

CEREBRAL ASYMMETRY IMPLIES THAT MATHEMATICAL - LOGICAL TOTAL ORDERING OF THE UNIVERSE AND THE MIND IS IMPOSSIBLE

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It was suggested (Fidelman, 1987) that the cognitive conflict related to theorems and paradoxes, which follows from diagonal processes in mathematics, is related to a neurological “conflict” between the left- and the right-hemispheric mechanisms in the brain. Goedel’s theorem is one of the theorems proved by a diagonal process. It is related to the liar’s paradox, i.e., to the statement S: “What I am saying now is a lie.” A lie is an element of the set of all the untrue statements. This set is integrated by the holistic right hemisphere. The statement S has the property of being untrue, since assuming that it is true implies that it is a lie. However, S is not an element of the set L, since if S were an element of L then it would have been true. The single element S is extracted by the left hemisphere. The existence of S disintegrates L as the set of all the untrue statements. This disintegration involves a cognitive and neurological conflict between the right hemisphere which had integrated the set L and the left one which disintegrated it by extracting the additional untrue statement S.

All the proofs by diagonal processes and all the set theoretical paradoxes are related to such a cognitive conflict in which the right hemisphere integrates a set which is supposed to comprise all the elements having a certain property P. Then

the left hemisphere extracts an additional element having the property P, which is not an element of this set. Goedel constructed in arithmetic a proposition G which states: "G is unprovable", which is analogous with the Liar's paradox. A corollary of Goedel's theorem is that the consistency of arithmetic is unprovable.

Penrose (1989, 1994) proved that Goedel's theorem implies that no formalizable theory which includes arithmetic, can represent the physical world totally, since the world includes the human brain in which this theory is encoded. However, Penrose's Platonic view causes him to believe that this difficulty can be circumnavigated by either a non-formalizable theory or an unusual structure of the physical world.

Non formalizable theory cannot provide a model of the physical world, including the brain's cognitive function, since such a model must be lingual, written or spoken. However, such a model implies the following paradox of Berry: Let n be the smallest number which cannot be defined by an English sentence having less than, say, a hundred letters. This sentence exists. Nevertheless, it has just now been defined by a sentence consisting of less than a hundred letters.

An example of a world having an unusual structure which "avoids" a diagonal theorem is a world having a closed time coordinate (in the sense of relativity theory). In this world a Turing machine can check its past output and find whether it has stopped, contrary to a diagonal theorem that the halting problem of a Turing machines is unsolvable. However, this world is contradictory, since in it one can go to the past and kill his (her) grandmother before the birth of his (her) mother, contrary to his (her) existence. Therefore this world cannot be described by any consistent theory.

Therefore the program of Penrose is impossible. This impossibility follows from the suggested observation that the lack of coordination between the two hemispheric mechanisms causes a contradiction in any holistic conception of the totality of the universe (Fidelman, 1988). The holistic cosmos of the right hemisphere is perceived by the left one as a single element which requires external space and time in which it is included, contrary to its being “all that there is.” Thus Kant’s “cosmological ideas “ lead to a contradiction (Fidelman, 1988). Thus the impossibility to perform Penrose’s program is in line with Kant’s view that attempting to apply the logic of experience to cosmological- (Fidelman, 1988) and theological-ideas (Fidelman 1992) may result in contradictions.

According to Kant the logic of experience does not apply to psychological ideas. This view of Kant is related to the impossibility to construct a theory of the cognitive functioning of the brain, due to Goedle’s theorem.

Penrose is aware of the above arguments against his program. However, Penrose (1989, pp. 108-112) believes that mathematical truth is accessible to us through Platonic mathematical insight. Goedel’s proposition G is an example of such a mathematical truth, which cannot be proved within a formal system. His insight is that there is a theory of the physical world which includes the function in of the brain. It is not clear to me why the arguments against the existence of such a theory are not such a mathematical insight. We considered the liar’s statement as meaning that S is an untrue statement not included in the set of all the untrue statements. However, we can consider S to be a true statement not included in the set of all the true statements. Similarly, a “mathematical insight” that G is not a true statement, and arithmetic is not consistent, is as legitimate as the “insight” that G is true.

May be that arithmetic works only regarding a finite, though very large, number of objects, and above this number it may be inconsistent. This number may be larger than the number of objects in the universe. Thus the observation that arithmetic “works”, does not prove its consistency, as follows from Goedel’s theorem. This possibility is analogous to the observation that Euclidean geometry “works” in our immediate vicinity, but not in interstellar distances.

References

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