

# 1

## LIFE AND WORKS

### 1 Life

Leibniz was born on 21 January 1646 at Leipzig, where his father was a lawyer and professor of philosophy. He started his career as a scholar very early. He went to the university at the age of fifteen, and before that he was interested in logic. While at the university he read Bacon's *De Augmentis*. He meant to be a lawyer, and in 1663 he went for a year to Jena to study law. Here his mathematical interests were first strongly stimulated.

In 1666 he submitted a legal thesis for a doctor's degree at the University of Leipzig. The degree was not granted, probably because Leibniz was only twenty at the time. But it was accepted by the University of Altdorf, which invited him to become a professor there. He refused the offer and went to Nürnberg, where he stayed for a year. While there he studied alchemy and magic, and is said to have been initiated into the Rosicrucians and made secretary of the local branch of the society.

In 1667 he entered the services of the Elector of Mainz, where he remained till 1672. During this time most of his published writings were political. His political writings were mostly against the ambitious designs of the French. Louis XIV was threatening Germany, and Leibniz formed a plan for diverting his ambition to the more Christian object of expelling the Turks from Egypt. He went to Paris in 1672 to explain this plan to Louis in person but, like most of Leibniz's diplomatic schemes, it came to naught. Leibniz laboured all his life to reconcile the Romanists and the Protestants in Germany, and also the Lutherans and the Calvinists. His great object was to get both religious and political peace, but he failed. He attached great importance to the existence of learned societies; he founded the Academy of Berlin, and was consulted about the foundation of the academies of Vienna and St Petersburg. He hoped in this way to get the support of royal and noble patrons for scientific and literary research.

Leibniz was in Paris from 1672 to 1676, except for a short visit which he paid to England in 1673. While in Paris he made a careful study of the Cartesian philosophy and of mathematics. He had much conversation

## 2 LEIBNIZ: AN INTRODUCTION

with Malebranche on philosophy, and with Huyghens on physics and mechanics. He studied the mathematical works of Pascal, and invented a calculating machine to add, subtract, divide, and multiply.

During his visit to England in 1673 he was made a Fellow of the Royal Society, partly through the influence of his friend Robert Boyle, the chemist. Leibniz had read Hobbes's writings, and had been a good deal impressed by Hobbes's theories of physics. He wrote to Hobbes and hoped to see him during this visit. But Hobbes was eighty-five; he left the letter unanswered, and the two philosophers never met.

When he finally left Paris in October 1676 he went to London for a week and thence to Amsterdam, where he stayed for four weeks with Spinoza's friend and disciple Schuller. Leibniz had already in 1675 met Tschirnhausen, the most intelligent of Spinoza's correspondents, and had been interested by him in Spinoza's work. In November 1676 Spinoza, who was always very nervous of letting strangers see his unpublished writings, finally allowed Leibniz to meet him at The Hague. Leibniz stayed there for some time, had much talk with Spinoza, and pointed out to Spinoza certain fundamental mistakes in Descartes's mechanics. In return he was allowed to see some parts of the *Ethics* in manuscript. Later, when Leibniz had completed his own system, he became very critical of Spinozism. But at this time he had convinced himself that both Cartesianism and Hobbes's materialism were ultimately unsatisfactory, and he was ready to accept ideas from any quarter.

At the end of 1676 Leibniz was appointed librarian to the Duke of Brunswick at Hanover, a post which he held till the end of his life. The library at Hanover still contains masses of Leibniz's manuscripts on all kinds of subjects, which were slowly being published by the Berlin Academy until the Second World War. While there he carried on a voluminous correspondence with other learned men, e.g. Arnauld, John Bernoulli, de Volder, des Bosses, and Clarke. Leibniz's official duty was to write a history of the House of Brunswick. He travelled for some time in Italy collecting materials, for the first historical member of the Guelph family was Azo D'Este, and the noble Italian House of Este is a collateral line of the House of Brunswick.

Leibniz seems to have been working out his own system between 1680 and 1697, and to have been a good deal influenced during this period first by Plato and later by Aristotle. In 1698 his Duke of Brunswick died, and was succeeded by the man who became King of England in 1714 as George I. George was an ignorant boor, and he disliked Leibniz for busying himself with foreign monarchs in trying to found

academies. And Leibniz lost two very good friends at the deaths of the two Electresses Sophia, George's mother and sister, who were highly intelligent and cultured women.

Leibniz completed his discovery of the differential calculus in 1676, but did not publish an account of it till 1684. Newton published his own form of the calculus in 1693. There was very acrimonious controversy about the discovery, though there is little doubt that in fact the two men made it independently of each other. Today in use is Leibniz's notation and not Newton's. Neither gave a logically flawless account of the principles of the calculus, but Newton was perhaps nearer the truth than Leibniz. The Newtonians in England poisoned George I's mind against Leibniz, and he failed to get the office of Historiographer Royal of England, which he had wanted. He died in 1716 in Hanover, almost in disgrace.

Leibniz was probably the most universal genius that there had ever been in Europe. He had none of the contempt for antiquity which characterized Descartes, Malebranche, Hobbes, Bacon, and Locke. He admired and learnt much from Plato and Aristotle, and he was thoroughly versed in the Scholastic philosophy. And, in general, he was extremely eclectic; though he had so much originality and such logical acumen that he thoroughly transformed and developed the germs which he got from others. He said that Descartes 'leads us into the vestibule of philosophy' and that Spinoza 'would be right if it were not for the monads'. He made an extremely careful study of Locke's *Essay*, and collected his criticisms into a large book – the *Nouveaux Essais*.<sup>1</sup> Locke treated his criticisms with a contempt which they certainly did not deserve. He also elaborately criticized Newton's theories of absolute space, time, and motion, in his *Correspondence with Clarke*, who acted as Newton's representative. Leibniz was a mathematician of the first rank. He made important contributions to the foundation of dynamics. He was one of the founders of modern symbolic logic. He tried to devise a geometrical calculus, and this afterwards became the starting-point of Grassmann's *Ausdehnungslehre*.<sup>2</sup> He sketched out the principle of a universal language of ideograms. He was also a very considerable jurist and historian. Among his minor achievements was to produce a geometrical argument to prove that the electors to the monarchy of Poland ought to choose Philip Augustus of Neuburg as king.

<sup>1</sup> [*Nouveaux Essais sur l'Entendement Humain*. G., V, 39–509. Langley, 41–629.]

<sup>2</sup> [H. Grassmann, *Die lineare Ausdehnungslehre, ein neuer Zweig der Mathematik* (Leipzig, 1844).]

#### 4 LEIBNIZ: AN INTRODUCTION

### 2 Works

Leibniz wrote copiously, but very little was published in his lifetime and much is unpublished still. His most important philosophical works are probably the following:<sup>1</sup>

(1) *Discours de métaphysique* (written 1685, published 1846 by Grotendorf).

(2) *Correspondence with Arnauld* (written 1686–90, published 1846 by Grotendorf). The correspondence begins by Leibniz sending an abstract of the *Discours* to the Landgraf Ernst of Hessen-Rheinfels, and asking him to forward it to Arnauld.

(3) *The New System* (published in the *Journal des Savans* for 1695). This is the only complete account of his system which Leibniz ever published. It omits certain very fundamental considerations which are stressed in the *Discours* and the *Letters to Arnauld*. It led to a good deal of controversy, and Leibniz tried to explain and defend various points in it in later articles and letters.

(4) *Controversy with Pierre Bayle* (written in 1698 and round about 1703; published in 1716 in the *Histoire critique de la république des lettres* at the instance of des Maiseaux.) Bayle had criticized certain doctrines in *The New System* in the article on Rorarius in his *Dictionary* (1695–7); Leibniz answered; and Bayle raised further objections in the second edition of his *Dictionary* (1702). Leibniz answered these in turn.

(5) *Letters to John Bernoulli* (written about 1698; published first with many omissions in 1745). John Bernoulli was one of a family of extremely eminent mathematicians. The correspondence deals largely with infinity, continuity, and the nature of bodies.

(6) *Letters to de Volder* (written 1699–1706; first published by Gerhardt round about 1880). De Volder was Professor of Philosophy, Physics, and Mathematics at Leyden. He was a friend of John Bernoulli. He was an eminent Cartesian. The correspondence covers most of the main doctrines of Leibniz's philosophy.

(7) *Letters to des Bosses* (written 1706–16; published first by Dutens 1768). Des Bosses was a learned Jesuit teacher of theology at Hildesheim. Both he and Leibniz were interested in the doctrine of transubstantiation, which is held by Roman Catholics and rejected by Protestants. This gave rise to very elaborate and subtle discussion about the nature of substances in general and bodies in particular. In his correspondence Leibniz develops a theory about compound sub-

<sup>1</sup> [For further references see Bibliographical Note.]

stances, viz. the theory of the *Vinculum Substantiale*, which does not appear elsewhere in his works.

(8) *Theodicy* (published 1710). This is a huge book, published in Leibniz's lifetime, in which he elaborately tries to justify the ways of God to man.

(9) *Principles of Nature and of Grace* (written between 1712 and 1714 for Prince Eugen of Savoy; first published 1718) and *Monadology* (written about the same time, almost certainly for some other individual whose name is unknown; first published in 1720 in a German translation). These are short and clear but somewhat popular accounts of Leibniz's complete system in its final form, written as a help for readers who had been interested in the *Theodicy* and wanted to know more of Leibniz's philosophy as a whole.

(10) *Correspondence with Clarke* (written 1715–16; published first by Clarke in 1717). This deals mainly with the question whether space and time and motion are absolute or relative, and with other logical and philosophical topics connected with it.

### 3 Influence

It appears from the above list that many of Leibniz's most careful expositions of his system were not available to the public until long after his death. Nevertheless he had an immense influence in Germany. His philosophy was popularized and simplified by Wolff, and it became the orthodox system taught to students in German universities in the eighteenth century. Kant was brought up in it; he remained in it until Hume 'awoke him from his dogmatic slumbers'; and there are many traces of Leibnizian doctrines embedded in Kant's critical philosophy. The optimism of Leibniz's *Theodicy* is somewhat unfairly made fun of by Voltaire in the character of Dr Pangloss in *Candide*. Among later philosophers Herbart and Lotze in Germany and Ward and McTaggart in England were greatly influenced by Leibniz.

## 2

## GENERAL PRINCIPLES USED BY LEIBNIZ

There are certain general principles of which Leibniz makes constant use. I shall begin by discussing these.

**I Predicate-in-Notion Principle**

This plays a very important part in the *Discours de métaphysique* and the *Letters to Arnauld* (1685–90). It is not explicitly mentioned in *The New System* (1695) or in any of the later works that I have mentioned. But there is no reason to think that Leibniz himself ever abandoned it or ceased to think it of fundamental importance. From time to time he makes remarks which seem plainly to refer to it. E.g. in his *Second Answer to Bayle* (c. 1703) he says that in *The New System* he put forward the theory that each substance represents in itself all other substances in the world *simply as an explanatory hypothesis*.<sup>1</sup> But it is in fact *necessary*, for reasons which he had developed in his *Letters to Arnauld*. Again, in a letter of 19 August 1715 to des Bosses he says that it is of the essence of a substance that its present state should be pregnant with all its future states, and that from any one of its states all the others could be inferred unless God should interfere miraculously.<sup>2</sup>

The principle may be stated roughly as follows. Every substance has a complete notion, and the complete notion of it in some sense contains every fact about it down to the very minutest detail of its remotest future history. We will now consider it more in detail.

**I.1 Complete notion of an individual**

In his letter of 14 July 1686 to Arnauld, Leibniz tries to explain what he means by the complete notion of the actual Adam.<sup>3</sup> It is identical with ‘the knowledge which God had of Adam when he determined to create him’.

<sup>1</sup> [G., IV, 554–71. Loemker, 574–85.]

<sup>2</sup> [G., II, 503. Loemker, 613.]

<sup>3</sup> [G., II, 47–59. Loemker, 331–8.]

Leibniz then points out that we must carefully distinguish between specific notions, e.g. that of the sphere or the ellipse, and individual notions, e.g. that of Adam. All true propositions about the subject of a specific notion are *necessary* and *independent of God's volitions*. But a specific notion is, in a certain sense, incomplete. It applies to an indefinite number of actual or possible individuals, and therefore does not provide an exclusive or an exhaustive description of any one of them. The notion of an individual is *complete*. It applies only to that individual, and it supplies an exhaustive as well as an exclusive description of it. It therefore always contains explicitly or implicitly predicates referring to determinate times and places and circumstances. True propositions which ascribe such predicates to an individual are *contingent* and they *depend on God's free decisions* at the time when he created the world. Therefore the complete notion of an actual individual must contain the fact that God made such-and-such free decisions.

Suppose now that we abstract from the notion of an actual individual the fact that it exists, and thus regard it as the notion of a merely possible individual. Then it is plain that the notion of this possible individual will contain the notions of these same free decisions of God, considered now as merely possible and not as actual.

It should be noted that Leibniz held that the actual laws of dynamics and the actual laws of human psychology express certain free decisions of God, subordinate to his primary decision to actualize the best on the whole of all the possible worlds. So I take it that the notion of the actual Adam would contain *inter alia* the actual laws of human psychology and of dynamics. If you want to conceive the actual Adam as a merely possible individual whom God might not have decided to actualize, you will still have to include in the notion of him the same laws, considered now as merely possible laws.

## 1.2 Alternative possible individuals

Leibniz often talks of alternative possible individuals with the same grammatical proper name, e.g. several alternative possible Adams. Arnauld says in his letter of 13 May 1686 that he finds such phrases very obscure.<sup>1</sup> If it be intelligible to talk of several alternative Adams, it should be equally intelligible to say that there were two alternative possible Arnaulds, one of whom would become a priest and remain single and childless (as the actual Arnauld did), and the other of whom would become a physician and marry and have several children. And

<sup>1</sup> [G., II, 25–34. Mason, 24–34.]

## 8 LEIBNIZ: AN INTRODUCTION

it should be intelligible to say that God deliberately actualized the first of these possible Arnaulds and deliberately left the second a mere unrealized possibility. Now such sentences seemed to Arnauld to be meaningless.

Arnauld's own view about merely possible substances may, I think, be put as follows. When one talks of a merely possible substance one is talking intelligibly only if one starts from the notion of one's actual substance, e.g. the actual Arnauld, and then proceeds as follows. (1) You may consider the nature of that substance in abstraction from its existence, and can imagine that that nature never had been endowed with existence. (2) You can imagine that certain of the potentialities involved in the nature of an actual substance had been actualized in certain ways instead of remaining permanently latent or conversely. E.g. you can imagine that the potentiality of the actual Arnauld to beget children had been exercised though in fact it was not; or that the same potentiality in his father had not been exercised though it in fact was. (3) You can imagine that certain of these potentialities, which were in fact exercised in certain ways, had been exercised instead in certain other ways. E.g. you can imagine that Arnauld's intellectual and practical gifts had been exercised in medicine instead of in theology.

Leibniz deals with these points in his letter of 14 July 1686.<sup>1</sup> He admits that the phrase 'several alternative possible Adams' is meaningless if you take the word 'Adam' to be the proper name of a certain completely determinate individual. But, when he uses the phrase, he takes the word 'Adam' to connote a certain limited collection of properties. These seem to us to describe uniquely a certain individual, but they do not in fact do so. E.g. we might take the word 'Adam' as denoting any individual who had the property of being a man without human parents, of having a woman created out of one of his ribs, and of disobeying God's orders by eating the fruit of a certain tree at the instigation of that woman. If the story in Genesis is true, that description does in fact apply to one and only one actual individual, and he has all the other properties possessed by the actual Adam. But we can obviously conceive without contradiction that these few properties (even if we include among them the actual laws of nature) might be supplemented in innumerable different alternative ways. Each such alternative supplementation would describe a possible individual, who might be called an 'alternative possible Adam'.

I think it is plain that this process could be generalized and applied

<sup>1</sup> [G., II, 47–59. Loemker, 331–8.]



to *any* actual substance. You start with any finite set of properties  $P_S$ , which together suffice to distinguish the actual substance  $S$  from all other actual substances.  $S$  will in fact have innumerable other properties beside these, and they will not all be entailed by the properties in  $P_S$ . You can therefore imagine this nucleus  $P_S$  to be supplemented in innumerable different alternative ways. You would thus conceive so many 'alternative possible  $S$ 's'. Leibniz remarks that the only description which would suffice to distinguish the actual Adam, not only from all other *actual* individuals, but also from all other possible individuals, would be his complete notion, i.e. the sum-total of all his predicates.

Leibniz remarks that anything that is actual can be conceived as merely possible. If the actual Adam will in course of time have such-and-such a history and such-and-such descendants, the same properties will belong to the same Adam considered merely as one possibility among others. Anything is possible, Leibniz says, which is the subject of a genuine proposition; by which I take him to mean one that is not self-contradictory.

Now Leibniz frequently talks of alternative *possible worlds*. In the same letter he tries to explain what he means by this. Each possible world corresponds to certain possible *primary* ends or intentions characteristic of it. If God had decided to actualize a certain possible world, he would have made certain *primary* free decisions, embodying the main ends or intentions characteristic of that world. These would have been the most general principles constituting the ground-plan of that world. The notions of all the individual substances in that world would be determined in view of these primary intentions. If there were to be miracles in the course of that world's history, they too could have been determined from the beginning in accordance with these primary intentions. For a miracle would be an exception only to certain *secondary* principles which God willed in view of his primary intentions in creating that world.

### 1.3 Various formulations of the Principle

Leibniz formulates the Predicate-in-Notion Principle in various places. The main statement in the *Discours de métaphysique* is in Section 8.<sup>1</sup> The essential points which he makes there are the following. The predicate of every true affirmative proposition is contained, either explicitly or implicitly, in its subject. If it is contained explicitly, the

<sup>1</sup> [G., IV, 432–3. Loemker, 307–8.]

10 LEIBNIZ: AN INTRODUCTION

proposition is analytical. If it is contained only implicitly, the proposition is synthetic. It is a characteristic property of an individual substance to have a notion so complete that anyone who fully understood it could infer from it all the predicates, down to the minutest detail and the remotest future, which will ever belong to that substance. Leibniz takes the case of Alexander the Great as an example. In contemplating the complete notion of Alexander, God sees in it the foundation or reason for every predicate which can ever be truly ascribed to him. In this way God knows *a priori* whether, e.g., Alexander will die by wounds or by disease or of old age. But no *man* can fully and distinctly comprehend the notion of any individual substance. So men have to depend on experience or on hearsay for their knowledge of many of the facts about individuals. Thus, e.g., men who died before Alexander's death never knew for certain how he would die; his contemporaries had to wait and see; and his successors knew only by traditions which go back to contemporary eye-witnesses.

In his letter to Arnauld of 14 July 1686, Leibniz says that we need a 'reason *a priori*' to enable us to say that the same individual who was in Paris last week is in Germany this week.<sup>1</sup> He alleges that the only possible *a priori* reason for such statements is that the notion of that individual contains and connects these two successive and separated events. In the same letter he says: 'In every true proposition, necessary or contingent, universal or singular, the notion of the predicate is contained in some way in the subject. If not, I do not know what truth is.'<sup>2</sup> It would appear from this that Leibniz thinks that the Principle emerges from, and is justified by, reflecting on what is meant by a proposition being true.

## 2 Principle of Sufficient Reason

What Leibniz calls the *Principle of Sufficient Reason* is so closely bound up with the Predicate-in-Notion Principle that it seems desirable to consider it before making any criticisms on the former.

In Section 13 of the *Discours de métaphysique*, Leibniz says that for every *contingent* fact there is a reason why the fact is so and not otherwise.<sup>3</sup> He adds that this is equivalent to the principle that for every contingent fact there is a proof *a priori* which would show that the

<sup>1</sup> [G., II, 53. Loemker, 335.]

<sup>2</sup> [G., II, 56. Loemker, 337.]

<sup>3</sup> [G., IV, 436–9. Loemker, 310–11.]