which they were experienced. Consequently, a circuit is required from the cortical sensory areas back to the thalamic sensory nuclei, which circuit then accompanies the sensory projection fibers up to the cortical sensory area. The circuit must be connected with a structure which permits selection of the relevant images. The hippocampus seems to fill the requirements, since it has the necessary cortical connections and its afferent pathway, the pre- and postcommissural fornix, is connected with the septal area and sends relays to the midbrain reticular formation. The reticular formation is, in tum, connected with the thalamic nuclei and the sensory association areas of the cortex. We might expect that, since the recall circuit repeats the pathway of sensation, the thalamic sensory nuclei would carry the original sense impressions and the subsequent recall impulses in different parts of their structure. Some support has been found for this in the visual system.[41] Six layers were found in the lateral geniculate bodies, three layers from each side. It has been suggested that the dorsal pair mediate impulses to the primary visual area, the

[40] Arnold, *op. cit.,* p. 66.

[41] R. L. De Valois, C. J. Smith, A. J. Karoly, and S. T. Kitai, "Electrical Responses of the Primate Visual System. I. Different Layers of Macaque Lateral Geniculate Nucleus," *Journal of Comparative Physiology and Psychololgy,* LI (1958),

middle layers mediate the registration and recall of visual memories, and the ventral layers mediate the experience of familiarity.[42] The circuits for recognition and recall have been diagrammed in figure 8.

The constructive imagination requires the mediation of a brain structure which receives impulses from the sensory areas

FIGURE 9. The Imaginative System. A=Amygdala. AT=Anterior thalamic nuclei. DT = Dorsomedial thalamic nuclei. OC =Orbital cortex. OT =Olfactory tubercle. P =Pulvinar. PT =Posterior thalamic nuclei. S =Septal area. Arrows suggest paths by which the imaginative impulse is conveyed to sensory centers of the cortex.

and permits the rearrangement of memory images. It must also be subject to the influence of physiological appetites (sex, hunger, etc.). The necessary connections seems to be supplied by the amygdaloid complex. This complex is composed of nuclei: the medial, cortical and central nuclei compose the anterior portion, and the larger basal and lateral nuclei form the posterior portion of the complex. The anterior nuclei are con-

•• Arnold, *op. cit.,* pp 68-70.

nected by the diagonal band with the septal area and with the olfactory tubercle an•1 the orbital cortex by the lateral olfactory tract. The posterior nuclei of the amygdaloid complex send fibers to several of the thalamic nuclei: the dorsomedial thalamic nuclei (whose fibers project to the prefrontal cortex), the pulvinar (projects to the parietal association cortex), the posterior thalamic nuclei (project to the occipital association cortex), and the dorsolateral nuclei (project to the temporal association cortex). The imagination circuits are represented in figure 9.

Some mention should be made of motor memory. Motor images are seemingly reactivated by the hippocampal circuit, including a connection to the cerebellum and its projections to the ventral thalamic nuclei. Impulses from the anterior and medial ventral thalamic nuclei to the prefrontal cortex are subsequently conveyed by association tracts in the cortex to the premotor and motor cortex. Similarly, the constructive use of motor imagination implies a manipulation of images (as in sensory imagination) and is probably mediated by the amygdala circuit, which affects the dorsomedial thalamic nuclei. These project to the lateral part of the orbital region (areas 11 and 47), the inferior frontal gyri (areas 44, 45 and 46), the middle frontal gyri (areas 9, 10 and 46), and the superior frontal gyri (areas 8 and 9).[43]

Estimative Sense

The estimative power is the innate power of concretely and directly apprehending objects as either harmful or suitable to the individual organism or to the species. Its proper object, then, is the sensible object precisely as good or harm-

[43] A smaller portion of the dorsomedial thalamic nuclei receives fibers from the nuclei of the midline and centrum medianum and connects with the hypothalamus by way of the periventricular system. The medial part of this nucleus apparently sends fibers to the medial half of the orbital region (areas 11 and 12) and thus constitutes a projection for olfactory imagination. See A. Meyer, E. Beck, and T. MacLardy, "Prefrontal Leucotomy: A Neuro-Anatomical Report," *Brain* LXX (1947), 18-47.

ful.[44] The organic structure which mediates this estimative function must be very closely connected with the sensory pathways, with the circuits for the unifying sense and for the imagination. Insofar as the immediate consequence of the estimation of sensed objects and situations as good or harmful is an emotional response, we might also expect that the estimative system is closely linked with the circuits which govern the emotions. This sensory appraisal is a process of evalua-

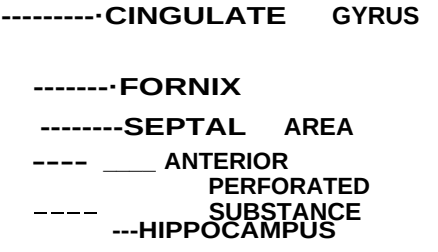

FIGURE 10. Areas of the Limbic Cortex (shaded).

tion and comparison of sense impressions from the various sense modalities and forms an intermediate step between the perception of an object and the arousal of an emotional response. The best adapted neural system to fullfill these functions is the so-called limbic system. See figure **10.**[45]

The hippocampus sends fibers by way of the fornix to the hypothalamus: the precommissural fibers extend to the septal cell groups and to the preoptic hypothalamic area, and

« Klubertanz, *op. cit.*, pp. 134-139, 142-145.

[45] The limbic system is a complex set of structures including the primitive allocortex (entopallium) and the transitional paleocortex (mesopallium). Allocortical structures include the olfactory bulb and tubercle, the area of the diagonal band of Broca, the septal area, prepyriform cortex, periamygdaloid cortex, the hippocampus with its rudiment (which leaves the septal area, passes over the corpus callosum and meets the hippocampus) and the dentate gyrus. Paleocortical structures include the cingulate, para-and retrosplenial, hippocampal and subcallosal gyri, together with the frontotemporal transitional cortex, the island of Reil and the operculum.

the periventricular hypothalamic zone, the region of the tuber, the postcommissural fibers to the dorsal hypothalamic area, cinereum and the mammillary bodies. Fibers also pass in considerable quantity from the hippocampus to the anterior thalamic nuclei and the medial thalamic nuclei. The mammillary bodies are likewise connected with the anterior thalamic nuclei and the cingulate gyrus by the way of the mammillothalamic tract and with the tegmentum of the brain stem and the reticular formation by the mammillotegmental tract. This latter path establishes connection with the primary sensory pathways and the sensory cortex. Sensory impulses from the various sensory pathways are received into the thalamic nuclei. By a projection from the thalamic nuclei of the midline and the intralaminar nuclei, the thalamic estimative system is connected with the several parts of the limbic cortex.[46] The limbic system has five well-defined areas which have a two-way connection with area of the sensory and association cortex. Each area is connected with a neocortical area, and the areas of the limbic system are connected with each other. The medial occipitotemporal region connects the visual sensory and association area (cuneate, fusiform and lingual gyri) with the limbic cortex of the posterior hippocampal gyrus. The medial parieto-occipital region connects the somatic sensory and association cortex (precuneate gyrus) with the limbic cortex of the posterior cingulate and parasplenial gyri. The medial frontoparietal region connects the motor and premotor regions of the superior frontal cortex with the limbic cortex of the anterior cingulate gyrus. The medial frontal region connects the ventromedial cortex of the frontal lobe with the limbic cortex of the subcallosal gyrus and the medial frontal orbital surface. The medial frontotemporal region connects the frontal lobe and the ventromedial aspect of the temporal lobe with

[46] Recent experimental results based on the degeneration of nerve pathways in monkeys have indicated that there is an orderly projection from the anterior nuclei of the thalamus and from the midline nuclei of the thalamus respectively to the anterior cingulate gyrus and to the hippocampal rudiment.

the limbic cortex of the insula and prepyriform area and the posterior operculum, which receives the somatosensory facial and gustatory impulses. Lastly, the medial temporal region maintains only a one-way connection from the areas

FIGURE 11. The Estimative System. AT=Anterior thalamic nucleus. C=Cuneate gyrus. CG = Cingulate gyrus. DT = Dorsomedial thalamic nucleus. F =Fusiform gyrus. *H* =Hippocampus. HG =Hippocampal gyrus. HR =Hippocampal rudiment L = Lingual gyrus. M =Mammillary body. 0 = Olfactory stria. PA = Prepyriform area. PG = Precuneate gyrus. RF =Reticular formation. SF= Superior frontal cortex. Arrows indicate the two-way connections between sensory and limbic corte¥

. for hearing and equilibrium (superior and middle temporal gyri) to the limbic cortex of the posterior insula.[47] See figure n.

It should be emphasized that this sort of reconstruction is highly tentative. The structures of the thalamus which seem

[47] These connections were described by Pribram and MacLean, *art.* cit. (see note 6).

to mediate sensory estimation may also be involved in the unification of sensory experience. The same nuclei of the thalamus which we have associated with the unifying sense are also involved in the estimative sense. The intimate association of these organs may partially account for their intimate association in experience. However, the estimative system involves connections with the limbic system which the unifying sensory system does not.

J.lfemorative Power

The memorative power is the faculty of retaining past estimations for future recall. Our estimation of an object or situation may be altered by previous experience or it may depend on previous experience. Consequently, the functions of the memorative power and those of the estimative sense are intimately connected. In man, moreover, sensory estimation is controlled to a certain extent by reasoning and intellectual judgment. [48] For this reason it is often called the " cogitative sense." At any rate, we might suspect that the organ of the memorative power is closely involved in the same structures as the estimative sense. We might also expect that the structures, which mediate the function of memory, are also involved. The limbic cortex certainly allows for the retention of memory impressions. Impulses from the respective sensory areas of the cortex send impulses to the adjoining limbic areas, as we have seen. The retained estimations may be activated by these impulses and collected in the hippocampus of the memory system. Impulses from the hippocampus are conveyed to the septal area, the hypothalamus and the sensory thalamic nuclei. The thalamic sensory projection would return the impulse to the cortical sensory areas, thus closing the circuit. The appraisal of an impulse to action as useful or harmful, for example, would involve an impulse from the hippocampus, through the fornix to the mammillary bodies of the hypothalamus, then to the anterior thalamic nuclei which project fibers

•• Klubertanz, *op. cit.,* 139-140.

to the anterior cingulate gyri. The anterior congulate gyri are in mutual association with the motor and premotor areas of the cortex. Similar circuits would presumably be operative in the various sense modalities and in the reconstruction of sensory experiences.

Summary

We have attempted to reconstruct the neurological brain circuits which might constitute the organic structures for the external and the internal senses. Much of the reconstruction offered must remain for the moment in a highly tentative mode of statement. The circuits themselves have not been adequately worked out, nor is the physiological evidence in support of them totally conclusive. In addition, most of the available evidence has been gathered from research on animal brains. Even though primates have been used in many instances, the assurance that the evidence gained in this way is immediately transferable to the human brain is bolstered only by a smattering of information of a far less systematic nature from research performed on humans. Nonetheless, it is of some significance to the philosopher of nature that most recent advances in neurophysiology permit at least this primitive attempt to specify and, in a sense, concretize our knowledge of the human faculties.

W. W. MEISSNER, S. J.

Woodstock College
Woodstock, Maryland

THOMISTIC MORALITY AND OPENNESS TO BEING

the root of every philosophy of action or morality lies a conception of the manner in which the agent is related to the action to be performed. Just as there are realist and idealist philosophies of being, so there are " objective " and " subjective " ethics. In the one, the agent is seen as conforming his action with what is, with a reality somehow presented or given; in the other, the agent discovers within himself an ideal or norm or standard to which concrete action must be conformed. It will be a task of this essay to see how the Thomist ethic transcends this dichotomy, or any similar scheme for dividing the varieties of ethical reality and theory. However, the genuine understanding of the profundity of Thomistic thought can be grasped more clearly after an examination of some of the views of other philosophies propounded in Western thought both within and without the framework of scholasticism. It is not our intention to review even cursorily the' principal ethical theories but to select certain ones for examination, in the belief that such analysis will reveal the fundamental deficiencies of any ethics not rooted in the real and metaphysical convertibility of Being and Goodness on which the Thomist ethic is based. The originality of this position, -its standing as a genuine originative thinking of ethics and of moral activity, is perhaps best brought out by contrast with other ethics whose claim for attention is based on their partial grasp of ethical reality and whose partial characteristics as such point to the uniqueness of an ethic of the existential Good given in the grasp of human action revealed in Thomistic thought and its further development. The question here, then, is one of presenting the various partial positions in so revealing a way as to lead to a clearer insight into the ethical reality itself.

It may be well, first of all, to see more clearly what an ethical theory is. For our immediate purposes, it may be sufficient to say we are concerned with those philosophical positions which seek to go beyond the merely descriptive and to establish some norm or standard, inner or exterior, according to which man's action is to be guided and governed. In other words, our concern is with selected theories of normative ethics dealing with the manner in which moral judgments are to guide conduct, or moral decisions are to be made, or, more generally, with how man is to act. Immediately there arises, however, the opposing voice of those who deny the very possibility of any sort of normative ethics which could possibly establish a standard, goal or ideal for moral judgments, or who would refuse to commit themselves in any way to such a possibility and who would thus restrict ethics to a purely descriptive, wholly non-evaluative statement of *de facto* behavior whether personal, social or cultural. Such positions, of course, eliminate not only ethics in the classical sense but also the whole of philosophy, indeed the whole of what has traditionally been called reason. These positions, however, are of interest to the moralist who cannot genuinely avoid the reality of human action and its ineluctable necessity. Man is given as a being who does act, who must act; indeed, action is unavoidable, and not only action but even decisions are inescapable for the direction of my actions is as immediately a necessity as the action itself. Pure spontaneity and total unreflectedness are simply not found in the human condition of action. Furthermore, as M. Blondel pointed out, the very necessity of guidance in our action demands a complete investigation.[1] Not only is it dangerous to live the unexamined life, but once the problem of action has been raised, it must be carried to its term. It is therefore necessary to examine those positions which deny the possibility of ethics and thus of the direction of human activity.

[1] *L'Action* (1893), (Paris: Presses Universitaires de France, 1950), xvi-xvii.

In one way or another, these denials of the possibility of ethics reduce to a total immersion in the particular, a collapse into pure phenomentality, a moral world of individual concrete appearances totally unique, so that what appears can only be described on the wing, so to speak, for the appearances are not appearances *of* anything transcendent or universal. The denial of transcendence and universality effectively removes any possibility of going beyond the immediately given and constantly changing and loses itself in the actual and the unique, denying thus the very humanity of man and his action, because it denies man's ability to stand off from his experiences, to dominate and judge the appearances. This position represents a carry-over into ethics of the positivistic mentality reducing the empirical to the merely observable, thus sinking quickly into the utterly trivial. If there is nothing to know in human behavior, if total diversity through history and through cultures is the sole real *datum,* it is obviously impossible to discover any way of speaking of a good or evil form of conduct, nor any method to favor any standards at all, not even those of progressive evolutionary change. Thus Westermarck notes: "If, as I maintain, the objective validity of all moral valuation is an illusion, and the proposition 'this is good' is meant to imply such validity, it must always be false." [2] This writer's conclusion that ethical statements merely express feeling of pleasurable approval, or unpleasant disapproval leads properly to a total absence of standards. Human action is reduced to that of the merely animal. The same conclusion of ethical nihilism results from any position which is based soley on a vision of diversity, change, process and a total facticity in which man is lost.

Man is lost, for he and his action are so bound to the immediate, particular context of his action that any thought or decision or even feeling involved in his action passes totally away as the situation changes, and we have the picture of a

• E. A. Westermarck, *Ethical Relativity* (New York: Harcourt, Brace, 1982), 142.

complete occasionalism, whether the starting point be historical investigation, or contemporary anthropological and sociological study. Human moral behavior is totally situationist in such a way that there may be, according to the diversity of view-point, truth or correctness or proper feeling in a given individual, social or cultural situation but, since each situation is totally new (or contains radically new ideas, facts and conditioning) no standard of evaluation is possible. Yet, of course, the very assertion of the general principle that every situation is unique is itself taken as a principle of universal validity. But in the light of the situationist view no universal statement can be made, and thus its own positivistic position is itself conditioned by the situation and can be transcended.

However, a genuinely radical positivist view would deny this sort of attack by denying that any such sweeping claim to intellectual validity is made. The positivist's own position merely denies the possibility of understanding at all, seeing moral behavior as dependent on some totally non-intellectual source. Moral behavior is thus left to the totally unique decision of the individual; man's free decision, forced upon him by the very necessity of action, is its own support and is itself creative of the values embodied in the act. It is understandable that such a radical critique of intellect involves the disappearance of Being accessible to mind, and thus leaves for man the alternative of the free creation of values as the projection of meaning into the moral life, as the subjective institution of unique ethical standards. Certainty is obtained only by the will positing itself, and no standards are available but the individual's will-act which posits them. As Heidegger acutely remarks, the loss of Being leads to the endowment of objects with value, and the establishment of these values as goals of activity. He sees Nietzsche as the dominant figure in this process. The creation of values to replace those destroyed in the Nietzschean analysis, is the function of the drive to growth, the will to power or might: " The will to power is the basis for the necessity of determining values and the ori-

gin of the possibility of the judgment of values." [3] Thus the man-created, freely posited value replaces Being, and ethics as an intellectual discipline disappears together with metaphysics.

While not many positivists have had the philosophical acumen to see the implications of radical historicism as did Nietzsche, we must note the prevalence of the positivist outlook not only among the so-called situationists in ethics but also among the social scientists. Professor Leo Strauss has discussed the absolute dichotomy of facts and values as enunciated by Max Weber. According to this important figure in the foundations of social science, such science is to be completely neutral towards values and may only describe references to values without ever evaluating. The real heterogeneity of the Is and the Ought, of reality as understood by science and of man's norms and values is complete. Furthermore, this divorce involves Weber's position that no real knowledge of values and standards, of the " Ought," is possible. This position means eventually that social science would be unable to deal with social phenomena in which standards of conduct are an intrinsic part of the real situation and which cannot even be described without at least implicit evaluation. More fundamentally, this position involves a real denial of any accessible meaning to moral standards, and inevitably implies the denial of the "Ought" (the realm of norms and standards) which is set over against the world of reality accessible to science. This destruction of ethics is perhaps not uncommon among contemporary practitioners of the social sciences, for, as Professor Strauss remarks: "Many social scientists of our time seem to regard nihilism as a minor inconvenience which wise men would bear with equanimity, since it is the price one has to pay for obtaining that highest good,

[8] Maxtin Heidegger, "Nietzsches Wort 'Gott is tot,'" *Holzwege* (8 ed., Frankfurt: Klostermann, 1957), *"Der Wille zur Macht ist der Grund fur die Notwendigkeit der Wert-setzung und der Ursprung der Moglichkeit der Wertschatzung."* Cf. *ibid.,* "Die Zeit des Weltbides," 69-104.

a truly scientific social science." [4] From the wastelands of positivism one has passed to the establishment of a scientism which, turning its back on any genuine concern for thought and being, looks to empirical techniques for salvation.

With the breakdown of metaphysical thought completed in Nietzsche's substitution of Will for mind, the modern world has faced two possibilities. The first is a genuine return to metaphysics, to the thought of Being, and of Goodness as Being which alone can found an ethics. The second is a further collapse into the particular, into a manipulative technicism or scientism which looks to the wholesale and complete application of so-called natural science techniques to the whole of human life both personal and societal. [5] Again, from the philosophical point of view, Heidegger has shown that the scientistic, subjectivistic affirmation of self through technique is a logical outcome of the "forgetting of Being." The exaltation of subjective will in which man institutes values and reorders reality to its own demands, leads to the adoption of technique which is mere human mechanical productivity. The essay on the " Inquiry into Technique " shows that the scientistic mentality involves a complete absence of Being and a vision of reality in which·nature represents but a structure of energy wholly at man's disposal. [6] Insight into Being is forgotten and truth is attained in an engineering of nature and even of human nature. Yet the very ultimate character of this view of reality may contain within itself the exigency to turn to Being and the "letting-be" of things in reality. From the exaltation of will in Nietzsche and the consequent loss of being by immersion in the total facticity of the various forms

• Leo Strauss, *Natural Rights and History* (Chicago: University of Chicago Press, 1953), 49.

[5] Thus, political scientists in the great tradition of the West have described the reign of Caesaro-scientism in areas of political policy making, and have called for a return to a doctrine of the human mind seen as capable of grasping reality and of guiding human action in the light of that comprehension: William H. Roberts, J. U. D., "Problems of Foreign Policy Formation," *The Catholic University of America Bulletin* 29 (July, 1961) Iff.

[6] " Die Frage nach der Technik," *Vortriige und Aufsiitze* (Pfiillingen: Neske, 1954)

of positivism comes then the final positing of man as the scientific creator of the world and of values-man, cut off from his roots in Being and his destiny in the Goodness of Being. It is the originative affirmation of man's dynamic relation to Being in his accomplishment of the Good which we will discover as the Thomist answer to the central problem of human action - the discovery of what constitutes the goodness of action. We may turn then from the desolation of scientism to other ways of leading to the central problem of ethics.

In order to place ourselves in a more advantageous position from which it will be possible to grasp the constituting of goodness in action by man, it will be well to review some of the other fundamental divisions and dichotomies in ethical theory. Allusion has already been made to the dichotomy of fact and value, of " Is " and " Ought," of reality and goodness. In one way or another, the proponents of this distinction will see the source and possible validation of moral standards as arising from something different than our awareness of non-moral reality. In one sense this distinction is as old as the classical dichotomy of Physis and Nomos. Basically this distinction involved a difference between the characteristic or customary way of behavior and the good by nature. Indeed, the search for what is good by nature as distinct from what is good by convention is put forth by Plato as a distinctively Socratic inquiry.[7] The distinction is made between what is good for man as man, and what is accepted traditionally as good in this or that clan, city or group; the one is discovered by man, the second is his product. The good by nature is not immediately apparent, hence the Socratic questioning of the accepted and the traditional, the seeking for " real nature " behind or beyond what is commonly accepted and taken for granted in human behavior.[8] Eventually the Platonic discussion leads to an ethical distinction between those things good

[7] *Republic:* 538d3-4, *e5-6; Statesman:* !'l96c8-9; *Laws:* 70!'lb5-8; cf. Aristotle. *Politics:* l!'l69a3-8; l!'l71M3-!'l4.

[8] Cf. *Laws:* 889e3-5; 890a6-7; 904a-bl.

for man by nature and those which are bad as set over against the conventionally rejected or accepted. Thus there is a standard which can be discovered in nature, or specifically in human nature, by which to judge the conventional so that Aristotle can attribute to political skill and virtue the determination of what is truly just.[9] The classical thought of Socrates, Plato and Aristotle agreed in their own distinctive ways on the establishment of Physis as the standard to which Nomos is to conform, or in virtue of which it is to be judged. The reality of human nature, the proper *ergon* of man as man is the standard. Elaborated in the Republic, it is repeated in the Aristotelian ethical treatises[10] as the task for which by nature man is destined: the task of man as man, and the tasks of his various abilities. The examination, the discernment of what man is, in the light of what he is to be and to do, establishes *Physis* as the source of moral judgment and as the basis of *Nomos,* of those laws and standards which are to serve as guides to human action. We shall see this question again in Aquinas, but for the moment it is sufficient to appreciate the classical attempt to establish ethics on the basis of what is by nature, on a rational appreciation of what is. As Festugiere has described in great detail, this meant eventually the view that the intelligible and divine order of things revealed in the *Cosmos* was to be the ultmate standard of action.[11] That human life is good which is in accord with the natural order of man's being and eventually with the cosmic order of the universe. In one way or another, classical ethics founds the " Ought " on the "Is "-the " Ought" springs from and is to reflect what man basically is.[12]

In modern times, we may say that the "Is " and " Ought" dichotomy appears in a somewhat different dress. In British

[9] *Politics:* cf. *Nicomachean Ethics:*

[10] *Republic:* cf. *Nicomachean Ethics,* I, 6.

[11] A. J. Festugiere, 0. P., *La Revelation d'Hermes Trismegiste,* T. II: "Le Dieu Cosmique," (Paris: Gabalda, 1949).

[12] Cf. *Nicomachean Ethics:* for evidence of the problems here involved in spite of a general clarity of doctrinal position.

ethical theory, Shaftsbury and Hutcheson separate the perception of moral good from all other aspects of reality and place moral concepts in a world of their own to be perceived by an independent moral sense akin to a special aesthetic sense for the perception of beauty. This non-rational sense is a feeling of approbation of appreciation relating to some non-perceptible, intellectually unattainable quality. David Hume continues this dichotomy with a sharp distinction between (moral) rightness and truth. If rightness is a *real* quality of things it is neither true nor false, but this is absurd; so rightness is denied as a quality of things, as anything " factual," nor is it a special kind of trait of action available to a moral sense. Rather:

> Take any action allowed to be vicious, wilful murder, for instance. Examine it in all lights and see if you can find that matter of fact, or real existence, which you call *vice.* In whichever way you take it, you find only certain passions, motives, volitions, and thoughts. There is no other matter of fact in the case. The vice entirely escapes you ...[13]

Eventually, Hume's monism of sensory evidence forces him to ascribe moral statements to the feelings of the agent or of the observer. The "Ought" or the realm of Value is but a feeling response with no possible relation to reality as Hume conceives it. What has happened here with Hume is, in the wake of Descartes' positing of the human subject as the source of all certitude, that the world of the " Is " is reduced to a monistic world of sensory occurrences so that any statement which is not a description of what is available to sense is dependent on the subject. Hume relates moral " qualities " to the passions, for he has restricted reason to another area of non-sensory relations of statements about truth and falsehood. This is but one form of a broader dichotomy in ethical theory and one which is charactertistic of modern times. Once the Cartesian empirical subject becomes the center, reality becomes in one way or another subjectivized in a fundamental

[13] David Hume, *Inquiry concerning the Principles of Morals,* Appendix I.

sense. Hume, remaining with the Cartesian empirical self, is led to the dichotomy of fact from value because he has reduced the world of fact to what is available to sensation. It is but a step then to attribute moral statements to the feelings or passions.[14]

To see the often discussed divisions of fact and value, reason and feeling, objective and subjective, we may tum to the Kantian ethics and critique of practical reason, the analysis of which will lead us to the consideration of the Thomistic ethic. In Kant's work can be seen in very vivid form three dichotomies: 1) e!Tipirical fact and moral value; !2) feelings, impulses and desires as distinguished from (practical) reason and Kantian "good will"; 3) subjective objectivization of ethical norms. This is quite opposed to classical *physis* or Thomistic Being and Goodness.

At the risk of some over-simplification, but presupposing an awareness of the transcendental character of Kantian thought, the following summary observations may be made. As usually presented, the most striking feature of the Kantian position in the *Critique of Practical Reason* is the refusal to base ethics, law or moral standards on any sort of empirical foundation, parallel to Kant's rejection in the *Critique of Pure Reason* of an empirical grounding for the principles of reason and metaphysics. This means, in terms of the history of ethics, a rejection of any sort of pleasure (lower or higher, bodily or spiritual) of any sort of utility (personal, cultural, social or universal) and of any sort of eudaemonism which would ground ethics in man's tendency to or

[14] This position is carried still further by the logical positivists: ". . . the reason why they (ethical concepts) are unanalysable is that they are mere pseudo-concepts. Thus if I say to someone, 'You acted wrongly in stealing that money,' I am not stating anything more than if I had simply said, 'You stole that money.' In adding that this action is wrong I am not making any further statement about it. I am simply evincing my moral disapproval of it ... If now I generalize my previous statement and say, 'Stealing money is wrong,' I produce a sentence which has no factual meaning-that is, expresses no proposition which can be either true or false." A. J. Ayer, *Language, Truth and Logic* (New York: Dover, 1952), 107.

beatitude. The rejection of all these positions by Kant radically denies the possibility of founding ethics on the " fact " of nature or any facet of nature, such as the desire for happiness. If one takes *Physis* as referring to any aspect, or to the totality of empirical, non-transcendental human nature, then Kant denies *Physis* as in any way capable of grounding the necessary and universal character of ethical *Nomos.* Anthropology in any sense, whether it be that of the early Aristotle of the *Nicomechean Ethics* or the later Aristotle of the *de Anima,* and even more, if it be that of contemporary ethical anthropology of a Deweyan or " scientific " caste, is rejected in favor of the transcendental grounding of ethics in the *a priori* categories of pure practical reason and of pure good will. This rejection is based not only on Kant's general position distinguishing non-necessary *a posteriroi* knowledge from that which is necessary and *a priori,* analytically or synthetically, but also on a more strictly ethical basis. This is that any imperative based on the " reality " of human nature, and any ethical norms arising from a consideration of what is fit and proper or even required for the fulfillment of that nature must be *of* a conditioned and conditional, i.e., hypothetical, character. The eudaemonistic position must always be basically conditional, dependent on the individual's *de facto* choice and willing of " beatitude "-whether this is a rationally perceived thing or a happiness of a more sensate quality. The pure and categorical quality of the genuine ethical norm is thus from the beginning unobtainable.

The separation of Value and Law from "reality" is likewise found in the Kantian rejection of both an " ontological " or a " theological " reality as the ground of ethics. Values founded on the perfection of human reality or on the presence of a commanding divine will are both rejected, for both positions demand an empirical basis for their perception and furthermore, already pre-suppose the presence of a grounded moral value rooted in "law."

" Among the *rational* bases of morality-those springing from reason-the ontological concept of perfection ... none the less is better than the theological concept which derives morality from a divine and supremely perfect will; not merely because we cannot intuit God's perfection and can only derive it from our concepts ... but because, if we do this ... the concept of God's will still remaining to us . . . would inevitably form the basis for a moral system which would be in direct opposition to morality ... But what is of more interest to us here is to know that these principles [e.g. God's Will and perfection, etc.] never lay down anything but heteronomy as the first basis of morality and must in consequence necessarily fail in their object." [15]

In the broad sense, then, Kant has rejected any grounding of value in fact, for the pure ethical value must be anterior to fact, even to the :' fact " of a rational nature striving for its own rational fulfillment. The dichotomy of " Is " and " Ought " is clearly perceived, radically founded on the Kantian concept of transcendental philosophy. This leads, then, to a subjective grounding of ethics, to the founding o£ ethics on no other *thing,* no *noumenon* available to the empirical subject. But it must be noted that Kant's ethical subjectivity does not rest either on the empirical subject, in whatever way conceived, but on the transcendental subjectivity of *pure* practical reason and *pure* good will. This leads us to see Kant rejecting feeling of any sort-of personal or generalized character-as the basis o£ moral value. Reason and good will ground ethics, but not in an empirical sense for what is accepted is only pure transcendental practical reason with its maxims, and pure good will with its reverence for duty. No criticism o£ Kant can be valid i£ we mistake his statements on reason and will and see them as referring to the *de facto,* here and now, existing empirical subject. We must penetrate further to an understanding of the transcendental grounding of ethics.

Value is grounded by nothing " outside " the transcenden-

[15] *Groundwork of the Metaphysic of Morals,* 443 (Berlin ed.), Tr. in: H. J. Paton, *The Moral Law, or Kant's Groundwork of the Metaphysic of Morals* (London: Hutchinson's University LibraJ:y), 110-111.

tal subject but solely on the non-heteronomous, fully autonomous self-command of transcendental practical reason ordering reverence (good will) for duty, for value as such. We need not, for our purpose, concern ourselves with the other consequences or postulates of practical reason, but only with this fundamental one of the reverence for duty, the basic, *a priori*, universal and categorical imperative. Finally, we may note the purely formal quality of this imperative, containing no material or empirical or sentiment content.[16] This formal quality is linked to the universal character of the fundamental maxim of morality prescribing reverence for duty, and it thus eliminates any "content" coming from man's nature, needs, desires or condition. No deduction of moral principles such as is found in St. Thomas, based on universal human inclinations, could be acceptable here.

Thus, Reverence or Respect for law as universal imperative is the norm or standard for all moral decisions and values. The " maxims " of concrete action are formed by or in-formed by this reverence, and morality is the relation of an action to the pure autonomous good will.

" Thus morality lies in the relation of actions to the autonomy of the will-that is, to a possible making of universal law by means of its maxims ... A will whose maxims necessarily accord with the laws of autonomy is a *holy*, or absolutely good, will. The dependence of a will not absolutely good on the principle of autonomy ... is *obligation.* Obligation can thus have no reference to a holy being. The objective necessity to act from obligation is called *duty* . . . For it is not in so far as the man is *subject* to the law that he has sublimity, but rather in so far as, in regard to this very same law, he is at the same time its *author* and is subordinated to it only on this ground ... "[17]

[16] Max Scheler's attack on Kantian ethics centers on this empty, pure formalism. This is indeed a point of attack, and in part we may follow Scheler in seeking to establish a " material " *a priori* which contains an available human content. However, we would reject Scheler's grounding of his material, " content-ful" *a priori* in pure "feeling." Cf. *Der Formalismus in de Ethnik und die materiale Wertethik* (Bern: Francke, 1954).

[17] *Metaphysic of Morals,* 439 (Berlin ed.); Trans. Paton, *op. cit.,* 107.

Thus when Kant speaks of respect for the humanity of persons, he is not deriving moral value from the *de facto* object of respect, but from the universalizing *form* of a maxim of the categorical imperative. The goodness of acts does not derive from their objects; value does not arise from a relationship of agent with object of action; rather, the form of reverence for law which "in-forms" these acts gives to them their moral worth.

" An absolutely good will, then, the principle of which must be a categorical imperative, will be indeterminate as regards all objects, and will contain merely the *form of volition* generally, and that as autonomy, that is to say, the capability of the maxims of every good will to make themselves a universal law, is itself the only law which the will of every rational being imposes on itself, without needing to assume any spring or interest as a foundation." [18]

"... but fidelity to promises and kindness based on principle (not on instinct) have an intrinsic worth. In default of these, nature and art alike contain nothing to put in their place; for their worth consists not in the effects which result from them, not in the advantage or profit they produce, but in the attitudes of mind -that is, in the maxims of the will-which are ready in this way to manifest themselves in action even if they are not favoured by success." [19]

Practical reason is thus an autonomous, *a priori* and transcendental source of morality expressed in the reverence of good will.

Many scholastic writers, to say nothing of others, have given extended critiques of Kant's *Critique*, and there is no need to repeat these in detail. The major focus of attack by scholastic authors has been on the epistemological and metaphysical foundations of Kantian ethics. The further criticism may also be offered that for the Thomist the moral value of an act does indeed derive from the object of the action, but

[18] *Ibid.*, 78 (Berlin ed.); Tr. from *Kant's Critique of Practical Reason and Other Workw on the Theory of Ethics*, T. K. Abbott (London, Longmanns, Green, 1909), 63.

[19] *Ibid.*, 435 (Berlin ed.); Tr. Paton, *op. cit.*,

not from the object considered as a merely empirical fact or reality. Rather, the Thomist sees the object as judged by reason, and thus elevated to the moral order, in such a way that a genuine, if non-Kantian, autonomy is preserved for practical reason and the good will. Even the doctrine of natural law does not imply a simple passage from fact to value, but elevates the natural fact or reality to the properly human and moral order by the personal judgment of practical reason. This is a valid criticism of Kant if properly understood, but it would be well to point out two other connected aspects of Kantian ethics which will be of particular assistance in understanding the Thomistic position.

First of all, and apart from any critique of Kantian epistemology as such, the importance of the transcendental *a priori* may be legitimately emphasized. If the Kantian *a priori* is severed from a " natural " unity with being and the Good, Kant at least has pointed out the necessity of the *a priori* determination of practical reason and good will. The importance of this essential notion is found again in the *Thomistic* teaching on natural appetite and the foundation of a naturally-given, *a priori* synderesis or form of moral judgments. The Thomistic *a priori* is totally different from the Kantian *a priori*, yet the importance and value of the Kantian insistence cannot be overlooked if only as a means for gaining insight into Thomistic doctrine which relates the *a priori* "a prioristically" to Being in its quality of goodness. The "realistic " *a priori* will allow us to see how the Kantian dichotomies of fact and value, of object and subject are resolved into *a priori* unity or transcendental relation.

Secondly, and often disregarded, the Kantian insistence on reverence as the form of practical reason and good will is a most important discovery which, again, being transformed, will enable us to see more clearly the fundamental character of reverence as the basic moral attitude of a finite agent, directed passively and primarily (a *priori)* to the promotion of Being and the Good. If Thomistic reverence reverses, in its

own way, that of Kant, it is no less necessary to see the imperative attraction of Being as a reverence relating the acting subject to the Good. If the Kantian reverence for the law as such appears as an arid and coldly formal deontologism, the *principal* criticism of Kant is not the absence of feeling, emotion and human warmth, but rather than the Kantian reverence is not fully a reverence for Being. Heidegger has remarked that the Kantian reverence may lead us to a renewed appreciation of the fundamental unity of ethics and ontology in the one and absolutely primary call of Being on man in his thought and action.[20] The very misconception of Kant on these fundamental points may well serve to draw our attention to forgotten aspects of Thomistic teaching.

The brief previous review of some fundamental ethical problems prepares us for a renewed application to the central questions of ethics as discussed by Thomas Aquinas and the scholastics. If we have seen these problems as organized around such dichotomies as those of fact and value, " Is " and " Ought," feeling and reason, object and subject, it is for the purpose of seeing the unity in diversity of the Thomistic solutions. It is fitting now to take up the Thomistic ethics revealing the grounding of ethics in man's openness to being both in thought and in action. Aspects of fundamental Thomistic ethics will be presented in such a way as to emphasize the ontological foundations of human action, or more precisely the ontological conditions of the possibility of moral action as described in the *Prima Secundae.*

The Prologue

The beginning of Thomistic ethics is a recalling of the doctrine of *Prima Pars, Quaestio 93,* and of the whole Scriptural and Patristic tradition there included, on man as the image of God, founded in man's capacity for thought and free action by which he determines his own activity:

[20] Martin Heidegger, *Kant und das Problem der Metaphysik* (Bonn: Cohen, 1929,) 150 fl'.

Man, being made, as St. John Damascene said, in the image of God-meaning by this that he is endowed with intelligence, free will and a power of action which is proper to him-we are to treat of him, having discussed the Exemplar, God, and those things which come forth from his power according to his will; that is, we shall discuss God's image, man, who likewise is the principle of his own acts, due to his having free will and a dominion over his own activity. [21]

The Prologue, by implication, distinguishes man from all other beings of this world, which, indeed, do participate in divine being, but not as *images* of God and the divine activity. Man's distinctive quality is not merely in his being biologically at the summit of earthly living things, but in the fact of his unique activity: that he is the principle, *princ;ipium* and *dominus,* of his action and this in a wholly unique way by which he reflects the being of God and the divine activity. The supreme exemplar of human being and action is thus the *idem est operari et esse* proper to God. In God operation, thought and love, are one with the divine being: there is identity of Being, Truth and Goodness in such a way that God is beyond Being, beyond Truth and beyond Goodness in a unity which can be named but never comprehended by man. There is likewise identity of operation with being so that God is not only Truth but Thought, not only Goodness but Love, in such a way that the divine Being *(Esse)* is Truth and Thought, Goodness and Love, and the divine Life is the actual exercise of this identity of being and operation.

If this is the divine exemplar of human action, it is to the structure of this action that we may first give attention. Created activity, like man himself, is a deficient similitude of the divine exemplar. Similitude in being means not only man's participation in the divine being placing him on the scale of beings in the world, for, in this sense, man is similar to all other creatures. The uniqueness of man's participation lies in

[21] Prologue, *Prima Secundae.* For an outline of and reference to Patristic tradition, vd. P. Th. Camelot, 0. P., "La theologie de !'image de Dieu," *Revue de8 Science8 Philosopkique8 et Theologique8,* XL (1956), 443-471.

the fact that he is capable of a conscious response to being as such, that he is open to being and that by his action he can grasp being. This grasp is not merely a grasp of the being found in various beings, in the various categories of being, but rather this is a grasp of *Esse:* the human imitation of the divine activity which is the eten1al exercise of *Esse* as such. As a finite creature, man's exercise of being lacks the totality and perfection of the divine, yet we are led to see the essence of human operation as a genuine, if finite and deficient, imitation of the divine " *interminabilis vitae tota simul et perfecta possessio."* [22] St. Thomas' Prologue invites us to explore more deeply for a moment an ontology of human action by which man realizes himself by an ever more conscious and total dedication to the advance of being.

The finite of human being involves a deficiency, a distinction of actuality from potentiality, which may lead to conceiving of all human action in terms of a *motus,* or *transitus* from potentiality to actuality. The activity of the creature, whether it be external or internal action, or whether it be, in Hannah Arendt's classification, labor, work or action/ [3] seems always divided by a distinction of object and subject, of agent and patient. The openness to being which is distinctive of man is always mediated by an otherness, of which the principle is material. This is true not only of the more obvious forms of man's engagement in the material world, but also in his "highest " activities of thought and love. Not only is thought always the thought *of* something, and love always a love *of* something, but this otherness by which man attains to being is mediated by matter, so that thought always involves the " *conversio ad phantasmata,"* [24] and love always includes a similar " *conversio"* to the appetitive powers of sense. Human activity is constituted by this otherness in materiality, and this seems always to involve the *motus,* change or move-

[22] I, q. 10, a. 1, obj. 1.

[23] Hannah Arendt, *The Hnman Condition* (Chicago, University of Chicago Press, 1958), 7-8.

[••] I, q. 84, a. 7.

ment on the part of the agent from a state of non-activity to act, and on the part of the " patient " from passive otherness to an actualized sharing in the perfecting of the subject: *actio est in patiente.*

Yet this analysis of action is incomplete-a fact noted in the traditional distinction of transient and immanent activity. Immanent activity is described in one way as an overcoming of otherness, so that the *intellectus in actu est ipsum intelligibile in actu,* and the lover is transformed into the beloved. This emphasis stresses the intentional identities in thought and love which are the creature's imitation of the fullness of actual possession in identity in the divine activity. In another way, the immanent activity of thought and love are not merely transitions from potentiality to actuality but are the actual exercises of the perfection of being *(Esse).* In thought and love, man exercises or actualizes his being as openness to being in imitation of the pure actuality of the divine exemplar. Thought is then the grasp of being in the light of being *(esse),* and love is the going out to being in the attracting power of the good. The exercise of this openness to being never takes place for man apart from the conditions of potentiality, materiality and otherness which are proper to the human condition, but the center of activity is the *excessus ad ipsum esse* realized in immanent activity. [25] In this activity, man realizes himself by the actual exercise of that which is distinctive of man: the ability to grasp and go out to being through and in the mediation of the things of the world.

This exercise of being mediated through the necessary conditions of transient action is itself double so that the attaining of being involves both thought and freedom, both the active passivity of a relation to being as truth and the passive activity of a going out to being as good. The reality of man's openness to being and his presence in the world is revealed in knowledge as the unfolding in thought of the truth

•• Cf. Karl Rahner, S. J., *Geist in Welt* (2ed.: Munich: Kosel, 1957), 892-398.

of being and in will as the establishment by action of the goodness of being. St. Thomas frequently describes this two-fold grasp of being by man both in his description of truth and goodness as trancendental properties of being from the " objective " point of view, and in his analyses of the mutual involvement or *circulation* of thought and love from the" subjective" point of view. The supreme exemplar of this *circulatio* is to be found in the treatment of the intra- Trinitarian life whose perfection is imitated by man in the activity of thought and love. Philosophically this is to be seen in the attaining of being in human immanent activity, and it is this that underlies the whole Thomistic conception of human activity and renders possible the reflexive self-possession of man in the judgment by which he attains truth and in the loving free decision by which he goes out to goodness. The transcendence which is the condition of the possibility of thought and love is the relation to being which is constitutive of man as the natural image of God.

This openness, furthermore, is the radical explanation of human activity and the ground of human dynamism by which man constantly is to become more fully and totally himself by an ever increasing assimilation to being rendered present in the fullest by his immanent activity. This activity is always a process involving the actualization of the human potential through action in the world. This is the human *ergon* in the sense of an ineluctable task or proper work by which man is inexorably drawn to being. This is also the *telos* of man who has not yet attained his perfect state. Human activity is thus a constant exercise of his tension to being which culminates in the moral, free activity of love by which man goes out to goodness and becomes himself good.

To recall this ontological vision of human being and action, it seems, is the purpose of the Prologue. Thus it serves not merely to connect the treatment of the moral life with the theological orientation of the *Summa* but gives an indispensable orientation for the understanding of human action in

itself. Of course, this part of the *Summa* is never isolable from the rest of the book in some moralistic sense which could conceive a study of man and his action as a study of the purely human condition apart from its relation to and grounding in transcendence by way of imitation. The moralistic view in ethics corresponds to the purely antic outlook in philosophy which rests satisfied with thematic analyses of the categorical aspects of beings. The Thomistic Prologue carries us immediately beyond so limited a position to a vision of man in the relation of *exemplatum* to the divine exemplar. And this relation is considered not categorically as a static likeness, but as dynamic openness to being in action by which man's being as image is realized. As we shall see, it is this ontological penetration into the reality of human action as the exercise of the relationship to being that is the basis of the moral life.

On Human Beatitude

The study of the ultimate end of man which covers the first five Questions of the *Prima Secundae* can easily be interpreted as the description of a progress through human life to a state of final felicity. That is, the treatment of beatitude can be seen as a dialectic establishing the insufficiency of created goods to satisfy man's needs and of the sufficiency of God, the infinite good, to provide such felicity. This would make this passage strictly eudaemonistic, with beatitude expected not in this life, or not in human societal life, but in a state of bliss in another life wherein the possession of God would provide the means to the full protection of man. From this, one might well conclude that the subjective satisfaction of man's tendency to perfection and happiness is the ultimate principle of Thomistic morality. If beatitude is the true goal of human action, if the pursuit of it is the basic dynamism, and if all lesser goods are sought only in virtue of the attraction of this ultimate state, then it would seem clear that the fulfillment of man's longing for happiness is the center of his activity. Even when this state is seen in its noblest aspect as

the highest activity of the human subject, it seems that the moral life becomes a matter of noble self-interest, in which God serves as the object fully satisfying man's need for perfection.

Such an interpretation fails to take into account the classic distinction between formal beatitude, or the state of possession of God, and material or objective beatitude: God himself as the ultimate end and supreme good. The Thomistic analysis clearly centers on this latter aspect in which God is sought for the sake of God in homage to the supreme goodness which he is, and not primarily as perfective of man. St. Thomas would insist, of course, that this ultimate good is actually perfective of man and could not be otherwise for the very nature of the perfect good is to perfect *(perfectum perficere)*. The nature of the good, from this point of view, as a *passio entis,* is that it, perfect in itself, is also perfective of the appetite.[26] Yet the good, under its proper formality of finality, is sought in and for itself, and not formally because it is perfective of man. The end of man is not merely a perfection which is realized in man himself; that is to say, self-perfection is not the ultimate end in and for itself. This end is rather God who, as ultimate end, is willed and loved as such.[27] Even on this level of analysis it is sufficiently clear that St. Thomas in no way subordinates God to being merely perfective of man. If this section is seen as a teleological examination centering upon good objects, the dialectic leads through the goods of this world in all their categories to a supreme good who is the cause of all other good things and thus loved absolutely as the supreme good outside of and beyond the series of all created goods.

The center of moral activity would then be the goodness of the ultimate end, prized and valued in and for its intrinsic

[26] It would be literally monstrous if the good to which man naturally tends were not perfective. What is denied is that St. Thomas sees the good as merely the appetibile and not primarily and formally as the *perfect-honestum.*

[27] *III Sent.,* d. 29. q. 4; *IV Sent.,* d. 49, 2, q. 1. ad Sum; *I,* q. 60. a. *5; 11-II,* q. 27, a. 3.

value, and this ethics could be called eudaemonistic only secondarily, for the primary movement of man is to the goodness of the ultimate end as such, which is only *then* perfective of man's striving. This analysis could then be carried further, by analogy, to the assertion that moral values sought in human activity in the world are not constituted as such by their being perfective of man, but by their intrinsic goodness as participations of and in the goodness of the ultimate end. Moral value-the *bonum honestum* of the traditional trichotomy-is thus constituted objectively and not formally and precisely because such values in action contribute to man's progress towards felicity. Rather the contrary would be true: the morally good is constituted by its participation in the ultimate good: *honestum dicitur quod per se desideratur.* Moral value is not a mere means to the good of human happiness, nor is moral value merely a means to the ultimate good; rather it has its own consistency as a genuine end, a participated anticipation of ultimate goodness. Moral value is not merely a useful good but an intrinsic good: an anticipated qualitative perfection, an assimilation in some degree to the ultimate good realized here and now. Precisely how this value is incarnated in the individual action will be the matter of our final section. We may now return to the meaning of the discussion of God as ultimate end.

The purpose of the questions on Beatitude is to demonstrate the morally necessary ordering of all that man is or can be to God. God then is to be the transcendent horizon of the totality of human action. Does this mean that God is the supreme good object encompassing within himself all the particularized goodness found in creatures? The answer to this is a qualified affirmative. Affirmative because God is the supremely good object of man's action, the highest object of his striving. Obviously, this does not mean that we are to consider God as the final link in a chain of final causes, for this would be to condition the unconditioned and thus to destroy his character of ultimate finality. Rather God is be-

yond the order of final causes as their transcendent principal and as the real condition of the possibility of their existence and efficacy. God is the necessarily existing condition for the possibility of finite finality and not merely its ultimate ending, postulated by the impossibility of infinite real regress. God rather conditions the whole order of moral and final causation, and he conditions every moment, every instance of this causality.

Therefore, our affirmative answer to the question of whether God is to be seen as the supreme good comprehending all particular goods is to be qualified. God as the ultimate end, the ever present real condition of every moral act, is the transcendental horizon of morality. It was said above that, in Kant, reverence for the law for its own sake was the transcendental unifying condition of all moral norms and acts. A criticism of this was that the Kantian view was only partially correct because it failed to assign a *real* transcendental horizon. Here then we have the Thomistic counterpart or solution. It is not reverence for the *form* of law but rather reverential acknowledgement of God, the supreme referent of human immanent activity, which is the transcendental horizon of moral action. The *habitudo ad Deum* is the necessary quality which human action in its authentic fullness must possess in order for it to be fully itself; human action attains its immanent *telos* by this reference alone. This, of course, does not deny that the human act can be authentically, if partially, fulfilled by a genuine reference to the good as such -to the moral *bonum in communi-which* is sufficient to make an act perfect in its own order. What is emphasized is that the totality of reference to being as good is attained in human action only when this action includes a reverential relationship to the transcendent being whose actuality is his goodness. It must be noted, in this connection, that St. Thomas is speaking as a " realist," taking man as he is, that is as actually ordered to a supernatural destiny, so that fully authentic, or in Augustinian terms-fully virtuous activity, is

possible only in the supernatural order. If we emphasize here the philosophic import of the discussion of beatitude it is to stress St. Thomas' ontological understanding of the teleology of beatitude which sees human action as constituted by a reference to transcendence. If human action in this world is always material and genuinely in the world, there is too the other pole of human action which is its reverence to the transcendental horizon of divine being. This reference is maintained, genuinely and authentically, in the philosophic appreciation of the transcendent reference of action to good in reverence for being.

The Question of Morality

The few but difficult questions on the constitution of morality (Questions 18-21) will give the final solution of St. Thomas to basic ethical problems. These questions deal with precisely how the various dimensions of immanence and transcendence, of reality and value, are actually constituted by and in the moral judgment which is incarnated in action. It is in these questions that St. Thomas discusses precisely how the human act is constituted as good or evil in itself. If man is the image of God in a dynamic sense as exercising the perfections of being which are truth and goodness, he thus is assimilated more closely to transcendence. In the divine being man's destiny is placed, here and now as well as eschatologically. This destiny, realized fully only in the supernatural order, is attained in the anticipatory possession of immanent action. It remains then to determine exactly how the human act realizes these perfections.

What is under discussion is the moral quality of the human act itself by which is meant essentially the act of decision which is at once a judged willing and a willed judgment. It is the culminating act of practical reason and the definitive engagement of freedom. Thus the moral judgment *par excellence* is this practical decision which gives form to action and which is embodied, at least implicitly in every genuine human

act as its form in the full technical sense of the word. The moral qualification of the external act as such is consequent upon that of the moral decision. Morality, too, is realized only analogically in those moral judgments which may be termed speculative and which do not definitively engage the person in action. We are thus concerned with what Dewey [28] would call the actual valuing, and not with statement about the moral quality of an act or category of acts. We are seeking the conditions of morality in that act in which such quality is fully incarnated, for it is only here that the constitution of moral quality is achieved.

In the language of scholasticism, we are concerned with the ultimate practical judgment which involves free decision, and not with any antecedent or consequent judgment of conscience which remains essentially speculative. This indicates that the type of moral theory involved in such a system as that of Probabilism is definitely ruled out for probabilist theory does not lead to action, but is, at very best, a somewhat questionable technique for deciding on the licit and illicit. These qualities of action derive, however, from the comparison of a possible action with an interpretation of positive law arrived at by a sort of casuistic method. Even if one should grant the liceity of the probabilist techniques, it would help but little in our question. First of all because this moral system is concerned at most with the judgment of conscience and thus fails to deal with action in the full sense of the word. Secondly, probabilism is concerned as such only with the licit and the illicit, whereas St. Thomas is concerned with the good and the evil-that is, with the essential and fundamental moral predicates. Finally, probabilism is satisfied with what is called a practical certitude seen as a variable subjective state to be attained by the " technical " manipulation of opinions (doxa). St. Thomas deals rather with the truth and falseness of moral judgment which is expressed as goodness or as

•• John Dewey, *Theory of Valuation* (International Encyclopedia of Unified Science, Vol. II, no. 4; Chicago, University of Chicago Press, 1939), *5fl'.,* 19fl'.

evil in action. The theory of probabilism is incapable of giving any satisfactory account of moral truth and goodness. Probabilism and all such similar systems may then be dismissed as inadequate for any proper understanding of the goodness and evil of human activity.

St. Thomas seeks the basis of morality and the *constitution* of the moral good in the judgment of right reason which is a *true* judgment effectively electing and producing a *good* action. This doctrine, stated in Question 18, especially in Article *5,* needs some further elaboration because of the variety of ways in which the conformity to reason and reason itself are understood. Thus the theory of probabilism is surely to be rejected in its implied position that the function of reason seems to be only as a reflected knowledge and a technical facility in the interpretation of law. Reason then is merely a subjective awareness of law and morality is constituted by a relationship of an act to an external law of which reason becomes little more than the internal counterpart.

Again, it is not uncommon among scholastic writers to see the judgment of reason as merely manifestative of " objective " goodness. Thus Suarez and his numerous disciples hold that a human act obtains its moral character from its relationship of conformity to man's nature (to which some would add: to this rational nature seen in all its essential relations with the structure of creation) .[29] This position resembles that of those other authors who place the necessary conformity in a relationship to man's destiny and ultimate end.[30] The principal objection to these explanations is their missing of the essential point, for in both theories the goodness of conformity to nature or to human destiny is presupposed as already tuted. This is to say that the mere harmony of an action with human nature or destiny is presupposed to be good and even morally neecssary. Such purely physical conformity, however, is not as such a judgment of reason but rather demands a judg-

[29] For example: Suarez, with Frins, Cathrein, Schiffini.
[30] For example, J. Gredt, and 0. Lottin.

ment of reason asserting that it is good to conform to nature or destiny. The mere fact that man has various physical and social needs does not constitute a moral demand, but rather the appraisal and judgment of these needs by reason. Thus one should say that morality is determined by a judgment-a practical judgment-of reason evaluating or appraising what is given as " natural," and then the relationship of an act which actually does further man's nature and destiny is itself determined in the beginning by a judgment of reason which brings it about that an act is what it is to be, and thus leads to the development of nature and the attaining of true destiny.

It is then a conformity with a judgment of reason which is fundamental and it is this that is expressed in Thomistic teaching. Furthermore, the traditional phrase is that this decisive judgment is a judgment of *right* reason. It may be asked, then, what is meant by the rectitude demanded. Does reason become right merely by registering or reflecting the good of nature, or does reason itself as judging enter into the constitution of morality by assuring its own rectitude? Negatively, we may exclude the first alternative as being merely a repetition of the positions just rejected and as involving an unacceptable view of the nature and functions of mind. Reason is not a mere mirror of nature, not a mere passive receptive power which only acknowledges fact and reality and, in so doing, transforms them into moral norms and values. When St. Thomas states that natural inclinations form the basis of natural law principles, he does not mean a mere passivity, but an active judgment. [31] If only to solve a conflict between the natural tendencies and to discern the natural from the un-natural and the acquired, a judgment of reason is needed which is an active taking of a position by the acting subject in regard to the givenness of his own nature. [32]

[31] *1-11,* q. 94, a. 2.

[32] One may point out in passing the different valuations of human and animal sexuality. In man it is not only the merely physiological teleology of sex which is respected, but the human value discovered in a " natural " process.

From this it may be stated further that human nature, considered as the given structure of man, his powers, impulses, needs and his position in the world, is not by itself a sufficient standard of morality. The givenne.ss of nature is just what it is-a naturally given dynamic structure by which man in part resembles and in part differs from the other beings in the world. But it is not a mere acceptance of this structure which is the basis of morality. A simple transfer from nature to goodness, from " fact " to " value " neglects the constituting function of mind, and tends to neglect the unique transcendence of man as more than a mere being in the world located at the highest level of animal life. This is to say that such a view of reason and nature neglects the uniqueness of human reason which is more than the guiding faculty of a highly evolved animal. Reason is capable of being grasped as truth, and is constituted by openness to being as a power of transcendence.

It is to this reason *as reason* that we are to look for the constituting of moral quality in virtue of its own unique *habitudo ad Es8e.* As finite mind, reason is not creative of being, but respectful, and in this sense, passive. Yet it is this essential and unique aspect of mind which makes man capable of grasping his own given structure or nature, seeing in the respectful perfecting of this nature man's own way to being. All purely given natural structures, all the dynamic inclinations of man,' all that relates to his activity in this world of persons and things can be judged, appraised and evaluated only in the transcending power of man's mind appreciating these realities in the light of being. In this light man is able to discern not only things other than himself, but to appraise and grasp himself, and to delineate the ways in which his relation to being can be developed in action. Actions are judged as good which will contribute to this respectful promotion or exercise of being, and it is only in this light that a genuine discernment of action is possible. It is only thus, too, that the given structures of nature can be appraised and can serve as the possible basis for moral directives.

Of modern authors, Joseph de Finance, S. J., has developed with particular clarity the uniqueness of the human mind as the ratio which in being true to itself is *right* reason.[33] For this writer, mind is a power capable of the Absolute which, as a relational power, can judge its objects, its data as in harmony or not with its own Ideal of objectivity, with ultimate reference to the plenitude of being. Practical reason looks to the realization of man's uniqueness in and through action, and it is capable of judging courses of action as promoting or lessening man's proper perfection as a being capable of Being. The author further sees that the activity of mind is an openness to being which is completed by a genuine love respectful of things as they are. This latter notion is then developed as the horizon of the subject opening out to other (human) beings in genuine spiritual love. This spiritual love of others does not define the Ideal of practical reason, but it is its most immediate manifestation and expression.

By way of constructive criticism of this position, several remarks may be made. It would seem necessary to define or describe reason as constituted primarily by its unique openness to being as truth, a power by which man hold beings in the light of being in judgment and thus allows them to be in the fullest sense. It appears that de Finance has not sufficiently emphasized this constituing relation to being, which is the form of judgment and the center of the Thomistic ontology of knowledge. The Ideal of reason is first this relation to being, and then, if one may speak in such temporal language, the " objectivity " or objective exigencies of conformity of which the author speaks.

Secondly, it seems that one might do well to explain more clearly the distinctiveness of practical reason as seen in the ultimate practical judgment of decision. St. Thomas thus speaks of a conformity of the practical judgment to "right

•• Josephus de Finance, S. J., *Ethica Generalis* (Rome: Universitas Gregoriana, (19.58), 29.5-819. Cf. 'Compte-Rendu' by J. Tonneau, 0. P., *Bulletin Thomiste*, X, 87.5-8.

appetite" or will. This often puzzlng doctrine, by which Aquinas assures the practical infallibility of the prudential judgment, is to be explained more fundamentally than by de Finance's spiritual relation of love to others. To this end, the relation to being is seen as two-fold: as the openness of the finite mind to being, and as the constitutive openness of the will to being as good. Just as man is capable of judgment by the relationship to the truth of being, so is he capable of the decision of action by virtue of his relationship to the goodness of being which is right will *(rectus appetitus).* [34] The human grasp of being is completed only in the full circle of mental and volitional activity in which the judgment of mind is confirmed by the love of the will.. The fundamental attitude of man as respectful openness to being as truth is completed only by the respectful love of being as good, and it is this which makes man capable of the judgment of right reason in which is expressed this transcendent condition of right will as openness to the goodness and full realization of being.

The dynamism of being is brought to man by the judgment in which he receives the perfection of being by receiving the forms of beings in the light of being. Yet this dynamism is completed by the active going out from self in action. Action is thus the complement of the reception of being as true, for it is the completion of being as giving it full existential expression as the good in action. This is what constitutes the unique order of moral goodness as distinct from the traditional recognition of ontological or physical goodness. Moral goodness is typically human and is found only in man's actual exercise of his relation to being, by conformity to his dynamic relation to the realization of the goodness of being.

This dynamic openness of will to the goodness of being is the condition which makes possible the goodness of the particular moral judgment of right reason. Just as openness to *Esse* makes possible the pure judgment of reason, so openness to the goodness of *Esse* makes possible the judged willing and

[84] E. g., *I-II,* q. 57, a. 5, ad 3um.

willed judgment which is the moral judgment. The moral act then has a double condition: both the openness of mind to being as truth and the dynamic tendency of will to being as good. The particular practical judgment is an expression of this double grasp of reality by which man attains to and realizes being in his action. Just as the constitutive openness of mind to being is realized in the judgment of realities existing in the world, so the moral act realizes the openness of will to being in the decision about concrete action in the world of existing beings. Particular moral judgments are the way finite man exercises his relationship to being. "Il faut en effet que la liberte se deploie et s'incarne pour se garder et se developper." [35]

This doctrine which rests on the fundamental Thomistic ontology of being and on man's unique mode of realizing being gives the way to overcome the antinomies of moral theory. The antimony of fact and value is resolved in the unity of the double relationship of man as the thinker of being as truth and as the actor of being in goodness. There is no simplistic passing from " Is " to " Ought," and even less is there a disruptive discontinuity of fact and value. Man's mental grasp of being is more than a mere grasp of facts; it is a judging relationship of fact to being. But this relation to being already contains within itself the seeds of the respect and love for being which is expressed in the will's intentional openness to the good. Value completes fact, or rather both fact and value are resolved into the double openness of man to being. This resolves too the antimony of objective-subjective ethical theories, as well as any false opposition of reason or mind to feeling, will or affectivity. For finite man there is indeed the distinction of subject and object, but they are united in their mutual reference to being. A separation of reason and will, or of thought and affectivity is also surpassed by the very fact of the unity of the person's reference to being disclosed to mind and will. I£ mind and will are distinguished in man so

•• M. Blonde!, *op. cit.,* 144.

that one may speak of a pure judgment of reason and a spontaneous tendency of will, these are but the two aspects of man's relation to being-a double relation which is unified in the practical judgment bringing together thought and affectivity in the judgment of right reason which is at once a conformity to being by mind and an intentional projection to being by will.

Finally the conflict of the good and the obligatory is resolved by a consideration of the inner necessity of the good as the necessary intentional term of man's constitutive relationship to being. The goodness of being, the true good, is not merely a facultative orientation, but constitutes man's authentic will. Just as the reality of error does not destroy the openness of mind to truth, neither does the reality of moral evil deny the necessary intentionality of will to goodness. Indeed the possibility of evil is the very constitutive intentionality of the good in virtue of which the discernment of true from apparent good is possible. The constituting relation to being as good is then the necessary ground of free moral activity, and it is in virtue of this relation that the category of obligatory actions, imposed by any external authority, can be recognized as good. The obligatory, the dutiful, the required make moral demands on man in virtue of his fundamental to goodness-the imperative goal of man's openness to being in action.

DoM GREGORY STEVENS

The Catholic University of America
Washington, D. C.

EINSTEIN'S EPISTEMOLOGY OF THE SCIENTIFIC METHOD

. . . The scientist [in general] who is making new discoveries must have his attention continously upon the subject matter of his science. His methods are present, but he must have them so incorporated in his habits that he operates according to them without his having to give any conscious attention to them. He is like the truly natural athlete, who performs spontaneously, but who often cannot teach others how he does it.[1]

Albert Einstein stands out among modem physicists as the scientist who not only formulated a theory of revolutionary significance but also had the genius to reflect in a conscious and technical way on the scientific method he was using.

It must be noted, however, that Einstein himself never presented his reflections on scientific method systematically. In his " Reply to Criticisms " Einstein acknowledged his debt in this regard to two of the contributors in Schilpp's volume on Einstein:

The essays by Lenzen and Northrop both aim to treat my occasional utterances of epistemological content systematically. From those utterances Lenzen constructs a synoptic total picture, in which what is missing in the utterances is carefully and with delicacy of feeling supplied. Everything said therein appears to me convincing and correct. Northrop uses these utterances as point of departure for a comparative critique of the major epistemological systems. I see in this critique a masterpiece of unbiased thinking and concise discussion, which nowhere permits itself to be diverted from the essential.[2]

[1] F. S. C. Northrop, "Einstein's Conception of Science," *Albert Einstein: Philosopher-Scientist*, Paul Arthur Schilpp, editor (second edition; New York: Tudor Publishing Company, 1951), p. 887.

[2] Einstein, "Reply to Criticisms," *Albert Einstein: Philosopher-Scientist*, op. cit., p. 688.

The two articles referred to are Northrop, *op.* cit., pp. 885-408; and Victor F. Lenzen, "Einstein's Theory of Knowledge," pp. 855-84.

Needless to say, this article draws much from the two articles warmly commended by Einstein.

Einstein's analysis of the scientific method often enters properly epistemological ground. When it does so, his analysis exihibits points of contact, now with the epistemology of Plato or Kant, now with that of Aristotle or Whitehead, now with empiricistic or positivistic tenets.

We may well wonder how one theory of knowledge can contain such divergent elements. Einstein himself, in his idea of the reciprocal relationship between epistemology and science, gives the most illuminating answer. Epistemology without science, he asserts, is an empty scheme; science without epistemology is primitive and muddled. However, while the scientist needs the conceptual analysis of an epistemological system, he cannot afford to adhere too closely to one such system, especially if it would at times oblige him to reject certain facts of experience. The scientist must therefore inevitably appear as an unscrupulous opportunist .

> . . . [He] appears as *realist* insofar as he seeks to describe a world independent of the acts of perception; as *idealist* insofar as he looks upon the concepts and theories as the free inventions of the human spirit (not logically derivable from what is empirically given); as *positivist* insofar as he considers his concepts and theories justified *only* to the extent to which they furnish a logical representation of relations among sensory experiences. He may even appear as *Platonist* or *Pythagorean* insofar as he considers the viewpoint of logical simplicity as an indispensable and effective tool of his research.[3]

What is implicit here is the reminder that this theory of knowledge or epistemology is one that belongs exclusively to scientific method. It is not properly a philosophical epistemology. The points of similarity with opposite cognitive theories are accidental. Nevertheless they have important repercussions on properly philosophical epistemology.

Philosophical epistemology has its starting-point in perceptive or sensible knowledge, according to that basic Aristotel-

[3] *Ibid.*, pp. 688-84.

ico-Thomistic principle: *Quidquid est in intellectu prius fuerit aliquomodo in sensu.* It is here that Einstein's scientific theory of knowledge most closely approaches Aristotelian and Thomistic epistemology. Einstein distinguishes between sensory experience and conceptual description. Empirical knowledge originates in sense-impressions but has its goal in understanding through concepts.

This point of departure, however, common though it is to both epistemologies, also marks the end of their similarity. But understandably so. That Aristotelico- Thomistic principle is after all the common foundation of any kind of human knowledge. Hence, the identity. But Aristotelian or Thomistic epistemology takes off from this springboard to go deeply into the *essence* of things, into being *as being.* The scientific epistemology, on the other hand, starts from the same principle to go towards a different formal object: to the ordering of sense-impressions and the discovery of the simplest mathematical conception that would express the law *or* order or relation prevailing among sensed facts. It considers being *as measurable,* being in its mathematically expressible properties and relatedness. Hence, the dissimilarity.

Early in the process Einstein widens the distinction between the world of sensory experience and the realm of concepts and conceptuals relations which constitute propositions. Between these two realms he finds a logically unbridgeable gap. While he believes that " all knowledge of reality starts from [sense] experience and ends in it," [4] he nevertheless asserts that the formulated concepts of a physical theory are "free inventions of the human intellect." [5] They are not derived from sense experience by any logical means-either by formal implication or by Aristotelian or Whiteheadian abstraction. To dispel the semblance of a paradox and to understand fully what this statement means, we must follow the theoretical physicist's approach to his goal, step by step.

• Einstein, " On the Method of Theoretical Physics," *Essays in Science,* trans. Alan Harris (New York: Philosophical Library, 1934), p. 12.

• *Ibid.,* p. 15.

But first it must be observed that the concepts spoken of as "free inventions of the human intellect" must not be understood as concepts of the essence of things. They are, in reality, *theoretical, mathematical* ideas, mathematical expressions of the relations connecting empirical facts. They are therefore no direct descriptions of phenomena, nor are they concepts of the ontological nature and cause of these phenomena. They are the ideas which, in Einstein's words, "furnish the key to the understanding of natural phenomena." [6] In the search for such mathematical functions, philosophical abstraction is obviously neither needed nor apt.

In the transition from ordinary sense experience to the final concepts of a physical theory, Einstein recognizes various strata or levels of knowing. To the first belong the primary concepts which have the closest relationship to sense-impressions. An example of such a concept is that of water as the primary substance in the cosmological theory of Thales. This primary stage, because of its lack of logical unity in concepts and relations, fails to satisfy the scientist's mind. Hence a secondary level is formulated, with fewer concepts and relations. From this stratum the primary concepts and relations of the first stratum are logically derived. At this stage the water of Thales is seen as an assembly of molecules whose different modes of arrangement furnish the basis of solid, liquid, and gaseous states (the kinetic-molecular theory of matter) . Further efforts towards logical unity bears fruit in the creation of an even more impoverished third level. From this third level the concepts and relations of the secondary system are still derivable. This possibility of deriving the concepts and relations of the secondary system are still derivable. This possibility of deriving the concepts of the first and second strata from the third shows that up to this point at least, something akin to Aristotelian abstraction (specifically to the first degree or physical abstraction) is still at work. But the process goes on until one arrives at a system with the

[6] *Ibid.,* p. 17.

est conceivable unity and poverty of concepts .and which must be found consistent with the structure introduced into the manifold of sense-impressions by primary concepts. [7]

The big question in this method of constructing a theoretical system in physics concerns the choice of concepts and principles that can both unify sense-data, and in turn be verified by them (i.e., be found consistent with them), at least indirectly. Einstein finds his guide in the twofold aim of a scientific theory. The first aim of a theory is the most complete conceptual comprehension of sense impressions. Hence the most favorable results may be expected from hypotheses *suggested* by experience. Secondly, reason guides and demands the construction of a theory which has the greatest possible simplicity. [8]

These two aims of scientific theory are, however, merely negative guides like the number of blank spaces **in** a crossword puzzle. Besides, the strata are not sharply defined, and finally between the third level and final formulated formal concepts of a physical theory, a wide gap still remains. The ever-increasing abstractness and remoteness from experience which characterize the mathematical concepts of modern scientific hypotheses force science to fall back on the intuitive mathematical genius of its Einsteins and Oppenheimers to bridge this gap .

. . . **It** appears that nature covers up her basic secrets; she does not wear her heart upon her sleeve. Thus only by the freest play of the imagination, both the intuitive imagination and the non-intuitive, formal, theoretical imagination, can the basic concepts and postulates of natural science be discovered. In fact Einstein writes, with respect to the discovery of " the principles which are to serve as the starting point . . . " of the theoretical physicist's deductive system, that " there is no method capable of being learned and systematically applied so that it leads to the goal." [9]

[7] Lenzen, *op. cit.,* pp. 370-71.

• "Simplicity is understood to consist in a minimum number of fundamental concepts and relations, together with a maximum of abstractness." *Ibid.,* p.

[9] Northrop, *op. cit.,* p. 394.

Modern physics thus teaches that between what we know as the second degree (mathematical) abstraction and the third degree (metaphysical) abstraction, there is a tremendously extensive field in which a high degree of scientific mathematical intuition alone, not abstraction, can operate .

. . . Einstein affirms that neither the formal, logical relation of implication nor any probability or other formulation of induction can define the method by which the scientist goes from the empirical data to the basic postulates of scientific theory. The scientist has, by trial and error and the free play of his imagination, to hit upon the basic notions.[10]

For the rest of mankind all this might mean sheer, futile guess work. But it is precisely in this incomprehensible realm of " fancy " that the intuitive genius of an Einstein finds home.

There is something we can learn from this: There is a great difference, not only between nature represented in its systematic relatedness by a mathematically formulated theory and nature as given with positivistic empirical immediacy, [11] but also between nature as designated in the basic concepts of a physical theory and nature as seen in its abstracted essence and philosophical properties.

We are now in a position to understand the meaning of the statement to the effect that concepts are free creations of the mind. Fundamental axioms can be chosen freely. Hence there can be any number of divergent theories on a single group of empirical data. The freedom to choose any of these however is controlled to the extent that consequences of the axioms must be confirmed by experience. " The freedom is not that of a novelist, but of the person who solves a crossword puzzle. Any word can be proposed as a solution, but there is only one that fits the puzzle in all its parts." [12]

Now another question arises. If the concepts of a physical theory are free inventions of the human mind-not deducible

[10] *Ibid.,* p. 897.
[11] *lbid.*
[12] Lenzen, *op. cit.,* p. 878.

from experience in any logical way-how are these concepts to be confirmed or verified by experience? How does knowledge of reality which begins from experience end in experience, if the final concepts are so completely detached from experience? How will these final concepts be found consistent with the structure introduced into the manifold of sense-impressions by primary concepts?

The answer may give a mild shock to the cut-and-dried logician. Formal logic in scientific method does not run from empirical facts to theoretical postulates, but in the opposite direction: from the postulates, through the theorems, to the data. Yes, this means that scientific verification always commits the fallacy of affirming the consequent of the hypothetical syllogism! This does not imply that a theory thus verified is false, but merely that it cannot be shown to be true necessarily. The indirectness of the verification justifies the retention of the theory, but the absence of direct relation to empirical data forces one to hold it tentatively. This, however is an asset rather than a liability, for it explains how established or verified theories, after further investigation, are shown to be inadequate and to require replacement by new theories founded on different postulates. [13]

This indirect means of verification and the consequent tentative nature of every physical theory give the clearest meaning to the following words of Einstein: "We must always be ready to change these notions-that is to say, the axiomatic sub-structure of physics-in order to do justice to perceived facts in the most logically perfect way. [14]

As new empirical information is acquired, traditional basic postulates must give place to new ones-if progress in science is to go on unhindered. Thus no theory in mathematical physics can hold true for all time. Even the probability of the truth of a given theory cannot be scientifically formulated.

[13] Northrop, *op.* cit., pp. 404-405.

[14] Einstein, " Clerk Maxwell's Influence on the Evolution of the Idea of Physical Reality," *Essays in Science, op.* cit., p. 40.

Einstein presents, nevertheless, a question which anticipates the temptation to think that the systematic, spatia-temporal relatedness of nature, as designated in the postulates of mathematico-physical theories, is a purely subjective construct:

> If then, it is true that this axiomatic basis of theoretical physics cannot be extracted from experience but must be· freely invented, can we ever hope to find the right way? Nay more, has this right way any existence outside our illusions?[15]

Einstein answers without hesitation that there *is* a right way, and that it has existence *outside* human illusions. "Our experience hitherto," says he, " justifies us in believing that nature is the realization of the simplest conceivable mathematical ideas." [16]

That last sentence might very well be a revelation of Cartesian or Galilean influence on Einstein's idea about the universe, but it must here be more explicitly confined· to what it should really be taken to mean. From the point of view of the philosopher-for whom there is more in nature than what can be expressed by mathematical ideas-that sentence merely means that physical nature, in its objective measurable relatedness, affords real (even if 'indirect) ground for a representation of it by the most unified mathematical function.

To continue with Einstein's reply to his own question:

> ... I am convinced that we can discover by means of purely mathematical constructions the concepts and the laws connecting them with each other, which furnish the key to the understanding of natural phenomena. Experience remains, of course, the sole criterion of the physical utility of a mathematical construction. But the creative principle resides in mathematics. In a certain sense, therefore, I hold it true that pure thought can grasp reality, as the ancients dreamed.[17]

Again, that last sentence needs some qualification. That " certain sense " must be more explicitly brought out. Pure thought-that is to say, sheer scientific intuition-can indeed

[15] Einstein, "On the Method of Theoretical Physics," *op. cit.,* p. 17.
[16] *Ibid.*
[17] *Ibid.,* pp. 17-18.

find the unified mathematical expression of the spatio-temporal relatedness of physical reality. But for a philosophical grasp of the *esS'ence* of reality, thought must go by way of abstraction from sense-data. It cannot be entirely pure or free. The philosopher does not make an intuitive " guess " which is roughly calculated to be indirectly verifiable later on by expenence.

These are but the general lines in Einstein's scientific "theory of knowledge." At the risk of stressing the obvious, it must be said that the theory of relativity, seen in these its epistemological foundations, carries implications of no mean importance. For example, for Kantians and positivists to accept this theory (as many of them profess to do) is to admit basic corrections in their systems. This epistemology of scientific method has serious repercussions on such modern philosophical systems.

Contrary to whatever relativists or Kantians might assert, Einstein's theory of knowledge necessarily implies the existence of an external world independent of the perceiving subject. The belief in such a world is, according to Einstein's explicit assertion, the basis of all natural science.[18] On this point, at least, Einstein was a realist.

While the element of free intuition which creates *mathematical* concepts (not abstracted from, but merely suggested by experience) entails the rejection on the one hand of Humean empiricism (which insists on immediately operational meanings or directly verifiable concepts) , and on the other hand finds no direct need of Aristotelian abstraction, " it equally rejects the Kantian epistemological thesis that the postulated, deductively formulated systematic relatedness of scientific knowledge is a categorical *a priori."*[19] Thus, Einstein's space-time is not the Kantian form-container of all our perceptions. It may be fictitious in the sense that it is not a

[18] Cf., opening sentence of the essay, "Clerk Maxwell's Influence on the Evolution of the Idea of Physical Reality," *op. cit.,* p. 40.

[19] Northrop, *op. cit.,* p. 395.

positivistically immediate datum, that it is discovered only by a free play of the imagination. But it is *not* fictitious in the sense that its entire reality is in the knower. On the contrary, it constitutes and is literally the physical relatedness of the physical object of knowledge. It is the relatedness of the gravitational field of nature. "It belongs to nature. It has its roots in nature; it is not restricted solely to the mind of man." [20]

Now, let us touch upon the positivistic system of thought. The free play granted to the scientist's intuition above the level of the merely observable and immediately verifiable is far more than any true British empiricist or positivist would be willing to admit. Furthermore, beyond the sphere to which the positivists have voluntarily limited themselves, Einstein always believed in a Leibnitzean pre-established harmony between thought and reality. He believed that such a harmony will win for the human mind; after patient effort, an intuition of the depths of reality. Would it be stretching this belief too far to interpret it as reducible to the confidence of the Scholastics in claiming (against positivism) that beyond the merely empirical or measurable, there is a depth of reality at which the human intellect can arrive? Finally, something in the second of the two aims of a physical theory looms high above the merely utilitarian, technological, and predictative aim of positivism. Let Einstein himself speak on this point:

It is, of course, universally agreed that science has to establish connections between the facts of experience, of such a kind that we can predict further occurrences from those already experienced. Indeed, according to the opinion of many positivists the completest possible accomplishment of this task is the only end of science.

I do not believe, however, that so elementary an ideal could do much to kindle the investigator's passion from which really great achievement's have arisen. Behind the tireless efforts of the investigator there lurks a stronger, more mysterious drive: it is existence and reality that one wishes to comprehend.... [21]

[20] *Ibid.,* pp. 896-97.

[21] Einstein, "Address at Columbia University, New York, January 15," *Essays in Science, op. cit.,* p.

Finally, a word about this theory's relation to Scholastic philosophy. This scientific epistemology of Einstein undeniably converges upon the Scholastic theory of knowledge regarding at least two points, which are generally denied by many a contemporary school: (a) the initial dependence of all concepts on sense-knowledge, and (b) a practical realism which finds no reason to deny an objective world independent of our senses. Without a doubt, there are also dissimilarities. But the reason for these has already been pointed out: the distinct formal objects of science and metaphysics.

ANTONIO MA. MoLINA, S. J.

San Jose de Mindanao
Cagayan de Oro City, Philippines

NOTES ON OUR CONTRIBUTORS

JoHN A. GAssoN, S. J., Ph. D. (Gregorian), co-author with M. B. Arnold of *The Human Person*, is presently engaged in special research at the Jesuit House of Studies, Spring Hill College, Mobile, Alabama, on the psychological screening of candidates for the religious life.

MAGNA B. ARNOLD, Ph. D. (University of Toronto), author of two books, *Emotion and Personality* and *Story Sequence Analysis*, and of special research papers which have been published in major psychological journals, is affiliated with Loyola University, Chicago, and Chicago State Hospital, Chicago, Illinois.

W. W. MEISSNER, S. J., M.A., Ph. L. (St. Louis University), who has contributed many of his studies in neuropsychiatry and clinical psychology to various scholarly journals, is now engaged in theological studies at Woodstock College, Woodstock, Maryland.

DoM GREGORY STEVENS, 0. S. B., S. T. D. *(Angelicum)*, author of *Principles of Ethics*, whose studies in Moral Theology have frequently appeared in scholarly reviews, is affiliated with Catholic University of America and St. Anselm's Abbey, Washington, D. C.

ANTONIO MA. MoLINA, S. J., M. A. (Berchmans College, Philippines), who has been engaged in the study of philosophy in its relation to modern science, is teaching in San Jose de Mindanao Archdiocesan Seminary, Cagayan de Oro City, Philippines.

MICHAEL STOCK, 0. P., Ph. D. *(Angelicum)*, a frequent contributor to scholarly journals, co-author with Francis J. Braceland, M.D. of *Modern Psychiatry: A Handbook for Believers*, is now *Lector Primarius* and Professor of Psychology at the Dominican House of Studies, Dover, Massachusetts.

RALPH MciNERNY, Ph.D., a graduate of Laval University, is Assistant Professor of Philosophy at the University of Notre Dame, Notre Dame, Indiana.

BOOK REVIEWS

The Range of Intellect. By BARRY MILLER, S.M. London, Geoffrey Chapman, 1961. Pp. with index and glossary of selected terms. *30* shillings.

The author of this quite abstruse treatise on the nature of knowledge through affective connaturality states, in the conclusion of one of his chapters, that " we can accommodate and incorporate what is true and valuable in the intuitions of other philosophical schools, without in the least compromising what is perennial in Thomism. Concern to preserve the perennial in Thomism is not to be identified with rigidity and insensitivity to modern developments " (p. 168). With these sentiments we heartily concur. As long as Thomism is alive and growing, it will meet and engage other living currents of thought, not merely to essay a challenge against their systematic formulations but also to profit from their truths, and as long as Thomism remains true to its own essential spirit and principles, it will be validly Thomism in the midst of its growth and change.

The Range of Intellect proposes to assimilate in Thomistic terms the currently much discussed theories of knowledge through affective connaturality. In this sense, the 'range of intellect' is presented as something broader than that which the Thomistic tradition has generally emphasized; it is broader than purely conceptual knowledge of the kind principally treated in Thomistic psychologies. So far this should cause no cavilling on the part of Thomists. It is generally recognized, for instance, that a good theory of intellectual knowledge of material singulars, or of experiential intellectual knowledge requires some elaboration of a thesis of non-conceptual knowledge.

However, taking up one by one the several propositions for which Fr. Miller argues in the course of establishing his position vis-a-vis knowledge through affective connaturality, a number of difficulties appear, which, in the end, seem to cast considerable doubt over his final conclusion.

What the root of the difficulties is not immediately apparent, but if a suggestion might be made at this point, it would be that the author's metaphysics builds itself up not wisely but too well. There is, of course, a somewhat widely-held opinion nowadays that metaphysics can proceed on its own power without deep roots (even without any roots) in natural philosophy. If this opinion is unsound, *The Range of Intellect* may perhaps be cited as an example. The author constructs his theory of knowledge mainly in the metaphysical terms of essence and existence. Essence is conceived as static, formal; existence is dynamic, activating. Hence, the author argues, since knowledge is clearly something dynamic, knowledge

pertains by right to the existential order. Now if, on the other hand, the same problem-the theory of knowledge-is viewed from the point of view of the natural philosopher, the emphasis is immediately placed on the *nature* (the essence as nature) of the knower, and nature is dynamic, the principle of motion in a thing which is in it *per se* and *primo.* There is no need then to appeal to *esse* to find dynamism in things.

The effects of ' metaphysicizing ' the terms of his discussion show up more or less clearly in many of the particular conclusions which the author proposes. His first major conclusion is that knowledge is " supraphysical *esse."*

This is a good definition although it is somewhat abbreviated. If we are thinking of the very root of knowledge acts, we might well term it " supraphysical *esse." Esse* here need not signify the *actus essendi,* but rather whatever exercises that act. But if, on the other hand, we want to define knowledge itself, and not merely its root, and if we want to defin(! it as the natural philosopher meets it (and he is the first to meet and treat of knowledge) we cannot abstract from the fact that knowledge is always *of something.* Then we would have to include its object in the definition, and define knowledge as ' the possession of a form existing in a supraphysical mode," or something of that sort. This definition expressly removes knowledge from the existential order and places it in the order of nature. The author's definition does not expressly insert knowledge in the existential order, but neither is it excluded. And this is with good reason, for he does in fact intend to establish knowledge as a feature of existence.

His second major conclusion, therefore, is that knowledge is an immanent action, and that immanent action belongs to existence. He says: " Thus, prescinding from the debate as to whether action is or is not existence in the true sense, it seems safe to conclude at least that it " ought to be conceived after the fashion of an existence, that is to say as an actuality," for it is rooted in existence, "like a property in an essence" (although "it cannot be reduced to a property, in the strict sense") (p. 49). The concluding clause of this quotation seems to indicate, not a prescinding from the argument, as much as a decision for one side in preference to the other. This seems to be confirmed later: "It remains then that what distinguishes immanent action from mere actuation must pertain to the *existential* order" (p. *55,* author's italics).

The notion that immanent action is existence is essential to the author's whole thesis. Later, he argues: "The source of dynamism is *esse"* (p. 1fl8), and: "It has been shown us that what is essential to love is for the lover to possess an inclination towards the beloved, and that this inclination is the ordination of an *esse"* (p. H!9). And again: "Wherever these is *esse* there is also inclination" (p. 138) and: "Love is an inclination, and inclination is a metaphysical property of *esse"* (p. 141).

The effect of these notions would seem to be disastrous. On the one hand, action, movement, power, dynamism are excluded from the natural order of things, and made properties or effects of existence. On the other hand, existence itself begins to acquire conceptualizable qualities; it begins to be capable of definition. These are knotty difficulties, and could easily be avoided if the natural order of things were not viewed simply as an order of essences. Once it is clear that essences are natures and principles of movement and action, there is no need to invoke *esse* to account for action.

Further difficulties seem to arise in the author's treatment of the Agent Intellect. He acknowledges the role of the Agent Intellect as the spiritualizer of the content of the sensible phantasms and he holds that universalizing is an accidental effect of this spirtualizing (p. 121). But he holds further that when the intelligible species has been presented to the possible intellect, after the spiritualizing action of the Agent Intellect, it is intelligible in first act only, and still requies to be made intelligible in second act, i. e., immediately intelligible. By intelligible in second act, or immediately intelligible, he means activated by supraphysical *esse*, and he concludes that the Agent Intellect is the producer of this supraphysical *esse*, and the cause, thereby, of actual intellection. He concludes, then, that this act by which the Agent Intellect produces supraphysical *esse* is its principal act, the raison d'etre of its abstractive activity, and the only act the Agent Intellect will exercise in the separated soul.

This thesis seem to raise all sorts of problems. If, for instance, when the Agent Intellect has abstracted an intelligible species from the phantasms, and has presented it to the possible intellect, intellection does not immediately follow from the dynamism of the possible intellect, does it not follow that the possible intellect is a passive potency, and hardly a vital potency in any real sense? Moreover, is the spirituality of the possible intellect not compromised? It would seem that anything received and possessed by the possible intellect must be received and possessed in a supraphysical mode, if the possible intellect is spiritual in nature. If then an appeal must be made to a production of supraphysical *esse* by the Agent Intellect in order to explain intellection, the nature of the possible intellect is radically diminished. It is true, moreover, that the Agent Intellect does not cease to function after it has once abstracted the intelligible species from the phantasms; it operates continually in all subsequent uses of phantasms too. The author cites many of the texts from St. Thomas which assert this continuing role. He seems, however, to infer from these texts some support for his thesis that the additional work of the Agent Intellect is this production of supraphysical *esse-this* does not seem to be justified by the contexts.

Another difficulty which arises from the thesis that intellectual knowledge cannot be explained except in terms of suprahysical *esse* produced by the

Agent Intellect, is the manner in which sensible knowledge can be explained. As true knowledge, its root is also supraphysical *esse,* but what agent produces it? And if some agent is assigned as the cause of sensible supraphysical *esse,* what is left of the vital and operative nature of the senses?

These [as they seem to me] distortions of the function and nature of the Agent Intellect seem to arise from a methodological oversight. In Aristotelian and Thomistic philosophy, the Agent Intellect occupies the position of a postulate.· Its necessity, and therefore its existence, are posited to account for the fact that in our experience we find human intellectual knowledge dependent on and consequent to sensible knowledge. The Agent Intellect is an .expression of the necessity for an active power abstracting and spiritualizing the contents of the phantasms. This necessity verifies its existence and strictly defines its nature and function. However, having postulated an Agent Intellect, we cannot assign new roles to it unless they are also demanded by the experiential evidence, and certified as belonging to the Agent Intellect as previously defined. We know nothing about the Agent Intellect except *ex consequenti,* and cannot therefore deduce new activities for it, as if it were an object whose existence is directly known, and whose nature can therefore in itself be constantly re-examined for possibly new insights into its workings.

When the author considers the nature of love, he again maintains theses which seem very arguable. First of all, he takes natural love as a real inclination in a thing, really distinct from its nature, and designates it " just as truly love as that which is dependent on and preceded by knowledge " (p. . He does not prove this point, and indeed it is hard to see how it can be proved. For St. Thomas, the natural love which moves a thing is nothing more than its very nature, by which it is inclined to do whatever it does. Such a love is only rationally distinct from the nature itself, and not as truly love as elicited love.

When, therefore, he makes elicited love a particularization of natural love, he does not do justice to its distinctiveness. There is a truth in what he says, certainly, for elicited love depends on the natures of the appetites, and if they were not by nature inclined to do what they do, there would be no love at all, and this inclination is the natural appetite of the appetites. But it seems at least superfluous to make the natural appetites of the appetites a real medium between the powers and their acts.

On page 131, the author makes supraphysical *esse* the root of love, as ·he had made it the root of knowledge. He does this on the grounds that love is an immanent action. But not every immanent action is supraphysical *esse.* His own argument, and it is the proper argument, for supraphysical *esse,* is that " the presence of the known does not result in the expulsion of any form from the knower " (p. 36) . This is not the case with the presence of acts of the appetites, for the very acts differ with

different objects. We equally know the loved and the hated, but the appetitive acts towards these two are really different. The root of love, then, cannot be supraphysical *esse,* at least, not of the kind that constitutes knowledge.

Again, in discussing the nature of love, the author makes an emphatic point that love is an experienced befittingness of the object known, not a mere known befittingness. "Elicited love does not depend (except presuppositively) upon what we know, but upon what we *are"* (p. 147). There is a great truth in this, of course, for the appetites are determined as much by the dispositions of the subject as by the representations of the object. But it is hard to see how the term 'experienced befittingness' establishes an opposition to 'known befittingness' since experience, in all common acceptations of the word, is a species of knowledge. The impression given by the author's words is that there is some kind of experiential knowledge apparently on the part of the appetite itself, which is over and above the knowledge (on the part of the cognitive power which elicits the appetite), and that this is necessary to insure the appetitive act. This seems to be an unnecessary multiplication of entities, since the very nature of an appetite is to respond to knowledge in accordance with the harmony between its own dispositions and the qualities of the object presented. It also seems to place a formal diversity within the appetitive power, by which it operates both appetitively and cognoscitively; in effect, it has become two potencies.

All of the above-mentioned major difficulties, which generate a positive doubt about the validity of the author's process and conclusions, and a number of other lesser difficulties which follow from these, and which cannot be discussed for lack of space, do not necessarily prove that there is no such thing as knowledge through affectivity. On page 167, the author claims that affectivity may either come to bear on the content of knowledge, or may play a part as an unknowning bearer of knowledge. It seems that the latter is certainly true, for affectivity adds a whole new dimension to a knower's knowledge-the dimension of the manifold ways by which the knower himself is affected by the things he knows, and this in turn leads to a broadening and enrichment of the content of his objective knowledge, for the affective responses produced in himself tell something of the object's nature, and of his own nature too. But to determine the range and limits of this knowledge requires an examination of the reflexive knowledge of the intellect, and especially of its modes of knowing the will, as act and as power, in itself and in its habits and dispositions, and in its efficient causality. There are many problems yet to be resolved in this area, and happily Thomists are presently addressing themselves to them. But if their resolution is to contribute to the vigor of authentic Thomism, the terms of the resolution must adhere to the genuine tradition more nicely than they do in this book.

Remembering: A Philosophical Problem. By W. VON LEYDEN. New York, Philosophical Library, Inc., 1961. Pp. 119 with index. $4.75.

It is always a pleasure to read a piece of philosophical writing which is clearly and engagingly written, and even if the happy reader is not prepared to accept all of the author's conclusions, he feels a sense of gratitude for the clarity, if only because it makes his own assenting or dissenting so much more easy and certain. This little treatise on remembering-a topic apparently quite simple and yet tantalizing enough to have attracted attention from some of the greatest minds in the history of philosophy-is written with all the style and aptness of expression which has come to be associated with the English language as used in England, and thus, although its contents tend to be abstract, the reading never becomes too difficult for enjoyment.

The general structure of the author's argument is the simple one consisting of a resolution into some kind of harmony of two more or less opposing views. He presents the opinions of Bertrand Russell and Professor Gilbert Ryle on the nature of remembering-two contemporary approaches to the subject which seem to be opposed to each other. Then he criticizes both points of view, but not so as to destroy them; he elaborates and adumbrates both points of view but not so as to render either entirely persuasive, and in the meantime he finds opportunities to introduce many pertinent observations on and subtle elucidations of various features of the memory process. Finally he summarizes the two approaches in a harmonization of points of view, and he does this in a typically English way. Leaning heavily on the pragmatic insistence that the fact and veracity of memory have to be accepted ultimately on common sense grounds, he is, deep down, ready to admit that in this, as in most cases, the sceptics' view is philosophically probably nearer the heart of the truth.

It is entirely worthwhile reading this book of von Leyden, but, from the point of view of a Thomist, the way it presents its problem seems open to at least two fundamental criticisms. In the first place, there seems to be a confusion between the philosophical problem " what is memory? " and the practical problem "is this or that particular act an act of memory? ". The absence of a clearly drawn distinction between these two levels of thought seems to be derivative from a second and even deeper confusion, between the natural philosophy question "what is memory?" and the epistemological question "what is the veracity of memory and what are its criteria? ".

To omit or be unwilling to make the first distinction, between the definition of a thing and its recognizability in practical circumstances, is to introduce into speculative knowledge itself an indeterminacy which belongs properly only to the area of practical application. It is, for instance, one thing to know the definition of a circle, and another thing to be able to verify its definition in the parts of a design painted on a ceiling a hundred feet high, when closer inspection is impossible. But if, upon

reflection, the definition itself is doubted because of the unavailability of the means of verifying it in these particular instances, an unnecessary uncertainty is injected into the science of geometry. It is as if a biologist were to abandon hope of arriving at a definition of a living thing and of its criteria solely because he has observed some living things in comatose or dormant states in which no signs of life are detectable. It is one thing to formulate a definition, and another thing to be able to read the signs in nature or art which indicate truly the presence of the thing defined.

For lack of this distinction the author raises difficulties which are not entirely justifiable. His " appraisal of the paradigm-case argument " is an example of this (pp. 108-110). He grants that he does not doubt that there are cases of memory and that what is accepted as a standard case of memory is such. But then he balks on the grounds that the value of the concept of memory expressed by the paradigm is shaken if we cannot determine in some given case whether there is memory or not. See the point on circles above. He further mistrusts the paradigm approach because he believes that the criteria of a standard case may not be ' standard.' He sees it as a *petitio principii* to say that what is normally called a memory is always correctly called a memory.

This hesitancy reveals a fundamental scepticism in the author's general philosophical outlook. For while it must be granted that there are indemonstrable principles in philosophy, it must also be insisted that these do not need demonstration. Some are self-evident on their own terms; others-and definitions of real things belong to this class-can only point to the existent in nature and claim correspondence. This is not a *petitio principii* but a simple appeal from the thought to the thing, and, in its own way, an ultimate. Denying this, we have to deny the validity of all ideas and the possibility of their communication.

To assert all this is not to deny all difficulties in the use of paradigm cases. It all too frequently happens that, once a definition is established, we discover other existents which are so closely allied to the one defined, and yet in some subtle respect so different, that we are troubled to decide how our definition relates to them. This situation will not invalidate the definition itself. It still applies to the instances on which it was founded. The question now raised is: does it have further applicability, or must we formulate a new identity, and if we do, how will it be related to the other? Often we are obliged to appeal to more flexible logical tools, such as generic and analogical usage, and often we are obliged to impose a certain measure of caution with regard to the way we estimate our mental achievements. We may believe that we have attained a definition when in fact we have produced only a more or less accurate description. But it is going too far, I believe, to demand doubt in reference to the defining process itself in virtue of the sophistications which must be introduced to protect its validity. If we accept such a doubt, we must of necessity cede a large place

in all our subsequent conclusions to scepticism, for the defining process lies at the beginning of things.

The second distinction the author might have introduced profitably into his discussion is the distinction between the question "what is memory? " and the epistemological problem of memory's veracity. He frequently considers one or another proposition formulated about the nature of memory on the supposition that a memory must be verifiably true in order to be a real memory. This however seems to confuse the two issues. What memory is and how its veracity may be determined are two distinct questions. The first is a matter of natural philosophy, the second of epistemology, at a distinctively more abstract level of thought. To confuse the levels is to run the risk of rejecting knowledge attainable at a lower level because it cannot sustain itself on principles proper to a higher level. It would be like refusing to admit that the bumblebee can fly until its wing structure could be approved aerodynamically.

Moreover, the author applies this criterion only to memory. He grants, for instance, that false opinions belong to the category of opinions, and that unverifiable perceptions and unsubstantiated judgments are nevertheless perceptions and judgments, and not non-perceptions and non-judgments. By the same token, it must be granted that unverifiable memories are truly memories, even if not true memories, if they present themselves in experience with the signs of the memory act. The nature of the memory act ought to be derived from the acts as we sense they are exercised, and their veracity subsequently examined under a separate title.

There are many other points in this brief work on remembering which would be worth noticing in a more comprehensive study, and many of the points could perhaps be profitably examined in a Thomistic frame of reference. The discussion (pp. 76 ff.) on the sense of detachment involved in memory acts suggests an analysis in terms of intentionality. The discussion of the 'generic' nature of recollection (pp. 73 ff.) invites a consideration of the distinction between complete and incomplete knowledge of a thing, and whether incomplete knowledge is rightly called erroneous or delusive before a claim is made for its completeness. This in turn brings up the question of the relation of the memory of concrete events to the intellectual judgments on the contents of memories, and this adds a whole new dimension to the problem of memory's veracity. Perhaps delusive judgments which are based on memories are not attributable so much to the memory acts themselves as to the intellectual use made of the data presented "as of the past."

These and many other trains of thought are suggested from reading this treatise on memory. Along with the pleasure attending the reading of a neatly turned phrase, this stirring of the mind is probably the best recommendation for this book.

MICHAEL STOCK, O. P.

St. Stephen's PriCYry,
Dover, Massachusetts

Partecipazione e Causalita Secondo S. Tommaso D'Aquino. Cornelio l!'abro. Torino: Societa Editrice Internazionale, 1960. Pp. 693. Lire

Participation et Causalite Selon S. Thomas D'Aquin. Cornelio Fabro, C. **P.** S. Louvain et Paris: Publications Universitaires de Louvain; Editions Beatrice-Nauwelaerts, 1961. Pp. 650. 390 BF.

In 1938 Fr. Fabro published his *La Nozione Metafisica di Partecipazione* edition, Turin, 1950); in the present study he continues his efforts to show that participation is in many ways the key to the doctrine of St. Thomas. As he puts it, having shown that participation is employed by Aquinas to describe the static order of the constitution of being, he wants now to show that participation is the key concept in the dynamic order, the production of being. Besides this connection with his earlier study, Fabro's essay is of interest because of a running dialogue with Heidegger who charges that the history of Western metaphysics is one which exhibits a forgetfulness of Being and a concentration on beings. Fabro accepts his critique as applicable to everyone but Aquinas and admits that the position of Parmenides must somehow be recaptured. Being is being, after all, and Fabro even speaks of " Thomistic Parmenideanism " (It., p. 637; Fr.; p. 618). The book is noteworthy as well because it joins a good many others which have stressed the originality of St. Thomas' concept of *esse.* Fabro's own views on this are presented in terms of a distinction he draws between *esse in actu* and *esse ut actus.* Relying heavily on St. Thomas' commentary on chapter five of the *Divine Names* of Pseudo-Dionysius where the relative value of *esse* and *vivere* are discussed, Fabro developes the notions of *perfectio separata* and of predication *per essentiam* to show why *esse* is more perfect than *vivere* and is consequently the divine name without equal. The danger here of course is that one will come to misconstrue the import of the lapidary phrase, *vivere est esse viventibus.* Fabro speaks of *esse essentiae,* by which he means form or essence, and sees that it is in potency to *esse ut actus.* Sometimes it is not clear whether it is *vita* or *vivere* which is in potency to *esse.* The latter choice would lead to non-sense: *vivere* is not in potency to *esse* precisely because *vivere est esse viventibus.* That *vivere* is not *esse commune* goes without saying, but for the living thing *vivere* denotes *esse substantiale. Vivere* is *esse* in the maximal sense for living things and to insist on the more common word *esse* there is essentialism, i.e. a predilection for the abstract and vague and common at all costs. It is not always clear that Fabro rejects this brand of "Thomistic Existentialism" (a phrase he would abhor); nevertheless, there are puissant passages where he criticizes those who would argue for some direct perception of *esse* or speak too vaguely of the relation between judgment and *esse.*

One reads this study with growing awe at the erudition of Fr. Fabro,

and this reviewer, who has long been convinced of the eminence of Fabro in Thomistic circles, feels the present book to be one of the most important to appear in many a day. It must be said, nevertheless, that our author, in his desire to make St. Thomas. wholly unique, deals somewhat unfairly with other historical figures. Thus, while one cannot be too grateful for the emphasis put on the Neoplatonic sources of St. Thomas' thought, he may feel that there is something less than Thomistic in Fabro's handling o'f Aristotle. The suggestion is made that Aristotle was unaware of non-univocal causes, that there is something defective in his claim that prime matter is ingenerable and that he teaches that the soul is the efficient cause of the living compound. Furthermore, Fabro contributes to the history of misunderstanding of Aristotle's statement in the *Perihermeneia.s* (16Ml-3) that "to be" alone does not signify that something is or is not. This is taken to mean that, for Aristotle, " being " alone means nothing, in contrast to the position of St. Thomas according to which it means everything. Finally, Fabro's distinction between historical and speculative Aristotelianism is hardly nuanced enough: for him there seems to be a choice only between pure repetition of the words of Aristotle and an almost irresponsible twisting of the text. The *De unitate intellectus* should reassure anyone who doubts the manifest purpose of the commentaries on Aristotle as to what St. Thomas himself thought he was doing. To say he failed is one thing; to suggest he was doing something else requires something more than assertion to become plausible.

Despite these misgivings, it must be said that we have in the present study a work of the first importance; the careful documentation, the unhurried analysis of texts, provide the reader with an instrument for fruitful reflection on the doctrine of the *Doctor Communis.*

Since previous reviews have confined themselves to the French edition of this work, something should be said here of the relation between the two versions of the study. They are not in every way the same, although a comparison of the tables of contents of the Italian and French versions reveals a basic similarity of structure. After an introductory section on thf' timeliness and originality of the Thomistic *esse,* there are three main part11 followed by a concluding summary. Part One deals with the formation of the Thomistic *esse;* Part Two with the causality of being; Part Three with the dialectic of causality. One would notice a number of differences, to be sure. For example, the history of the obscuring of *esse* in the Thomistic school occurs in Part One in the French, in Part Three in the Italian. Moreover, the differences in the titles of sub-sections could lead one to believe that there are differences where none obtains, while identical titles in the two versions sometimes conceal wholly different material. If one were to compare in detail the two versions, he would discover that everything contained in the French, save for pp. 195-f!OS, has its counterpart in

the Italian; on the other hand, there is a good deal in the Italian which has not found its way into the French. There seems little doubt, furthermore, that the Italian represents a more finished and orderly version of the study. It contains, while the French does not, a subject index, an index of sources and an index of Thomistic texts subdivided into those quoted and those merely mentioned. The following significant portions of the Italian version are not in the French translation: pp. 91-100 (a continuation of the discussion of Parmenides); pp. QQ8-Q38 (entitled *La struttura intenzionale dell'ens tomistico,* this does not answer to pp. Q60-Q80 of the French, *La structure notionelle de l'ens thomiste* whose Italian counterpart is found on pp. 197-Q13); pp. Q7Q-306 *(I Gradi della causalita Platonica);* pp. 345-355 *(La causalita della forma e l'emergenza dell'esse);* pp. 470-498 *(Causalita divina e divina presenza* and *Partecipazione e predicazione dell'essere);* pp. 567-580 *(Platonismo Ficiniano e partecipazione tomistica).* These passages serve to indicate that the Italian version, besides being cheaper, is more complete; an additional indication is had in the fact that while French pp. 344-359 answer to Italian pp. 330-345 *(Causalita formale dell'esse: forma dat esse),* in the latter 54 texts are discussed, in the former only 35. Matters are further complicated by the fact that the footnote material is not identical in the two versions, sometimes the French having what the Italian does not, sometimes vice versa. And pp. 195-Q08 of the French which, as has been mentioned, have no Italian counterpart, contain important remarks concerning Fabro's conception of *esse* as intensive act with especial reference to Festugiere's analysis of the Platonic *synopsis.* Of course, where the same material is used in both versions, a good deal of relocation has taken place from the one to the other. Finally, while the Italian version seems to be the most complete, the French is not dispensable and the final word on Fabro's contribution must take both into account.

RALPH M. MciNERNY

University of Noire Dame,
Notre Dame, Ind.

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THE REVIVAL OF THOMISM *

THE foundation of a Thomistic Institute in the second half of the twentieth century might well be the occasion for a person to enquire what can be the meaning and the purpose of an outlook which professedly lingers on an outgrown episode of thought which, however much nobility and splendour one may care to concede it, now belongs, on any supposition, clearly and irrevocably to the past. And the enquirer might go on to ask whether this Institute simply sets itself the aim of cultivating tradition and memories of the past or whether it intends to take a vital part in the contemporary intellectual dialogue; whether, to put it briefly, it conceives its task as authentic philosophy or merely as the history of philosophy. Again, we are living in a period when the message of the Gospel is spreading throughout the world and Christian culture is coming into ever closer contact with fundamentally diverse cultures. Particularly among the Oriental races, these other cultures have left an indelible impression, both fruitful and unique, on psychological attitudes, on customs and on all the modes in which the human spirit expresses itself. It might, then, appear strange at first sight that we do not know how, that we do not desire, that we are unable to free ourselves from the principles and the fundamental schemes of thought of a philosophy which takes its name and its inspiration from St. Thomas, a son, not merely of the West, but of the medieval West. It is just this remoteness in time together with the quite

* The text of a paper read by H. E. Mgr. Dino Staffa, titular Archbishop of Caesarea in Palestine, Secretary of the Congregation of Seminaries and Universities, in the Aula Magna of the Pontifical Lateran University, for the official inauguration of the Chair of St. Thomas Aquinas, 10 March, 1963. Among the distinguished guests were: Their Eminences Cardinals Pizzardo, Aloisi Masella, Tappouni, Marella, Santos, da Costa Numes, Antoniutti, Jullien, Heard, Browne, Albareda; Their Excellencies the Ambassadors of Germany, France, Ireland, and representatives of several other Embassies to the Holy See; and many archbishops and bishops from Italy and abroad.

rudimentary scientific apparatus available to St. Thomas that raise doubts in some minds with the result that the Thomistic system appears unacceptable to them. How is it possible still to maintain this system on the data of modern physies which are so far removed from what St. Thomas could use as foundation? And how is it possible to reject the efforts and the conclusions of present-day thought, irreconcilable as they often are with the very principles of Thomism?

Philosophy cannot be the bare repetition of what has been said by others. It implies, of its very nature, arduous effort and conquest on the part of reason. How can it be imposed by decree without being transformed into an act of obedience or of faith? And even on the absurd supposition that it ought to be or could be an act of faith, how is it that only in the last century the Church has commanded this philosophy?

I will not attempt here to propose an adequate and consequently a suitably extended reply to 'these questions which concern the legitimacy, the necessity and the very possibility of a return to the philosophy of St. Thomas. Yet it is certain that these aspects of the problem are once more being brought to light today and are .enjoying wide currency; and consequently I feel it my duty to make a reply, however brief, to them. It appears feasible to me to give a reply in such a fashion because the Supreme Pontiffs of the last century who have made the study of Thomism obligatory have evidently faced these same difficulties and have solved them.

Why was it only in the nineteenth century that the Supreme Pontiffs began to make the teaching of Thomism obligatory?

At the Council of Trent there was placed on the altar, side by side with the Sacred Scripture, the *Summa Theologica* of St. Thomas/ the significance of this being that the latter was called to the support of the former. This was a precedent for the decision taken by the Church in the last century when she authoritatively proposed the principles of Thomist philosophy in defense of the faith, when she placed, that is, human reason

[1] Encyclical *Aeterni Patris: Fontes C. J. C.,* III, p. 146 or *Acta Leonis XIII,* I (1878-1879), pp.

with its definitive achievements as a protection to divine revelation.

It has indeed been remarked [2] that the words of the popes, especially of Leo XIII, calling for a return to Thomism, have a drastic note to them, the pitch and the strength of a cry; evidently it was for the popes a problem which was and is of immense significance. In fact the problem which was being placed and is being placed is a fundamental one, I would even say is the most fundamental one, not only for the Church but for human thought. As long as the heresies, grave as some of them were, and the philosophical errors which arose did not so directly concern human reason the Church was content to make frequent reference to, and simple recommendation of, Thomist philosophy. But in the nineteenth century modern philosophy cast doubt on, or totally rejected, the power of reason, denying its compatibility with faith and at the same time reducing to ruin the moral, the family and the social order. The attack was directed against all the truths of faith, but it took its departure from the plane, the entire plane, of philosophy, and it was on this plane that it had to be repulsed. Since doubt, error, negation were total the choice was thereby rendered unavoidable but also simplified: either pure irrationality or integral realism, as it was understood by St. Thomas. [3] "The Angelic Doctor," says the Encyclical *Aeterni Patris,"* discovered his philosophical conclusions in the essences of things and in universal principles which contain the seeds of almost an infinity of truths which subsequent scholars would in due season bring to maturity and to abundant fruit. It was likewise this philosophical method that he used in confronting errors; and this he did with such success that single-handed he refuted all those of the past, at the same time providing invincible weapons for defeating those that, with ceaseless regularity, would arise after his death. With all due circumspection he drew a fundamental distinction between reason and faith, at the same time establishing a harmony between the two and

• Cf. J. Maritain, *Le Docteur Angelique,* 1930, p. 168.
• Cf. J. Maritain, *op. cit.,* p. 174.

thus preserving intact the rights and the dignity of both. As a consequence reason was raised on the wings of St. Thomas to such a human peak that it can hardly rise higher; and faith can hardly look for more plentiful or more valid assistance from reason than that which it has already received from him." [4]

After solemnly affirming that the Church has had to return once again to St. Thomas after long and sad experience-gained principally since the sixteenth century during the years when the traditional path was abandoned and systems of thought multiplied with a consequent clash of opinions even concerning the fundamental principles of human knowledge [5]-Leo XIII comments with a note of profound sadness: " Even the minds of Catholic philosophers seemed to be invaded by the love of novelty so that *patrimonio antiquae sapientiae posthabito, nova moliri, quam vetera novis augere et perficere maluerunt."* [6]

These words seem clearly to indicate that the great Pontiff was already aware of the first stirrings of modernism. *"Tolle Thomam, et dissipabo Ecclesiam"* was said at the time of the Reformation/ and it is indeed worthwhile to ponder the gravity and the extent of the wound that Moderism would have opened in the very heart of the Church had not Providence inspired the Roman Pontiffs to restore Thomism.

[4] Cf. J. Maritain, *op. cit.*, p. 174.

[5] With the diffusion throughout the universities of the whole world of renowned philosophical works, such as those of Emanuel Kant (1724-1804), Johann Fichte (1762-1814), Georg Wilhelm Hegel (1770-1831), Auguste Comte (1798-1857), John Stuart Mill (1806-1873), the conflict between Catholic teaching and contemporary culture became more acute. Thus began attempts to reconcile Revelation and modern philosophy. Against rationalism F. de la Mennais proposed traditionalism, according to which the human mind can know truth only through tradition. Traditionalism was condemned by Gregory XVI in the Encyclical, *Singulari nos* (H. Denzinger-A. Schonmetzer, *Enchiridion Symbolorum,* n. 2732. Cf. *ibid.* also nn. 2571 and 2811-2814). H. G. Hermes, A. GUnther, J. Frohschammer, rejecting scholastic philosophy, attempted a direct reconciliation between rationalism and revelation. The first was condemned by Gregory XVI (H. Denzinger-A. Schonmetzer, *op. cit.*, n. 2738), the others by Pius IX *(ibid.*, nn. 2850 ff.). Modernism continued on the same path, attempting to harmonize revelation with the principles of modern philosophy. It was condemned by St. Pius X in the Encyclical, *Pascendi (ibid.*, n. 3475 ff.). The condemnation was repeated by Pius XII in the Encyclical, *Humani generis (ibid.*, nn. 3877-3878).

[6] *Fontes C.* J. *C.*, III, p. 147. • *Fontes, C.* J. *C., ibid.,* pp. 146-7.

St. Pius X did not hesitate to declare that "there is no clearer indication that a person has begun to favour the teaching of modernism that when he begins to reject the method of scholasticism"; [8] and in order to block the advance of the new heresy, or rather of what he calls the "synthesis of all heresies," [9] the saintly Pontiff insists in the firmest manner on the study of St. Thomas.[10] For while modernism proclaims the separation of science and faith-thus taking up, after a lapse of nearly seven centuries, substantially the same position as that of the Latin Averroists, and in particular that of Siger de Brabant who contrasted philosophical truth with the truth of faith and succeeded in angering the imperturbable St. Thomas in his *De unitate intellectus contra averroistas,*[11] written against Siger's *Quaestiones de anima intellectiva-St.* Thomas in all his works demonstrates the perfect concord existing between philosophy and Revelation. Reason and faith are two distinct lights, two means for penetrating two diverse areas in the immense field of truth: one is a natural and human light, the other a supernatural and divine which brings splendour to the first and does not extinguish it: "*Lumen fidei,*" he says, "*quod nobis infunditur, non destruit lumen naturalis cognitionis nobis naturaliter inditum.*" [12]

With a happily chosen analogy Thomas Heitz [13] says that for the Common Doctor "philosophy was not meant to be a provisional scaffolding for theology, something destined to be removed when the building would be completed; rather it was

[8] Encyc. *Pascendi:* A. S. S., XL (1907), p. 636.

[9] *Fontes C. J. C.,* III, p. 713.

[10] Cf. Encyc. *Pascendi,* A. S. S., XL (1907), p. 640; Motu Proprio, *Doctoris Angelici:* A. S. S., VI (1914), pp. 336-337.

[11] The *opusculum* has this well-known conclusion: "Si quis autem gloriabundus de falsi nominis scientia velit contra haec quae scripsimus, aliquid dicere, non loquatur in angulis, nee coram pueris, qui nesciunt de causis arduis iudicare; sed contra hoc scriptum scribat, si audet: et inveniet non solum me, qui aliorum sum minimus, sed multos alios, qui veritatis sunt cultores, per quos eius errori resistetur, vel ignorantiae consuletur."

[12] S. Thomas, *In librum Boetii de Trinitate,* q. fl, a. 3.

[13] *Essai historique sur les rapports entre la philosophie et la foi de Berenger de Tour a St. Thomas d'A.,* Paris, 1909, p. 161.

to be thought of as a porch, the columns and the principal elements of which are cut out of solid marble, shining with evident certitude. To this porch of philosophy, however much it may possess in itself a sufficient *raison d'etre,* sacred theology attaches a temple, following its own principles of construction, different from those used by the architects of the porch, and comparable, in respect of their relatively obscure certitude, to blocks of unpolished granite. Thus the original porch of rational knowledge becomes a part and a way of entry in the vast sanctuary of Christian wisdom."

"Beneath the well-formed portico, splendid in the beauty of its Greek style, and in the vast basilica, there shines in the night of time the light which illumines being, lit by rational thought or by the hand of the revealing God." [14]

When the modernist crisis had been overcome, at least in its most acute and manifest form, Pius XI points to the Author of the victory: " There is no Doctor of the Church," he says, " whom the Modernists fear as they do Aquinas." [15] Their principles, borrowed from subjectivist immanentism, cannot stand in face of the objective validity of our knowledge and in face of, for example, the proofs for the existence of God proposed by St. Thomas.

At a distance of exactly forty years from the Encyclical, *Studiorum ducem,* and only a few years after Pius XU's Encyclical, *Humani generis,* which confirmed the dispositions of his predecessors concerning the study of the Angelic Doctor as a means of resisting present-day errors/ [6] there is no lack of scholars who are profoundly concerned with the unity of Catholic thought; and among the gravest causes of uneasiness they find once again, as always, opposition, renewed and widespread even among sons of the Church, to the Common Doctor.

There was a further motive leading Leo XIII to his historic decision. It lay in the threat to family and social order, which sprang from the errors and the conflicts of the various systems

u F. Olgiati, *L'anima di San Tommaso,* Milan, p.
[15] Encyc. *Stndiorum ducem,* June, A. A. S., XV p.
[16] A. A. S., XXXXII (1950), p. 573.

of thought and from the declared intention to bring about, even by violence, the general overthrow of the order of Christianity. " Domestic and civil society also," says the Encyclical, *Aeterni Patris,* "threatened as they are by the grave danger which we all see and which is the result of perverse and disastrous teaching, would without doubt be more serene and more secure if in colleges and schools there were taught a healthier doctrine, one more in conformity with the teaching of the Church, one such as is contained in the works of Thomas Aquinas. What he teaches on the true nature of liberty ... on the divine origin of all authority, on laws and their binding-force, on fatherly and just government by Heads of State, on the obedience owed the highest authorities, on mutual charity among all, these and like doctrines possess an unrivalled efficacy for countering those principles of the new law which constitute such a treat to the peace of the social order and to the common good." [17]

We cannot claim that the dangers which *Aeterni Patris* warned against have today disappeared or been weakened. On the contrary we are compelled to acknowledge that they are now more grave and more widespread. This means that the return to the Common Doctor is more urgent than ever.

Thomism is neither left-wing nor right-wing; [18] it is, like truth itself, above all egoism and all divisions. Even in sociology, economics and politics the principles of Thomism, which guided the revival of Catholic thought in the face of liberal laicism with its agnosticism, its individualism, its denial of social justice, must now sustain that thought with their harmonious synthesis of justice and charity [19] against the gravest error of our time, atheistic and materialistic communism, and must defend the supreme value of the human person and his liberty. In St. Thomas' lapidary phrase: *"Persona significat id quod est perfectissimum in tota natura."* [20]

[17] *Fontes C. J. C.,* III, p. 148.

[18] J. Maritain, *op. cit.,* Preface, p. xiii.

[19] Cf. e. g., A. Vikopal, *La dottrina del superfluo in S. T(YI11,maso,* (Italian trans.), Brescia, 1945.

[20] *Summa theol.,* I, q. 29, a. 3.

This review of the years of the Thomistic revival leads us to a statement of fact, or, if you prefer, to an examination of conscience and an acceptance of responsibility.

If all Catholic scholars, the Catholic scholars of the whole world, had paid heed at once to the call of the Supreme Pontiff and, instead of looking on Thomism as a kind of historical relic, worthy of study only by the historian, if they had made it—as is the intention here-a starting-point as well as an instrument for wide-flung research; if they had faithfully and promptly put into practice the Church's program, which had as its aim, not to favour one side or the other in a human undertaking, but to serve truth everywhere for the good of souls and of the world; if they had overcome the division of the various schools, which renders their activity fragmentary, sterile and sometimes confusing, then the Thomistic metaphysic, our metaphysic, would have been able in these eighty years fully to illumine, and to receive illumination from, the progress of the positive sciences. Instead this program has been exploited by erroneous philosophies. Thomism would also have been able to preside, with greater efficacy and decision, over the construction of the new social order which the present situation of the world demands with ·such urgency.[21]

In a letter, dated 15 October, 1879, to Cardinal Ant. DeLuca, Prefect of the S. Congregation of Studies, Leo XIII wrote that the teaching of St. Thomas was to be revived as soon as possible in all Catholic universities. This was specially urgent in the city of Rome, capital city of all believers, which, being the see of the Supreme Pontiff, must precede all others in solidity of teaching.[22]

[21] J. Maritain, *op. cit.,* pp. After recalling the dangers which certain systems of thought contain for the faith and for philosophy itself, especially in ethics and theodicy, which are so closely connected with the faith, Pius XII, in the Encyclical, *Humani generi8,* states: "There would be no need to reprobate these errors if all, even in the field of philosophy, paid the Teaching Church that reverence which is her due. By divine institution the Church has the mission, not only of guarding and interpreting the deposit of revelation, but as well of watching over philosophy lest Catholic dogmas be undermined by false opinions." *(A. A. S.,* XXXXII (1950), p. *575.)*

[22] *A. S. S.,* XII (1879), p.

Where the guardian of revealed truth is found, there also is the center from which radiates human wisdom. Those who live and who are moving towards life in the light of this truth, at once divine and human, must be in a position to acquire it and to communicate it absolutely pure and incorrupt.

Vae mihi, si non thomistizavero. [28] So said a living philosopher, shortly after his passage from the farther shore, during the most luminous period of his thought. If they are not to build in vain on principles in conflict with reason and with reality, to say nothing of revealed truth; if they are to penetrate the problems of modern science, viewing them in the light of higher principles, and provide fundamental solutions to them; if, finally, they are not to be cut off from the continuity and therefore from the true progress of thought, those who dedicate themselves to the study of philosophy must make their own that warning and that motto: *Vae mihi, si non thomistizavero.*

The University of the Lateran, which even in the material sense is united to the Pope's cathedral, *omnium ecclesiarum mater et caput,* dedicated to Christ and His Precursor, has a unique reason for being an example in invincible fidelity to the teaching of the Roman Pontiffs, for preserving and handing on intact, perfected and living, the doctrine of the Universal Doctor, for defending with this means those *praeambula fidei* which, like the ways pointed to by the Precursor, will continue to lead succeeding generations of the human race to the Son of God.

DINO STAFFA

Secretary
Congregation of Seminaries and Universities
Vatican City

[23] J. Maritain, *op. cit.,* Preface, p. ix.

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BOOK REVIEWS

Philosophical Reasoning. By JOHN PASSMORE. New York: Scribner's, 1961. Pp. ix, 150. *$3.50.*

In this tidy little work, Professor John Passmore, of the Australian National University at Canberra, presents a deceptively simple yet powerful argument for the legitimacy of reasoning in philosophy-all reasoning is not, nor should it be, either mathematical deduction or causal inference from experimental fact. Passmore's argument is deceptively simple in that he does not set himself in violent and noisy opposition to anyone; he carries on a quiet polemic, critically examining the reasoning procedures of his fellow philosophers, most often those of an analytic bent like himself. At the same time, the argument is extremely powerful-one is tempted to say even radically revolutionary-in that its explicit purpose is to reinstate "metaphysical deductions" (though not "deductive metaphysics ") .

General procedural lines are already clearly visible in the chapter, "The Infinite Regress "-the first of the types of reasoning discussed by Passmore. Names of philosophers referred to in the discussion range from Parmenides and Plato to Ryle, Popper, and Waismann. The argument is first set out in a quotation from Plato and objections to it are brought up principally in terms of evading the force of the infinite regress; contemporary use of the infinite regress is then referred to, the upshot of

which is the statement that the argument " has force only under relatively complex circumstances" (p. 28); and finally the chapter contains a rather sharp criticism of a rejection by Waismann of the infinite regress. This is the pattern in all the discussions that follow-discussions of " the two-worlds argument" (against dualism), of self-refutation, of arguments to meaninglessness (verifiability, arguments of "excluded opposites," and "paradigm cases "), and, Passmore's own tentative contribution, "allocation to categories." In some cases arguments are rejected, at least in the form proposed; in others they are not only accepted but insisted upon, though never without critical examination.

A neat, compact analysis, it will be interesting to see how *Philosophical Reasoning* is received by Passmore's fellow analytical philosophers-provided, that is, that its deceptive appearance of lack of substance does not cause it, like Hume's treatises, to "fall dead-born from the press." Its main point will naturally be welcomed by philosophers of a tradition which has never doubted the validity of properly philosophical reasoning. The work can, then, be generally recommended to anyone familiar with or interested in analytical philosophy.

Nevertheless, the work is presented as an exercise in philosophical reasoning, and on such grounds it should be fair game for controversy on the cogency of its arguments in particular instances. One argument must appear suspect to any convinced dualist-the " two-worlds argument " directed expressly against dualism. Passmore says he could, " more frivolously, have described it as the Humpty Dumpty argument" (p. 40), since its point is that if the world is broken down into a duality it can never be put together again. At the end of the chapter devoted to this argument Passmore states the thesis exactly as follows: " Even to state such a theory, its exponents are obliged to destroy the ontological contrast which the theory is supposed to be setting up" (p. 56). Arguing for the validity of the "two-worlds argument," what Passmore maintains is that there is a fairly general agreement among modern philosophers (perceptionists, phenomenalists, nab ·alists, etc.) to reject dualism-an agreement which is based on an at least implicit acceptance of the "two-worlds argument."

In the discussion arguments for dualism are pronosed, and promptly demolished, in a haphazard series stretching from PLtto to "psycho-physical parallelism" (as a proposed way of avoiding the "two-worlds argument ") . In each case the form of the refutation is similar: to safeguard its value as an explanation, dualism must explain the interaction between the " two worlds," something usually done by postulating a " bridge-entity," which partakes of both worlds; but such entities are destructive of their own purpose since " to suppose that there is an entity which bridges the gap . . . destroys every argument for the existence of the gap" (p. 45). No proof of this assertion is offered, though it is repeated in a variety of ways:

> Nobody can ever be in a position to be aware that any given particular is related to any given [Platonic] form. . . . An eternal mind can have knowledge only, not mere belief. . . . A particular mind can only imperfectly participate in knowledge, [yet] it is not possible to have an imperfect knowledge of a form (pp. 41-42).
>
> If the particular is to participate in the form, there must also be a converse relation (p. 43).
>
> Either there can be no interaction at all between God and man-and then God cannot play the religious role which is his sole *raison d'iltre-or* else he turns out to be just one finite being among . . . [though] one with remarkable properties (p. 49).

That is all. No mention whatever of more sophisticated defenses of dualism: no proof of the basic, oft-repeated assertion. Little heed is paid to the profound differences between religious, ontological, and epistemological dualisms. No reference is made to Aristotle's defense of epistemological dualism or the Thomistic defense of ontological and religious dualisms. In other words, Passmore has selected the most vulnerable forms of naive dualism and destroyed them, believing that he will be able thus to dispose of any and all dualisms. What reason can there be for this illogical procedure in an otherwise quite logical work? Blindness, perhaps, to the fact that more sophisticated defenses have been proposed; prejudice, perhaps, a pre-judgment that all dualisms must be naive.

In short, although Passmore, in *Philosophical Reasoning,* presents a work that is worthwhile as well as logical, nevertheless one of the arguments he offers as a logical one will not stand up-the case for dualism may be debatable, but not by ignoring the best arguments in its favor.

The Integrating Mind. By WILLIAM F. LYNCH, S. J. New York: Sheed and Ward, 1962. Pp. vi, 181. *$3.95.*

It is a good thing indeed to see a Catholic devoting himself to the broader concerns of our twentieth-century world. It is better still to see a priest and theologian come to grips with some of the major problems of the American intellectual-problems of conformism and divisiveness, of freedom and authority, of the individual in the community, and problems of the role of art in the larger public scene. All these are topics to which Father William Lynch turns his attention in this collection of essays. The collection is more, however, than merely the stringing together of unconnected discussion; there is, to the extent possible where the themes are so varied, a unifying thread. The essays are grouped around the central theme of the "interpenetration of contraries." The solutions pro-

posed to the problems discussed are in terms of complementarities rather than alternatives, in terms of the "both/and" rather than the "either/or."

This central theme is a valuable one. It may even be a necessary one if any permanent answer is to be found for the problems of our contemporary world. And Father Lynch handles the essays in a way that could only be called extraordinarily stimulating. Yet the work has shortcomings as well. Some of its broad generalizations stand in need of the statistical or sociological grounding that has come to be (rightly) expected in secular discussions of these same topics. More serious to the trained theologian, Father Lynch's discussion of analogy-he equates it quite explicitly with connaturality and " the gift of *sensibility*, or awareness" (p. 118, italics his)-can only appear as a disservice to theology and philosophy. It is true that he makes his remarks in a context of existentialism, but even when that allowance is made one must carefully distinguish between the scientific use of analogy and poetic analogies. Another small criticism is that the reader is led to expect more (p. in the discussion of a "theatre of public action" than is actually forthcoming. Nevertheless, in spite of these reservations, it can be said again that this is a thoroughly stimulating book. Perhaps it will serve its best function, as Father Lynch himself suggests, if it encourages others to take up the same topics in the same genuinely inquiring spirit.

PAUL R. DuRBIN, O. P.

St. Stephen's Priory
Dover, Mass.

The Modern Theology of Tradition. By J. P. MACKEY. New York: Herder and Herder, 1968. xi, 219 pp. $4.75.

Previous to the opening of Vatican Council II, many Catholics were unaware of any great difference of theological opinion concerning the sources of revelation. They had perhaps learned in school that revelation is found in two sources: the written word of the Bible and the additional teachings of the apostles handed down in tradition. Of course, Catholic theologians have long been aware that the process is more complex than this and that the word " tradition " has a broader meaning than " extra-scriptural truth." Nevertheless, many theologians in the English speaking world were unprepared for the deep division which appeared in the Council as soon as the schema on the sources of revelation was introduced. Before the debate was cut off with little agreement having been reached, it had become clear that this was one of the crucial questions underlying the different attitudes of the Fathers of the Council.

J. P. Mackey's *The Modern Theology of Tradition* is one of the first

full length studies of tradition to appear in English in recent years. While the debate over tradition and its relation to Scripture has produced a constant stream of writing in French, German, and Spanish, only a few scattered articles have appeared in English together with a few longer works on special aspects of the question; notably, G. Tavard, *Holy Writ or Holy Church* and **J.** Murphy, *The Notion of Tradition in John Driedo.*

Father Mackey attempts to synthesize the writing of the past century beginning with the work of Franzelin. He makes it clear from the start that his main concern is with the notion of active tradition, that is, the transmission of revelation; only secondarily does he refer to the content of revelation, the objective tradition. He brings together all the main writing on this subject using both the standard manuals of the period and the more recent monographs and journal articles.

Mackey's main thesis is that Franzelin's identification of active tradition with the magisterium of the Church is not an adequate solution to the question. He contends that the essential truth of the matter is found in the writings of Scheeben where active tradition is extended to the whole Church with each of the organs in the Church having its own role to play. Mackey then attempts to set forth the proper role of the Fathers, the great theologians and the ordinary faithful in the transmission of revelation. Finally, the author takes up the questions of Scripture's relation to tradition, and a last chapter deals with non-Catholic notions of tradition.

The author's short treatment of the relationship of Scripture and tradition is somewhat disappointing. While it is true that he has chosen to write of active tradition rather than of the objective content of revelation, it is questionable whether the former can be so easily separated from the latter. He writes: "The whole deposit was committed by Christ to the care of the apostolic preaching and it has been handed down by an unbroken succession in the Church and guarded infallibly by the Magisterium. All this is true before the influence of the Scriptures is taken into account at all" (p. 158). **It** would seem, on the contrary, that the use of Scripture is at all times central to the question of the Church's transmission of revelation. The role of the Fathers, in particular, has often been misunderstood when they have been viewed as bearers of a tradition separated from Scripture. To say that " if apostolic traditions needed ' objectification ' they had that independently of the writing of Scripture and that ' objectification ' has been handed down as Scripture has " (p. 162) hardly does justice to the role of Scripture whether in Monastic theology, Scholasticism, or the present.

On the authority of Church and Scripture, Mackey writes: "Neither is there much point in deciding which is the superior norm, which the ultimate' court of appeal. They are too different to be easily compared

and words like ' superior ' and ' ultimate ' tell us precious little about either of them " (p. . Granted that the terminology in which the question is often posed is ambiguous, it would still seem to be of great importance to decide in what sense Church is superior to Scripture or Scripture is norm for the Church. The Ecumenical movement would profit greatly from just such a clarification of terminology.

Father Mackey has done a service to the American reader by bringing together a vast amount of writing on the notion of tradition. To provide a broader view of the concept of active tradition is perhaps all that ought to be demanded from one work. It seems, however, that for a full understanding of tradition there is need for further detailed studies on the nature of revelation, the role of Holy Scripture, and the development of dogma.

GABRIEL MoRAN, F. S.C.

The Catholic University of America
Washington 17, D. C.

Karl Barth. By JEROME HAMER, 0. P. Trans. by DoMINIC M. MARUCA, S. J. Westminster, Md.: The Newman Press, Pp. xxxviii, 300, with An Introduction to the American Edition and index. $4.95.

The French original of this work was reviewed in THE THOMIST XV 503-506. The present edition has a lengthy introduction written by the author with an appeal that the reader not pass it over; it is subtitled: A Reflective Glance and Precisions. In the twenty years since he first published his study of Barth, much has developed. Barth's own thought; several studies by Catholic theologians; Hamer's own views of Barthian theology. This introduction is not a retraction of the main work; the author wishes to restate better what he had said earlier.

To do this·, he gives a brief summary and some appreciation of the major contributions of Catholic theologians, such as von Balthasar, Bouillard, S. **J.,** and Kling. He is clearly sceptical of the effort of Fr. Kling to establish agreement between Barth and Catholic doctrine on the question of justification. While appreciating the work of von Balthasar and Bouillard, he is still convinced that whatever development has taken place in Barth's thinking is in line with the original positions he took. True there is no longer the emphasis on the event of the Word of God with its sheer vertical descent into the humanity. Karl Barth can speak of the Humanity of God, meaning Christ. Yet there remains the question of a completely "coherent Christology." "Can one treat of the humanity of God without its full dimension to the humanity of man? This is the whole problem. In Christology the instrumentality of the human action

is stripped of all true density. . . . The history of salvation is transported outside of concrete human existence . . . Barth does not know a history of salvation in the strict sense, which would pass into the humanity of man " (pp. xxix-xxx).

In support of his contention that Barth's position has not really changed, Hamer suggests that the basic ambiguity of the Protestant theologian's theology lies in the realms of faith, theology and reason. Catholics must enter into dialogue with Barth on the nature of faith, as illumination, as truth as well as gift of God, and on the legitimate role of human reason in formulating and developing the truth aspect of faith in theology.

J. M. EGAN, O. P.

St. Mary's College
Notre Dame, Indiana.

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