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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.

² E. J. Ryan, *The Role of the "Sensus Communis" in the Psychology of St. Thomas Aquinas*. Messenger Press, Carthage, O., 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 the 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, Fearon⁴ 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*.

Brennan⁵ 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 Scholasticism, XIV (1940), 181-195.*

⁵ R. E. Brennan, *The Thomistic Concept of the Imagination. The New Scholasticism, XV (1941), 149-161.*

Peghaire's⁶ study disentangles two fundamental obscurities about the whole subject: first, some scholastic confusion of the *vis aestimativa* 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 *vis 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 talis 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.

⁶ J. Peghaire, *The Forgotten Sense. The Modern Schoolman*, XX (1943), 123-140; 210-229.

⁷ *Ibid.*, p. 134.

⁸ *Ibid.*, p. 135.

Recently, a two volume work, "Emotion and Personality"⁹ 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 activities." 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

⁹ M. B. Arnold, *Emotion and Personality*. 2 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. 228.

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.¹³

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. Peghaire¹⁴ 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. 126.

¹⁴ *Ibid.*, p. 135.

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, pleurability, 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. 134-135.

¹⁶ *Ibid.*, p. 134.

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 activities of the *vis estimativa* and *vis memorativa* 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 *first* 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. 130 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, *op. 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 them²⁰ 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 sensible 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. 133.

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 judgments 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 *repetition* 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.

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