that everywhere it finds its own evidence of His existence.

Cynics sneer at it and call it wishful thinking. But who does not indulge in that? It has been conclusively demonstrated, philosophically, that you cannot prove that the natural, physical world exists. Yet many people choose to assume that it does; and because of their "wishful thinking" they have achieved some truly remarkable results in it. Everyone's beliefs, be he scientist or theologian, start with certain basic assumptions, presuppositions, that cannot be proved. There is nothing to apologize for in that. Wishful thinking is ridiculuous only when it makes assumptions that are contrary to logic and rationality. [p. 244-45]

You must read the whole of this beautiful paper, in which Mr. Odhner "proves" on the basis of axioms accepted on the ground of the self-evidencing reason of love, the basic tenets of our beautiful New Church doctrines.

I once heard it said that a proof is any over-whelmingly convincing argument. My first reaction was that some cynic was poking fun at mathematics; but the more I think about it, the more I realize that this *is* the way we use the word "proof." I do not say that we *should* use it that way, but we do. At a mathematics meeting this year I heard about the Law of the Least Astonishment: "A theorem is true if anyone would be astonished if it were false." I thought about that one too, and I am not sure what it means, if anything, but it might have a bearing on the subject.

I would very much appreciate comments. Should we be working on theorems from the Writings? Has anyone examples with more clarity and rigor than mine? Should we use them even if not rigorous? ■

THINKING FROM CORRESPONDENCES

N. J. Berridge

IX. The Ears

1. Hearing and simple obedience

The spirits who correspond to the hearing constitute the province of the ear in the Grand Man. They are in simple obedience. They do not reason about things but believe and do what others tell them. Hence they may be called "obediences." There are many differences

among them — from the most external to the most internal, who are intimately conjoined with those who belong to the internal sight but differ from them in having less discernment and giving as it were a passive assent to them (AC 4653). This second part of *Arcana Coelestia* 4653 appears to indicate a wide range of correspondence from the mere external ear or auricle to the spirit itself, for it is said "and finally to those that are in the spirit." Thus it seems as though we have spirits corresponding to the hearing of the spirit in man. Although the spirits thus indicated as belonging to the province of the ear extend internally as far as the spirit itself, they all follow the introductory indication of being obediences. But No. 4654 suggests that those in simple obedience belong to the auricles. On the other hand 4655 states that spirits "as it were" within the ear were simple and obedient.

2. *The auditory nerve and obedience of the will*

With regard to the connection of obedience and hearing, two statements from *Physiological Correspondences* by John Worcester[1] are of interest. On page 284 we find

> But an important part of the auditory nerve goes direct to the cerebellum, which is the seat of the affections of the life, and of involuntary motion, and there has a tendency to produce immediate impulsive action in response to its impulses.

And later,

> In studying the sense of hearing, we have seen that it has relation to obedience; and it is interesting to remember that the nerves of the ears, besides their extension to their special convolutions of the cerebrum, send large branches directly to the cerebellum, having thus a tendency to produce prompt and involuntary obedience, as well as voluntary. [P. 393]

It is interesting to consider a possible line of thought which may have led to these statements. Apparently they follow from the relation between the sense of hearing and obedience, and it is possible to develop the idea as follows. There are a few phrases in the Writings that, taken out of context, might lead one to think that sounds flowing into the ear affect the will immediately. For example we read, "whatever they (celestial angels) hear of Divine things they receive in

[1] John Worcester, *Physiological Correspondences*, (Boston: New-Church Union 1931; Copyright 1889. Reprinted 1976, Swedenborg Scientific Association, Bryn Athyn, PA.)

the will" (AE 14); and, "What the angels of the third heaven hear from preachings...enters directly into their perception and will" (loc. cit.). Sometimes it seems that perception ' .y little to do with understanding , e.g., "The correspondence of the variations of tone which derive very little from the understanding is with perception" (DW X 5); also, "the sounds enter the will and thence the affection" (AE 588). This is often the case with music, but for our present purposes we are mainly concerned with speech.

It is taught throughout the Writings that there is a correspondence between hearing or hearkening and obeying, e.g., "they who are obedient and submissive belong to the province of the ear and indeed correspond to the hearing itself" (AC 2542). Since obedience is often a matter of submission of the will, the idea that hearing and the will are closely connected is further strengthened. It is also said (DLW 384) that the cerebellum exists chiefly for the sake of the will.

So, as hearkening means the will must acquiesce in obedience, and as the cerebellum is for the sake of the will, it would be of special interest if the ears really were directly connected to the cerebellum. However, such a connection is not supported in the recent edition of *Gray's Anatomy*[2] from which we learn that it is not the auditory nerve that leads to the cerebellum but its close companion, the vestibular nerve, which leads from a different part of the inner ear. In view of this, the second statement in Worcester about the nerves of the ear is also misleading, though in itself correct, as the ear as a whole includes the vestibule.[3] A brief outline of the appropriate anatomy will clarify the matter.

3. *The routes of nervous impulses from the ears*

The inner ear consists of two distinct parts, the cochlea and the vestibule with its semicircular canals. The former, shaped like the spiral of a snail shell is the organ of hearing, and the latter are organs

---

[2] R. Warwick, and P. L. Williams (editors) *Gray's Anatomy*, 35th edition (Edinburgh: Longman, 1973.) (It is necessary to emphasize that a recent edition should be consulted, as quite an old edition is being reprinted in U.S.A. It is offered for sale in England.) I apologize for having incorrectly given London as the place of publication in a reference in *The New Philosophy* LXXXII No. 3.

[3] In spite of this criticism, I think Worcester's book is in many ways an admirable general introduction for the New Church reader. It is of course limited to the knowledge of its time (1889), but for gross anatomy this is probably adequate. The book contains little about what we now call physiology, most of the descriptions of the body being anatomy. This is of course because physiology has developed mostly in this century.

of balance, which are sensitive to position and acceleration. In each ear there are three semicircular canals in three planes approximately perpendicular to one another, but in spite of their name each forms about two thirds of a circle, and the ends come together in the vestibule. The nerve which conveys impulses from the canals and the vestibule towards the brain thus is known as the vestibular nerve; and it originates in the vestibular ganglion, which occupies an adjacent cavity in the bone of the skull.

The cochlear or auditory nerve has a quite separate origin in the cochlear ganglion, which occupies a hollow space in the central pillar of the spiral bone of the cochlea. After leaving their special organs the vestibular and cochlear nerves travel so closely together through one passage in the skull towards the brain that they have become know by one name, the vestibulocochlear nerve. On arrival at the brain, they separate again and end in different relay stations (see part VII for the meaning and function of relay stations). Impulses from the vestibule pass along the vestibular nerve, most of the fibres of which end in one or another of four relay stations different from those of the cochlear nerve (see part VII). The rest of the fibres of the vestibular nerve do actually lead directly to the cerebellum (unlike those of the cochlear nerve), and controlling fibres also pass in the reverse direction to the vestibular relay stations. In response to signals from the vestibular system, the cerebellum sends impulses to many nerve centres which activate muscles in various parts of the body. Besides this, some of the relay stations on the vestibular route activate directly other centres which control muscles of the eyes, neck, and other parts. These reflex mechanisms are the means by which we maintain bodily equilibrium instantaneously without thinking about it, although it must be added that sight also aids balance.

The many connections of the vestibular nerve through its several relay stations, including the cerebellum, constitute a mechanism which is even more complex than has been indicated above; but in summary it can be said that the whole vestibular system influences the motion of the eyes, head, body and limbs in such a way that under normal circumstances a man can automatically keep his balance.

4. The role of understanding and perception in obedience

There is another reason why an immediate connection between the ears and the cerebellum could not "produce prompt and involuntary obedience," and that is that the meaning of the words of the command must first be understood. One would expect such a complex activity of the intelligence to require participation of a

considerable area of the cerebral cortex, and indeed various cortical areas are believed to be involved in the numerous activities related to language, including speaking and listenin

Clearly obedience is by no means an automatic response of the cerebellum nor is it usually a mere response of the will independently of the intellect. The Writings make it clear that the understanding is often involved. For example in *Apocalypse Explained* 14, besides the phrases already quoted we read, "things which enter by hearing enter *directly by the understanding* into the will" (emphasis added). The wording is notable. Perhaps it means *not* directly into the will but through the understanding. However, we are not accustomed to finding "by" in the Writings if "through" is meant; and from the way the brain is constructed (as I understand it) it could mean that the cerebrum is able to influence the cerebellum to cause it to respond in an appropriate way to nerve impulses from the ears — or that the understanding can influence the will in its response to sounds. (The love perceived in a tone of voice may be genuine or feigned.)

In view of other statements, the word *directly* is probably used to mean that the information is not first filed away in a long-term memory. Apart from a few phrases such as those mentioned above, none of the many passages relating hearing to obedience indicates that it is by a direct influence on the will. Understanding or perception is always a prerequisite, except for the most external kinds of spirits who correspond to the external ear or to skins. These do what other spirits tell them (AC 4654), and some do not even reflect upon the meaning of things that are told them (AC 4656; SD 2667).

Perhaps, since spiritual language is "thought speaking," such obedient spirits do not even need to "translate" words into ideas but merely accept the ideas and act upon them. In general, however, hearing involves attention ("natural hearing [is] from spiritual hearing which is attention of the understanding and at the same time accommodation of the will" CL 220). Then hearing is receiving in the memory, being instructed, receiving with the understanding and believing, receiving in obedience and doing (AC 9311). We also read that "to hear" signifies to perceive, understand, and have faith, and "to do" signifies to live according thereto.

> But where hearing is spoken of and not at the same time doing then "hearing" signifies faith in will and act, thus obedience. The reason is that *what is heard passes into the internal sight, which is that of the understanding*, and is there received by the will, and passes as by a circle into act. [AC 8361, emphasis added]

The matter is further explained in detail in other passages, for example,

> when the things which are heard penetrate to the interiors they are also *changed into something like sight*, for what is heard is seen interiorly; and therefore by *"hearing" there is also signified that which is signified by "sight" namely, that which is of the understanding*, and also that which is of faith; but the hearing at the same time persuades that the case is so and affects, not only the intellectual part of man, but also his will part and causes him to will that which he sees. Therefore hearing signifies understanding of a thing and obedience and in the spiritual sense, faith in the will. [AC 3869, emphasis added]

These and many other passages confirm the common-sense view that, when a command or request is heard, the words must first penetrate the understanding, where the sounds and articulations are interpreted. The mind then sees what is to be done. If the love is at the same time agreeably stimulated, obedience follows from good will. This must be the case when good spirits and angels are involved, for they hear of good more or less directly from the Lord, and as we have seen, the good or love or affection is expressed in the sound. Clearly, good spirits in the intermediate state will also hear sounds which will offend their ruling love and urge them to ignore evil suggestions. This, of course, is often called *not* hearing; and it is part of our experience in this world that sometimes we honestly do not hear words that have no interest for us.

5. *Miserable spirits of the interior ear*

If we return now to the section on the correspondence of hearing, we find in *Arcana Coelestia* No. 4658, an account of a group of spirits who had studied logic and metaphysics solely for the sake of reputation and money and were therefore miserable. It is at first surprising to find that they belong to the interiors of the ear and "have the sight of the interior hearing, and...obey the things that its spirit there dictates and give fit utterance to its dictates." But as there is a spirit whom they must obey, it seems possible that they are merely servants and "belong" to the interiors in no other way than a servant belongs to a household. However, it is also worth remembering that, as Worcester points out,

> These descriptions seem all to be taken from the Christian heaven before the Last Judgment, thus during the process of its

formation and purification from evil spirits. The Ancient heavens would be described very differently, and likewise the Christian heaven now that it is in orde[illegible] p. 403]

It is pointed out for us (AC 4658) that in acquiring learning merely for honours and wealth the spirits we are considering had not perfected their Rational, and it is interesting to notice how easily these few hints about their character enable us to understand their role. Having no genuine Rational (which is the faculty of perceiving truth) the best such learned men could achieve was to be obedient to the truth that was told them (perhaps even forced upon them?). One assumes that as educated men they were able, once they had submitted, to understand the truth more clearly than the less learned, and that by virtue of this understanding they had some relationship to sight, but being unable to discern the truth for themselves the best they could do was to obey, hence their connection with hearing as well as sight, and hence their possession of "the sight of the interior hearing" and their ability to serve its spirit.

6. *Aristotle and the dancer*

The next part of this intriguing section of *Arcana Coelestia* is of special interest because there is an implied connection with the physiology of the inner ear. We are introduced to a spirit thought to be Aristotle.

It is clearly a perfectly orderly matter that Aristotle, being in the province of the ear (because he was obedient to his spirit) should be mentioned while Swedenborg is describing the correspondence of the ear and it is to be expected that two such men would discuss philosophical matters of mutual interest. This is sufficient reason, (if it satisfied you), for the inclusion of a paragraph (4658:3) about philosophy, analytical science, and the foolishness of trying to think from mere terms instead of from use and "from within." But one may ask "Why is it that when Swedenborg wished to exemplify the futility of thinking artificially from terms, he chose to mention the impossibility of a person being able to dance by means of a knowledge of motor fibres and muscles throughout the entire body?". A better question is "Why did the Lord choose this form of ultimate for the Word in this place?". It is a matter of faith to accept the wisdom of the choice, but it becomes a matter of sight when the physiology is known, because the connection with the inner ear is very close. The importance of the semicircular canals for balance and muscular control has already been mentioned; but from those to whom the physiology is not known the wisdom of the Lord's choice is hidden,

and it is in keeping with its arcane quality that no mention of the semicircular canals seems to be made in the Writings except as a mere item in the list given in AC 4653:2 (The Latin is translated "cylinders" in my edition (Swedenborg Society 1922) but "canals" in another). I can find nothing more about them and no reference to them in other indexes of the Writings that are readily available to me, nor in Potts' *Concordance*, yet their importance for normal bodily life, and especially for dancing, cannot be exaggerated. Their connections through the cerebellum and brain stem with the rest of the body are like a fantastically complex, speedy, accurate computer system whereby a dancer is able to execute marvellous, rapid, complicated evolutions with perfect bodily control. (The eyes help and the cerebrum is certainly concerned when the dance is complicated: but the routine of balance and coping with starting and stopping and changing direction must be largely the responsibility of the cerebellum and its sense organs in the semicircular canals). This, I submit, is the reason for the inclusion of such an example in a section of the Writings devoted to the correspondences of the ear. If I add that this again shows that there is much more in the Writings than we think when we first read them, I hope those who had already seen the connection will still share the joy of confirmation.■

PHILOSOPHICAL NOTES

Edward F. Allen

Connected Whole VI

378 *The Whole.* A whole is composed of realities. A whole is not an arithmetic sum of the realities which are its parts. The human body is not a simple sum of its organs. In an earlier note on wholes, it was pointed out that the whole of the universe is not a simple sum of what the senses bring to our minds, or even what these senses aided by sophisticated instrumentation bring to the mind. Radiation in space attributed to the "big bang" gives evidence of the enormous length of time covered by the past history of the universe, when it is concluded that the event of the big bang occurred some twenty billion years ago. When one assigns such a time to radiation traveling with the speed of light, he gains some idea of the size of the universe. The universe so judged is indeed an enormous whole, much larger than any arithmetic sum that may be conceived by adding solar systems. The origin of stars