OPENING ADDRESS
by
Professor KLIBANSKY

Ladies and Gentlemen,

It gives me great pleasure to welcome you here. I greet in particular the representative of the Province of Liège, and take pleasure in thanking the Relations culturelles du Ministère de l'Education Nationale which has contributed to making this meeting possible. I welcome the Dean of the Faculty of Philosophy and Letters, who also represents M. le Recteur of this University. I welcome the representative of the Director General of UNESCO, Mademoiselle Hersch, herself a distinguished philosopher, and I wish to thank our colleague, Monsieur Devaux, Vice-President of our Institute, President of the Centre National de Recherches de Logique, and chairman of the organizing committee, as well as all his collaborators, who have taken great trouble in arranging this meeting and in making us feel at home.

It is, indeed, particularly appropriate that the Institute, on the occasion of its thirtieth anniversary, which we are celebrating this year — for it was founded in 1937 under the name of 'Institut International de Collaboration Philosophique', at the Congrès Descartes, in Paris — should meet in Liège. It is perhaps not generally realized that, in its long history, this city has been the meeting-place of thinkers from all over the Western world. More than eleven hundred years ago, we find in Liège one of the first pieces of evidence of the study of Greek in the Occident. We can trace the influence of scholars from distant lands of the West; from Ireland, there came a group of learned Benedictines. It is due to this remarkable colony of Irish monks and to its activities at Liège, that parts of Cicero's speeches which otherwise would have been lost, have been preserved. After a period of decline during the Norman invasions, in the tenth century the schools begin to flourish again. This time their flowering is due to scholars from the South, from Switzerland. Notger, of Saint Gall, brought

the school to new life, and among the teachers he attracted there was a Greek refugee from Southern Italy, Leo of Calabria. Here again, we have evidence of some acquaintance with Greek and, a little later, some of the first signs of Arabic mathematics north of the Pyrenees. If we were to ask which problems were then discussed in this city, which questions occupied that master of the school who — having been called to the Imperial Court at Mainz — longed for the quiet studies of the city on the Meuse and praised Liège as *"ipsa flos Galliae tripartitae et alterae Athenae"*, a second Athens, not inferior to Plato's Academy, we find that one of the topics is precisely that which engages our own attention: demonstration.

Here, in Liège, those philosophers who wanted to demonstrate the nature of God by means of logic, or by means of natural science — Peter Abailard and William of Conches — were severely attacked by a master of this city, William of Segny, better known as William of Saint-Thierry, the friend of Bernard of Clairvaux. The problem of the limits of demonstrability now assumed a special relevance and received dramatic emphasis. The contemporary masters of dialectic were all familiar with the old Stoic argument (the logicians of ancient times were less delicate than their modern counterparts), — the argument *si peperit, concubuit,* if a woman gives birth, "concubuit»; *peperit, ergo concubuit.* This application of demonstration to matters of fact became a scandal to the theologians. It entailed no less than the denial of the Virgin birth. How could it be admissible ? And we find from the eleventh century, a clear cleavage between those who held that it is precisely the function of the philosopher to demonstrate whatever is claimed, in any way, to be a true and significant human belief; and the others, who held that a philosopher cannot demonstrate anything significant, and that demonstration (if it is possible at all) is possible only within a narrow field, that of mathematics. For the first position, we have the words of the poet, "Der Philosoph, der tritt herein Und beweist euch, es müsst so sein". "The philosopher, he enters upon the scene and demonstrates to you that things must be as they are." This, of course, is Mephisto's conception of philosophy. Mephisto, who recommends to the beginner to begin his studies with the collegium logicum of demonstrative proof. It is

the devil who presents the philosopher in this light. As a reaction we have those, at all times, we find them in the Middle Ages no less than today, who declare that, in philosophy, demonstration is impossible. Tennis players, it is said, do not score goals; philosophers do not provide demonstrations. Against this radical position, it could easily be shown that, in the history of philosophy, we have, in every generation, examples of demonstrations, demonstrations of a negative kind; demonstrations aimed at proving the falsity of conclusions reached by a previous generation, or by contemporary philosophers. And thereby showing that the conclusion does not, necessarily, follow from the premise or more frequently that the premise is unsound, or the argument hinges on a play with formal concepts. We have a third position which has become fashionable in our day. Logic is nothing but a kind of rhetoric. The new fashionable tunes heard nowadays in Cambridge, and echoed on the continent can be summed up as follows: Logic is rhetoric, proof-persuasion and philosophy, logic played with specially elastic equations. Here, we shall have to examine: is proof, really, merely persuasion, are we not letting ourselves in for endless confusion if we fail to distinguish clearly between the rhetor who manipulates his arguments as it seems best to him, to gain the adherence of the particular person or persons whom he wants to convince, and the logician who submits himself to a standard which he holds to be valid independently of his will, or of that of any other person, and who expects this standard to hold good for any reasonable being ? This may be one of the questions which will engage our attention. But in discussing demonstration, we shall place ourselves in a tradition. Demonstration has been discussed, in each generation since the second part of the twelfth century, in the form of commentaries to Aristotle's posterior analytics. Aristotle was, for generations, commented upon, then attacked and refuted, then ignored. Yet, in the end, it is the edifice, which he built, which underlines somehow all talk about demonstration. Hence, it may be worth while to sum up very briefly as a background for our discussion, the main propositions on which the Aristotelian theory of demonstration rests.

First, I shall do so in enumerating fourteen axioms. Demonstrative premise differs from a dialectical one, in that the demonstrative

premise is the assumption of one of two contradictories, while the latter asks which of the two the opponent admits.

Secondly, the premises of demonstration must be such that a predicate is true of every instance of the subject, true of the subject per se, and true of it precisely for itself.

Third. Since that which is known in strict sense, is incapable of being otherwise, that which is known demonstratively, must be necessary. But demonstrative knowledge, we possess by having demonstration. Therefore, demonstration must proceed from what is necessary. So we must examine the nature of the premises.

Fourthly. The premises of a demonstration must state necessary connections. Transconnections are not demonstrable; only eternal connections can be demonstrated.

Fifthly. The premises of demonstration must be peculiar to the science in question, except in the case of subaltern sciences. Since, the first principles in each genus are the propositions that cannot be proved. We assume the meaning, both of the primary and the secondary terms. We assume the existence of the primary and the secondary terms. We assume the existence of the primary and prove the existence of the secondary terms.

Sixth. Of the first principles, some are special to each science, or are common in virtue of an analogy, since they are useful just in so far as they fall within the genus in study. Special principles are such, as a definition of line or straight; common principles such as that: if equals are taken from equals, equals remain. It is sufficient to assume the truth of such a principle within the genus in question.

Seventh. There are also special principles which are assumptions of the existence of the subjects whose attributes a science studies. Of the attributes we assume the meaning, but prove the existence, through the common principles, and from propositions already proved. For every demonstrative science is concerned with three things: the subject assumed to exist, that is the genus, the common axioms and the attributes.

Eighth. That which must be so by its own nature and must be thought to be so is not an hypothesis, nor a postulate. There are things which must be thought to be so, for demonstration does not address itself to the spoken word, but to the discourse in the soul.

One can always object to the former, but not always to the latter.

Ninth. The first figure is a figure of scientific reasoning. For both, the mathematical sciences and all those that study the why of things come to the proof in this figure.

Tenth. There are negative as well as affirmative propositions, that are immediate and indemonstrable.

Eleventh. Can there be an infinite chain of premises in a demonstration ? There cannot be an infinite chain of premises, if both extremes are fixed. If there cannot be an infinite chain of premises in affirmative demonstration, there cannot be negative. There cannot be infinite chain of premises in affirmative demonstration if either extreme is fixed.

Twelfth. Universal demonstration is superior to particular. Affirmative demonstration is superior to negative. Ostensive demonstration is superior to reductio ad impossibile.

Thirteenth. There cannot be demonstrations through sense perception. There is nothing that can be both demonstrated and defined.

Fourteenth. Definition proves nothing. Knowledge of essence cannot be got either by definition, or demonstration. The whole rests on the conception of science, since perception is a foundation of all the science. The reason is that science proceeds by demonstration from general propositions, and since indemonstrable, stating the fundamental attributes of a genus; and that these propositions can be made known only by intuitive deduction from observation of particular facts, by which they are seen to be implied. Deduction must be intuitive. Deduction, not deduction by simple enumeration, nor even scientific deduction, since neither of these could establish propositions having the universality and the necessity which the first principles of science have and must have. Now this theory of demonstration is, in the course of history, combined in some way with the stoic notion of demonstration which also I have briefly to characterize. They serve as background for our discussions of the modern concept of demonstration. The stoic theory of demonstration is linked with the notion of the argument. The argument being a system of propositions composed of premises and a conclusion. We have to distinguish three principal types of argument. The valid, the true and the demonstrative.

Of these, the valid is not necessarily true or demonstrative. The true is always valid, but not necessarily demonstrative, the demonstrative is always valid and true. The demonstrative argument is a subset of the valid and true argument. It is an argument that is true and serves to reveal a non-evident conclusion. The stock example, again the logicians are fairly prude, "if she has milk in her breasts, she has conceived". She has milk in her breasts, therefore she has conceived. In this argument the conclusion is non-evident, and is revealed by the premises.

We find that the stoics develop the theory of the five basic types of undemonstrated argument which, in turn, leads to the theory of the hypothetical syllogism which is then combined with peripathetic logic. This gives the framework of traditional logic.

Now, if we see what use is being made of this traditional theory, we find Pascal, stating in a letter to Fermat, concluding an argument which the two had on the question of the probability of winning games, le problème des partis: "Car je voudrais désormais vous ouvrir mon cœur s'il se pouvait, tant j'ai de joie de voir notre rencontre, je vois bien que la vérité est la même à Toulouse et à Paris." Hence, truth can be demonstrated. Truth is the same. The question which we shall have to be asked is "what kind of truth will be the same and can be demonstrated as such in Peking and in Washington, in Novosibirsk and in Oxford, and in Belgium. Are there such truths ? If so, what is the manner of demonstration ? Demonstration is a mode of showing. This appears from the usage of the word in all European languages. From the ἀποδεικτικος of the Greek to the demonstration of the latin and all its derivative in the roman languages, "die Beweisen" in German, always it is clear that it is a mode of showing. It is that mode of showing which makes that which is shown seem to be true without a possibility of disagreement. Such showing can proceed in two ways.

First, by direct appeal to the senses: demonstration ad sensus. In this way we speak in English of the demonstrator in anatomy. The assistant who exhibits and describes specimens. Or the demonstrator who takes part in a public demonstration to make his sentiment manifest to those for or against whom the demonstration is intended. It is not about this kind of demonstration that we are going to speak. It is about the demonstratio ad intellectum.

That showing which proceeds by appeal to the mind. That showing which, by a process of reasoning, makes something be seen as necessarily true. What are the problems we shall ask for the A demonstration, where is it applicable, and, finally, how are we to account for the possibility of demonstration ? This latter precision is very often left out of account. Formerly, once upon a time, the foremost logicians of the age, in order to account for the possibility of human complication, stipulated the fundamental unity of universal human grammar. All individual languages being considered as mere accidents. Today, we have but a smile for such an assumption. But, do we not continue to take for granted other kinds of unity ? The unity of human experience. Or, do we hold with Averroès that a possibility of demonstration is wounded in the unity of the structure of the human mind. If so, we have to say what we mean by the unity of structure. Or do we dismiss all such questions ? And do we hold that all demonstration is, in a sense, merely development of tautologies ? But then the question still remains. What makes it reasonable for me to expect that any other being will, like myself, recognize a tautology as such ? Some of us may consider such questions won't be put, or superfluous. Yet, if they are not squarely faced, we shall not easily be rid of them. We shall not only be engaged with demonstration, but with justification. Here we enter a fundamentally different domain. From the realm of the mathematicians, we enter that of the theologians and lawyers. Justification is, of course, a theological concept. It is, on the one hand, the concept which is prevalent in the Old Testament. That which that action which renders man just, in the eyes of God. It is a concept which becomes simple for Saint Paul. It is the justification of man by his faith in Christ. The justification before God of the whole man. It is, from its Greek origins, originally a legal concept. The justification of the one who is accused. We find that these two concepts go together along each other. Very late, only in modern philosophy, do they become theological concepts. And here we no longer are concerned with justifying the whole man before God. But we are concerned with justifying single actions or the holding of beliefs, the making of assumptions... We still justify the form and authority. The form: a tribunal which is this tribunal, we shall ask ? It is a stan-

dard of rationality, and we find that this standard varies from time to time, from generation to generation. And it may not be the same at the same time. Its command to all is the demand of submission to a tribunal, to an authority which is independent of the will of him who justifies his actions or assumptions, or the holding of certain beliefs. We find here a peculiar tension: on the one hand, the demand for an absolute criterion with the full recognition that every content given, every specific description of this authority is historically conditioned. It is this tension which is perhaps particularly characteristic of the human situation, and of the situation of the philosopher as such. The attempt at transcending time and conditions by submitting to a criterion which is considered absolute, and a realization that any specific description must necessarily be relative to the conceptual apparatus, to the language of him who submits himself, to such a standard. It is the tension between the attempt at transcending time and the realization that every transcendance of time proceeds *hic et nunc* in time, and is conditioned by the situation *hic et nunc*.

We shall lastly speak about verification. In verification we have always the appeal to means of evidence, of testimony in the world of facts, outside mere reasoning. Much has been said about verification in our own generation. Verification and falsification. This discussion, of course, again, goes back a long time. It is sometimes forgotten that the criterion of falsifiability is stated by Aristotle in the Topics. The practical rule that an interlocutor has to grant a universal when an induction is made in the strength of many cases, if he is unable to bring some negative instance. And we find it in Mill, in the system of logic. It appears then to be a condition of the most genuinely scientific hypothesis. That it be of such a nature has to be either proved, or disproved, by comparison with observed facts. Do we solve the problem by appealing to the criterion of falsifiability, as the criterion of genuine science ? Do we solve the problem of induction by reducing it, by denying it, and reducing it to deduction and applying the criterion of falsifiablity ? This again will be one of the problems which will engage our attention.

To conclude, we shall not let the sequence of terms, in our

title, "Demonstration, Justification, Verification", mislead us. To thinking that these terms are of the same order. They differ, as to their object, as to their method, and as to criteria.

I conclude with the following prediction. We shall not be able to demonstrate much, except perhaps negatively. We shall not verify anything, because we are not concerned here with facts in the world, but with discourse about the world. But it is my firm belief that we shall find ample justification in having come here, from distant lands, and in devoting several days of our life to this discussion of the concepts of demonstration, verification and justification. Thank you.