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### SOME SYSTEM-THEORETICAL ASPECTS OF THE WORK OF G. W. LEIBNIZ

The question concerning the contribution of Gottfried Wilhelm Leibniz to system-theory may appear as self-evident on the one hand, or as an artificial construction, as modernization of his ideas, on the other. Undoubtedly both aspects are in a sense authorized but, at the same time, both include the danger of fundamental misinterpreting some of Leibniz' principal ideas. But we think that this refers to all great philosophical and scientific thinkers and the interpretation of their works, their contribution to philosophy and science. These dangers, which necessarily pertain to such interpretations express the internal contradictions of these pioneer works, of these pioneer ideas, mainly the contradiction between their anticipations of the further evolution of philosophical and scientific thought and the immanent (and, of course, external) limitations of their work, which penetrate all their thoughts, dangers, which may cause that the interpretation will be led in a false direction.

We have to ask, are there in the scientific, especially in the philosophical, work of Leibniz anticipations of aspects of system-theory in the modern sense of the word? We think there are. But we also think that, generally, they are concealed in the thought of Leibniz. Of course, if we look for the system-theoretical aspects in Leibniz' philosophical and scientific thought it seems to be evident to begin with the investigation of his metaphysical system in general, bearing in mind that it is the last great metaphysical system of 17th century philosophy.<sup>1</sup> But this method would be fatally conducive to the above-mentioned dilemma: the result would be neither a refutation of the value of Leibniz' ideas for modern system-theory nor their modernization.

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<sup>1</sup> Cf. K. Marx, F. Engels, *Die heilige Familie* in: *Werke* vol. 2, Berlin 1957, p. 132.

But there is possibly another way of questioning and investigation. We exclude at first principally the possibility of a general comparison between the philosophical and scientific ideas of Leibniz and contemporary system-theory. Consequently we admit only a comparison of some aspects of these theories. Next, we try to verify the hypothesis that the system-theoretical thoughts are mostly intertwined with other philosophical and scientific terms. And, thirdly, we try to verify the hypothesis that there exists a general system-theoretical aspect in the various branches of Leibniz' thought, which includes some leading ideas. Accordingly, we do not try to test how often Leibniz uses for example such terms as "system", "structure", "order", "equilibrium" and such like. This is not our direction of investigation.

But before setting out to explain our problem we have to explain shortly some specific points of the other pole of investigation, *i.e.* modern system-theory. The latter is in our days still *in statu nascendi*, it is growing as an expansive science or groups of sciences and, in a certain fundamental sense, it is one aspect of all natural and human sciences, a science situated along the bordering line between philosophy and the special sciences, between the abstract and formal and the concrete (and historical) sciences *etc.*<sup>2</sup> Especially, there are such sciences as cybernetic system-theory, general system-theory, mainly represented in the work of Bertalanffy and—last but not least—the theory of social and historical systems. The latter is based on the materialistic conception of history and materialistic dialectics, which does not only reflect the highest form of motion (historical and logical),<sup>3</sup> but which therefore also includes the other system-aspects as integral elements of itself as a whole, parts which express the fundamental laws and qualities of social reality, of social movement and evolution. We do not discuss this question here in want of place; but we have to spell out the fact that not only in non-Marxist sociology one of the most influential (and the most consistent) schools is that of functionalism-structuralism, but that in Marxist sociology as well the problems of functional-structural analysis are more and more discussed as a method which studies aspects of social life, not fully respected by the historical methods of investigations, especially those worked out and perfected by the materialistic conception of history, and which have to complement the historical-genetic methods.<sup>4</sup> And we have to consider that the conception of historical system as qualitatively different and highest form of a system in Marxist theory consists of the socio-economic formation.<sup>5</sup>

<sup>2</sup> About the difference between the abstract-formal and the concrete-historical cf. P. Bollhagen, *Gesetzmässigkeit und Gesellschaft*, Berlin 1967, chap. IV.

<sup>3</sup> Cf. Bollhagen, *Sociologie und Geschichte*, Berlin 1966, chap. 11.

<sup>4</sup> Cf. M. Hirszowicz, *Konfrontacje socjologiczne*, Warszawa 1964, chap. III.

<sup>5</sup> Cf. P. Bollhagen, *Soziologie*, chap. II and VII.

We only mention these various aspects of system-theory, not yet united into an organic whole, because a consideration of the theoretical and methodological contradictions between these aspects is of fundamental importance for an investigation of the system-theoretical aspects in Leibniz' thought.

It seems that system-theory evolves in partly converging, partly diverging directions in close connection with some new and old natural and human sciences, especially with cybernetics (as integral part of cybernetic system-theory), biology (as general system-theory), and in sociology both in the form of functional-structural analysis and theory of historical systems (of social-economic formations). It is interesting that sociological system-theories are not only related to biology (mainly in the concept of function and structure),<sup>6</sup> but also to cybernetics in various forms,<sup>7</sup> and that both in non-Marxist and Marxist sociology (in emphasizing the limitations of the applicability of cybernetics in sociology, of the qualitative difference between the terms "structure" and "function" in biology and sociology<sup>8</sup> etc.).

It may be asked why we prefer the sociological standpoint? We think that the validity and the fruitfulness of this procedure can be justified by the following reasons:

1) It takes into account the qualitative diversity of the different levels of motion and evolution in their unity. This problem deeply concerns Leibniz' philosophy.

2) Society (history of society) is a dynamic, genetic whole and, at the same time, the work of consciously acting man, and therefore a self-acting (self-acting in that historical individuals are its immanent creators) and self-creating system of relations between men. Again, we come here across a central point of Leibniz' thought: the principle of dynamic action, which plays a fundamental role not only in his metaphysics (*Monadology*) but in his moral theories (*Théodicée*), too.

3) Social systems are not only the highest forms of all existing systems. On the one hand, they include all other types of moving systems as moments or elements in a dialectically negated form, because—as Marx says—the key for the anatomy of ape is the anatomy of man.<sup>9</sup> On the other hand, as the most evolved form of system it demonstrates the immanent boundaries of system-relations in reality and therefore the immanent theoretical and methodological boundaries of system-theory. Here we find therefore the best criteria for judging Leibniz' contribution

<sup>6</sup> Cf. H. Stasiak, "Pojęcia związane z terminem «funkcja» w socjologii," *Studia Socjologiczne*, 2, 1964.

<sup>7</sup> Cf. O. Lange, *Całość i rozwój w świetle cybernetyki*, Warszawa 1962; O. Lange, *Wstęp do cybernetyki ekonomicznej*, Warszawa 1965.

<sup>8</sup> Cf. Z. Strmiska, *Současne teorie společenské struktury*, Praha 1966, pp. 23 ff.

<sup>9</sup> Cf. K. Marx, *Grundrisse zur Kritik der politischen Ökonomie*, Berlin 1953, p. 26.

to system-theory, because we can establish not only fruitfulness but also the boundaries of system-theory in the full concrete totality of its relations. This is valid for abstract systems which cannot express any concrete historical stage of system-evolution or any concrete historical form of a system (natural, social and mental) as well as concrete systems themselves.<sup>10</sup> This postulate also refers to a central aspect of Leibniz' philosophical and scientific system.

The idea of activity as a fundamental quality of the whole universe is solved by Leibniz in the form of differentiating the several levels of activity as several forms of monads, which are created and remain in close relation to God as the Central Monad.<sup>11</sup> This is not only important for the *Monadology* but also for the *Theodicée* and here we find (entangled in the theocentric idealistic philosophical system and its terms, concealed in a heteronomous moral view) the problem of man as the central point of the whole of Leibniz' thought in the form of an idealistic (and self-contradictory) anthropology. It is not difficult to perceive the connection between the idea of activity as a fundamental quality of universe and the fact that anthropology is the hidden starting point of the whole system; hidden—because, on the one hand, Leibniz' philosophy seems to be a purely idealistic philosophy of nature and of mathematics in the main work and, on the other, this anthropology is the weakest part of the system (in the philosophical sense). It must necessarily be the weakest part, if we consider the historical setting, the idealistic theocentric form of this anthropology as well as the fact that social systems are the most complex systems, that here we find many non-systematical moments *etc.*,<sup>12</sup> which have been difficult to explain and to unite into an organic theory of society not only for seventeenth century science but for the scientific thought of twentieth century.

One more difficulty has still to be remembered: Leibniz was the creator of the last great metaphysical system and at the same time he did not aim at a fully developed system. He writes in his letter to *Les Billettes* from 4/14 December 1666: "Mon système dont vous estes curieux, Monsieur, de sçavoir des nouvelles, n'est pas un corps complet de Philosophie et je n'y prétends nullement de rendre raison de tout ce que d'autres ont prétendu d'expliquer."<sup>13</sup> It is very interesting to read the following strokes, where he in a popular form interprets some central ideas of his own system as follows:

"Je crois qu'effectivement tout se fait mécaniquement dans la nature et se peut expliquer par causes efficientes, mais qu'aussi en même

<sup>10</sup> Cf. *ibid*, p. 10, P. Bollhagen, *Gezetzmassigkeit...* chap. IV/1.

<sup>11</sup> Cf. *Die philosophischen Schriften von Gottfried Wilhelm Leibniz*, vol. II, Berlin 1879, p. 481.

<sup>12</sup> Cf. P. Bollhagen, *Soziologie...*, chap. IV.

<sup>13</sup> *Die philosophischen Schriften...*, vol. VII, Berlin 1931, p. 451.

temps tout se fait moralement pour ainsi dire, et se peut expliquer par causes finales. Et que ces deux Regnes, le moral des esprits et âmes, et le mécanique de corps se pénètrent et s'accordent parfaitement par le moyen de l'auteur des choses qui est en même temps le premier efficient et la dernière fin. Je prétends donc, comme il n'y a point de vuide dans les corps, qu'il n'y en a pas non plus dans les âmes, c'est à dire qu'il y a des âmes par tout, et que les âmes qui existent une fois ne sçauroient périr. Les corps sont des multitudes et les âmes sont des unités, mais des unités qui expriment ou représentent la multitude en elles. Tout âme est un miroir du monde tout entier, suivant son point de veue. Mais les Esprits sont les âmes du premier ordre ou du genre suprême qui représentent pas seulement le monde, mais qui représentent encore Dieu dans le monde. Ainsi non seulement ils sont immortels, mais ils conservent toujours les qualités morales comme citoyens de la République de L'univers, à laquelle rien ne manque, puisque c'est Dieu qui la gouverne." <sup>14</sup>

Already here we see that the system-theoretical ideas of Leibniz culminate in the Idea of Universe as an ordered Republic, as a moral system governed by God and moving to stability of this universe. But before we discuss these problems we have to discover what valid contributions to or anticipations of modern system-theory there are in his hierarchization of souls (spirits, monads), since it is connected with biological research. This connection is formulated by J. Kamaryt and M. Rýdl in the following way: "Leibniz overcomes the mechanistic substance by reasoning that it as a building element, a substrate of structure, which is of a dynamic, functional nature which is a whole of relationships. In the dialectical concept of substance Leibniz anticipates the ontology of Hegel. Leibniz develops a dialectics between substance as part and substance as whole. The structural concept of being negates its character as substance and, *vice versa* the concept of substance negates the structural character of being. ... This double unity of substance and structure is the most valid element of Leibniz' dialectics. Here he comes close to the notion of dialectical negation which he, unlike Hegel, failed to apply in the whole of his philosophical system built up not on contradiction and negation as the central categories, but on the categories of modality and compossibility. In this sense Leibniz did not get beyond the boundaries of the mechanistic barock century." <sup>15</sup>

And the direct connection of Leibniz' thought with the ideas of modern biology, especially of general system-theory, is interpreted as follows:

"The principal difference between the living and the nonliving consists, according to Leibniz, in the organic form, in the structure. Inorga-

<sup>14</sup> *Ibid.*, pp. 451—2.

<sup>15</sup> J. Kamaryt, M. Rýdl, "Pojetí struktury a funkce v klasické a molekulární genetice," *Filosofický Časopis*, 6, 1964, pp. 834—5.

nic bodies create an accident unity (*unum per accidens*), organic bodies create a necessary, real unity, developed from an united and common principle or element, which has a special structure (*unum per se*). But by structure Leibniz does not mean a stable invariant form. According to Leibniz, the external objects are only the expression of an internal principle, which not only unites morphological parts and organs but also processes of exchange of matter. In this dynamic concept of organic structure Leibniz postulates a problem analogous to that postulated by the modern theory of the organism as an open system (L. v. Bertalanffy)."<sup>16</sup>

It seems that these ideas of the authors are important enough to justify this lengthy quotation. But we cannot agree with all conclusions because they disregard the specific historical-philosophical form in which Leibniz develops his ideas about function, structure and system. His dialectic of substance and structure appears to be polarized between the universe of things and the universe of souls, spirits, monads, if the interpretation of the authors is followed. But monads are not only the structure-creating principle but, at the same time, they are internally structuralized, they constitute a closed system which—as we have seen in the quotation from Leibniz—represents the universe and God as the Central Monad. It must be added that the authors quoted notice this difficulty as they criticize Leibniz' ideas on the relationship between preformation and epigenesis as well as its linkage with mechanistic structuralism which is typical of the 17th century,<sup>17</sup> but this criticism covers only part of the problem.

The idea of preformation and, consequently, of its relation to the concept of epigenesis is one of the most fundamental parts of Leibniz' metaphysical system, part of the idea of a pre-established harmony and belongs to the religious elements in his thought and is especially concerned with the conception of predetermination (*Théodicée*). Thus he writes on his hypothesis about the unity of body and spirit (de l'union de l'Ame et du corps): "Ainsi il ne reste que mon Hypothèse, c'est à dire que la voye de l'harmonie préetablie par un artifice divin prevenant, lequel dès le commencement a formé chacune de ces substances d'une maniere si parfaite et réglée avec tant d'exactitude, qu'en ne suivant que se propres loix, qu'elle a reçues avec son estre, elle s'accorde pourtant avec l'autre: tout comme s'il y avoit une influence mutuelle, ou comme si Dieu y metoit tousjours la main au delà de son concours general."<sup>18</sup>

We cannot agree with the authors in that the ideas of modality and compossibility demand *a priori* a non-dialectical interpretation of the

<sup>16</sup> *Ibid.*, p. 335.

<sup>17</sup> Cf. *ibid.*

<sup>18</sup> *Die philosophischen Schriften...*, vol. IV, Berlin 1880, p. 501.

world. Because a discussion of the dialectics in Leibniz' thought is beyond the scope of our investigation, we shall only recall the formulation of V. I. Lenin that the philosophy of Leibniz contains a dialectics of a special kind independently of the theological form of this system.<sup>19</sup> Of course, this does not mean that in Leibniz' thought there are no vast patterns of non-dialectical thinking, whatever historical form they may have or that there are no important elements of mechanistic conceptions;<sup>20</sup> this results from the main trend of the natural sciences and philosophy of his time. But it seems that the authors quoted make the mistake formulated at the beginning of our investigation: on the one hand, they modernize Leibniz' thought, and, on the other, they do not see the internal boundaries of this thought or else—knowing that there are boundaries—they do not look for them always in the correct direction, thus uniting the effect and the boundaries (internal) only in an external form, i.e. they neglect the dialectical unity of both these aspects in the philosophical and scientific system of this great thinker. Nevertheless, in many problems they arrive at remarkable conclusions, especially those concerning their thesis about the connection between Leibniz' notion of substance with the notions of substance and structure in the modern meaning.

It is true that the Leibniz' conception of substance as a dynamic principle of universe is one of the most important contributions to—or, better, anticipations of—some elements of modern system—theory. It is known that Leibniz developed his concept of substance not only in close connection with the ideas of Aristotle about Entelechy, about “substantial” forms, but, at the same time, in his polemic against Descartes' physics and metaphysics, especially against Descartes' idea of bodies and motion. He writes on the concept of substantial forms in the philosophy of Aristotle: “Certe formas substantiale (demta mente) etiam Aristoteli non esse ens absolutum, sed tantum λόγον rationem, proportionem, ἀριθμὸν structuram partium intimam ...”<sup>21</sup> These substantial forms are determined by final causes and because substance is the principle of bodies (or bodies are combinations of substance and in this way only phenomenological quasi-substances<sup>22</sup>) they determine the *causa efficientes* and thus play also an important role in physics. For example, in his polemic against Descartes' view he writes: „Pour moy je croy les loix de la Mécanique qui servent de fondement à tout le système dependent des causes finales, c'est à dire de la volonté de Dieu déterminée à faire ce qui est le plus parfait, et que la materie ne prend

<sup>19</sup> Cf. V. I. Lenin, *Polnoe sobranie sotshineni*, vol. 29, Moskva 1963, p. 70.

<sup>20</sup> Cf. P. Bollhagen, “Teoriopoznawczy dorobek Ehrenfrieda W. von Tschirnhausa i jego związki z filozofią, Spinozy i Leibniza,” *Kwartalnik Historii Nauki i Techniki*, 1—2, 1966, pp. 42 ff.

<sup>21</sup> *Die philosophischen Schriften...*, vol. IV, Berlin 1880, p. 208.

<sup>22</sup> *Ibid.*, p. 258.



pas toutes les formes possibles mais seulement les plus parfaites..."<sup>23</sup> And, in accordance with this, he writes in another context: "Jam supra etiam monui, cum omnia in natura explicari dicimus Mechanice, excipendas esse ipsa Legum Motus rationes seu principia Mechanismi, quae non ex solis mathematicis atque imaginationi subjectis, sed ex fonte metaphysico, scilicet ab aequalitate causae et effectus, deduci debent aliisque hujusmodi Legibus quae sunt Entelechiis essentiales. Nempe ut jam dictum est, Physica per Geometriam Arithmeticae, per Dynamicum Metaphysicae subordinatur."<sup>24</sup>

On this basis Leibniz formulates in consequence the concept of the monad. For example, in his treatise "De ipsa Natura sive de Vi insita Actionibusque Creaturam, pro Dynamicis suis" one can read: „Atque hoc ipsum substantiale principium est, quod in viventibus anima, in aliis forma substantialis appellatur, et quatenus cum materia substantiam vere unam, seu unum per se constituit, id facit, quod ego Monadem appello, cum sublatis his veris et realibus unitatibus, non nisi entia per aggregationem, imo quod hinc sequitur, nulla vera entia in corporibus sint superfutura."<sup>25</sup>

If we take only its philosophical aspect, this is undoubtedly pure idealism, more exactly: objective idealism. But there are other aspects in Leibniz' notion of substance as substantial form, entelechy, monad. As we have already said, this notion arises in connection with Aristotelian metaphysics and in the polemics against Cartesian metaphysics. Leibniz does not intend to disregard the mechanistic natural science. But he sees in this mechanistic conception of the world an interpretation of phenomena only; the essence is hidden but, at the same time, it represents the moving principle, active substance and therefore—and this idea is mostly important—the unity of content and form, which is formulated by Leibniz as substantial form. And the dynamic evolution of universe, which is conditioned by the substantial forms, realizes itself according to the law of continuity. We think that even this law is the key to the interpretation of the ideas of Leibniz anticipating modern system-theoretical thinking. He regards this law as "une de plus considerables que je croit avoir introduit le premier dans la Physique."<sup>26</sup> We know what great role is played by it in the development of the dialectical foundation of the infinitesimal mathematics by Leibniz.<sup>27</sup> But this law of continuity and the principle of uniformity closely related to it are also important in his idea of pre-established harmony in which, for example, he formulates the following thesis: "Comme je suis tout

<sup>23</sup> *Ibid.*, p. 281.

<sup>24</sup> *Ibid.*, p. 398.

<sup>25</sup> *Ibid.*, p. 511.

<sup>26</sup> *Ibid.*, vol. VII, p. 279.

<sup>27</sup> Cf. F. Engels, *Dialektik der Natur*, Berlin 1952, p. 275.

à faire pour le principe de l'Uniformité que je crois que la Nature observe dans le fonds des choses, pendant qu'elle varie dans les manières, degrés et perfections, toute mon Hypothèse revient à reconnoître dans les substances éloignées de nostre vue et observation quelque chose de proportionnel à ce qui se remarque dans celles qui sont à nostre portée." <sup>28</sup>

As we see, Leibniz formulates this law not in the form of a theoretical principle, but as a methodological directive, which is supported by another fundamental theoretical principle in the philosophy of Leibniz, by the principle of pre-established harmony. "Cette même Maxime", he writes to Lady Masham, "de ne supposer sans nécessité dans les Créatures que ce qui répond à nos expériences, m'a encore mené à Systeme de l'Harmonie préétablie. ... Les defenseurs des causes occasionelles veulent que Dieu accommode à tout moment l'âme au corps, et le corps à l'âme. Mais cela ne pouvant estre que miraculeux, est peu convenable à la philosophie qui doit expliquer le cours ordinaire de la Nature, car il faudroit que Dieu troublât continuellement les loix naturellement des corps. C'est pourquoi j'ay crû qu'il estoit infiniment plus digne de l'Oeconomie de Dieu et de l'uniformité et ordre constant de son ouvrage de conclure qu'il a créé d'abord les âmes et les corps de telle sort, que chacun suivant ses propres lois se recontre avec l'autre." <sup>29</sup>

In addition, the close connection between the idea of pre-established harmony (and monadology in general) and *Theodicée* ought to be mentioned, because this question in its system-theoretical aspect will be the subject of special investigation. Therefore we restrict ourselves to a discussion of the notion of substance as a dynamic substantial form, as the monad.

Leibniz formulates his ideas attacking the mechanistic conception and formulating a notion of substance, which to a certain degree anticipates the latter dialectic-materialistic theory of reality as dynamic existence. <sup>30</sup> But this is only part of the problem. In the idealistic theory of substance he finds the foundation for reasoning for a special class of relations in reality, which the pure mechanistic conception with its linear causality was unable to recognize or acknowledge. Leibniz uses the old philosophical term of *causae finales* to differentiate them from the mechanistic linear causality, which he gives the traditional name of *causae efficientes*. But if we disregard this traditional form, we shall find that under the idealistic covering a principally new conception of the relations in and the unity of reality is developed. The relations he investigates are those of function and purpose in a stable system which moves according to some uniform laws tending not only to maintain the system of functions and structural elements in stability but also

<sup>28</sup> *Die philosophischen Schriften...*, vol. III, Leipzig 1931, p. 337.

<sup>29</sup> *Ibid.*, p. 341.

<sup>30</sup> Cf. J. Zelený, *O logické struktuře Marxova Kapitálu*, Praha 1962, p. 86.

being in a state of harmony themselves. Each functional element aims at the maintenance of the stability of the system and the most important role here is played by the Central Monad, which represents the whole system as its creator, but which is not identical this system. Each functional element is a product of this system, which represented by the Central Monad as *causa sui*, creates the conditions for its own stability. Here we have of course an internal idealistic contradiction, because the Central Monad plays here the double role of being both the conscious creator of the system of universe and a part of the system. This is a consequence of the idealistic system, but nevertheless Leibniz formulates in his notion of substance and in his monadology the fundamental ideas of functional-structuralist system-theory and the weak points of his conception still persist in the modern theories, insofar as they are not treated as part of general dialectics, especially of the historical-genetic conception; in spite of using a modern philosophically "neutral" terminology, this refers to cybernetic system-theory, to general system-theory and to functional-structuralist sociology.<sup>31</sup>

This system not only brings into harmony its functional elements, but these elements themselves are autonomous structures representing in a sense the whole universe (and *âmes* as the highest form of monads, primarily God as the Central Monad). The whole system is, to use modern terms, at the same time optimized (*l'Oeconomie de Dieu et l'uniformité et ordre constant de son ouvrage*). In this connection we must still mention some other system-theoretical ideas developed by Leibniz.

1) The mentioned system is not static but dynamic in a double sense, because a) Leibniz knows the inner development of monads and b) there is a hierarchy of stages of development represented by the various types of monads. To be sure, the latter point of view is formulated in a static manner, because the Central Monad has created the best of all possible worlds (the mostly optimized system) and the diverse stages of evolution are reflected as a constant hierarchy of monads. This is a typical contradiction of Leibniz' philosophy and we think that there are two difficulties in following this way of solving the investigated problems. One is the static theocentric view of the world, and the other is the fact that functional-structural system-interpretations seem to tend to conservative and static models, especially in the patterns of society. But it seems that this is a special rather than general form in which functional-structural theories begin to develop, if we consider the modern discussions of the possibilities to overcome this conservatism within the boundaries of functional-structural theories themselves.<sup>32</sup>

<sup>31</sup> Cf. A. W. Gouldner, „Buduca kriza funkcionalne teorije,” *Sociologija*, 1—2, 1966, pp. 139 ff.

<sup>32</sup> Cf. for example, N. Mayntz, „Soziologie in der Ermitage? Kritische Bemerkungen zum Volwurf des Konvervatismus in der Soziologie,” in: E. Topitsch (ed.), *Logik der Sozialwissenschaften*, Köln—Berlin 1965, pp. 527—8.

2) We have seen that Leibniz linked up closely the idea of continuity with his dynamic notion of substance. Here we have also to do with a double function of the principle that he formulates as one of the most fundamental laws of physics. On the one hand, it establishes the theoretical and methodological foundations for the differential calculus and on the other, for the static theocentric (and, consequently, teleological) model of the world. In mathematics it is part of the introduction of dialectics into the science, whereas in the metaphysical system it seems to be part of a conservative view of the world which attacks scientific thought from reactionary positions. We say part of a conservative of the world, because we have already indicated that this conservatism is only one of the aspects of Leibniz' conception of the systematical unity of the world.

We have mentioned that there are close connections between the *Monadology* and the *Théodicée* and that in the latter we can also find elements of a system-theoretical interpretation. Leibniz himself very clearly expresses this connection, especially between the *Théodicée* and the idea of pre-established harmony. Of course, the same connection exists between the notion of continuity as a fundamental law of the universe and the hypothesis that God has created the best of all possible worlds as well as the idea that moral evil exists in consequence of accidental compositions in the world of matter that condition the metaphysical evil. There we have—again in an idealistic and teleological form—the contradiction between eufunctional and disfunctional elements of a system, an idea developed in particular by Robert K. Merton.<sup>33</sup> But, at the same time, we discover here one of the most fundamental weaknesses of Leibniz' system which incited attacks on Leibniz' theory of the best of all possible worlds as an apologetic and conservative doctrine, because Leibniz must needs absolutize the eufunctional properties of his system and, moreover, the harmony is only established by the intervention of God, superimposing the empire of grace upon the empire of laws.<sup>34</sup> This is a consequence of the whole system, but a consequence which is contradictory to the idea of pre-established harmony, especially to the formulation of Leibniz that monads are a sort of spiritual automata.<sup>35</sup>

Nevertheless we find that in spite of this contradiction Leibniz develops a further system-aspect which discovers the anthropological contents of his work in general and especially of the system-theoretical aspects of his work. This is his idea of *Civitas Dei* (*Cité de Dieu*), which is one of the most important links between the *Monadology* and the *Théodicée*. He formulates this idea in his letter to Arnauld from Septem-

<sup>33</sup> Cf. Robert K. Merton, *Social Theory and Social Structure*, Glencoe 1957.

<sup>34</sup> Cf. for example, *Die philosophischen Schriften...*, vol. VI, Leipzig 1932, p. 467.

<sup>35</sup> Cf. for example, *ibid.*, vol. IV, p. 485, vol. IV, p. 356.

ber (October) 1687: „Pour ce qui est des Esprits, c'est à dire des substances, qui pensent, qui sont capables de connoistre Dieu et de decouvrir des verités éternelles, je tiens que Dieu les gouverne suivant des loix différentes de celles dont il gouverne le reste de substance. ... Il prend un autre personnage à l'égard des esprits qui le fait concevoir revestue de volonté et de qualités morales, puisqu'il est luy même un esprit, et comme un d'entre nous jusqu'à entrer avec nous dans une liaison de société dont il est le chef. Et c'est cette société ou République générale des Esprits sous ce souverain Monarque, qui est la plus noble partie de l'univers, composée d'autant de petits Dieux sous ce grand Dieu. Car on peut dire que les esprits créés ne different de Dieu que de plus à moins, du fini à l'initial. Et on peut asseurer veritablement, que tout l'univers n'a esté fait pour contribuer à l'ornement et au bonheur de cette cité de Dieu. C'est pourquoy tout est disposé en sorte que les loix de la force ou les loix purement materielles conspirent dans tout l'univers à executer les loix de la justice ou de l'amour ..." <sup>36</sup> It is very remarkable that Leibniz emphasizes in this connection that "les esprits devant garder leur personnage et leur qualités morales..." <sup>37</sup>

In his thesis about the role of *Civitas Dei* Leibniz not only overcomes to a certain extent the mentioned contradiction in his *Théodicée* and thus contributes to the development of philosophy of man, a correct dialectical understanding of the relationship between necessity and accident, to an autonomous morale in which the active man is *summum bonum*, <sup>38</sup> but he gives also a fundamental contribution to the theory of the social system, one that is a unity of free functional acting (on the foundations of the "laws of justice and love") persons, whose conscious and free activity is a condition for the stability of the whole system. We think that this idea is the apex of all Leibniz' work anticipating modern system-theoretical thought. Certainly, Leibniz is unable to overcome in his idea of *Civitas Dei* the internal limitations and contradictions of his system-theoretical ideas mentioned above. As a pioneer in this field, he succeeds in overcoming these boundaries only in his intention, because the theocentric form and the understanding of development as a static stratification make it difficult for him to adopt the consequences of this new point of view. But nevertheless there are valid elements of this new point of view that justify our attempt to interpret some central ideas in Leibniz' philosophy not only in terms of the philosophical contradiction between materialism and idealism but also in terms of modern system-theory.

We think that this attempt, in which we obviously could only outline the boundaries of the whole complex, demonstrates the fruitfulness of

<sup>36</sup> *Ibid.*, vol. II, pp. 124—5.

<sup>37</sup> *Ibid.*, p. 125.

<sup>38</sup> Cf. M. Fritzhand, *Myśl etyczna młodego Marksa*, Warszawa 1961, pp. 49 ff.

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investigation in this direction; of course, only if we observe the principle of concrete historical analysis and therefore see that the theological form of Leibniz' thought is by no means accidental but constitutes the internal limitation of his ideas, that, on the one hand, he was unable to overstep this limitation and, on the other, that even this historical form of his thought was a condition for opening new aspects of thinking, which the mechanistic thought was unable to see and which at present become in a more correct form one of the most important parts of contemporary scientific thinking.