

Two Books that Marked their Epoch— A Personal Encounter

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Résumé: Cet article décrit ma rencontre personnelle avec *La Logique du vivant* de François Jacob et *Le Hasard et la nécessité* de Jacques Monod. J'ai pris connaissance de ces deux livres dès le début de mes études de biologie, en 1973, et le livre de Jacob en particulier a accompagné mon itinéraire académique depuis lors. Ce texte suit les différentes étapes de cet itinéraire à partir des années 1970, en parlant des échanges entre Louis Althusser et Monod et de ceux de Jacques Derrida avec Jacob à la fin des années 1960 et au début des années 1970, en passant par mes activités de biologiste moléculaire dans les années 1980, jusqu'à mon implication en faveur d'une épistémologie historique à l'Institut Max-Planck pour l'histoire des sciences de Berlin depuis les années 1990.

Mots-clés: Jacques Monod; François Jacob; *Le Hasard et la nécessité*; *La Logique du vivant*; Louis Althusser; Jacques Derrida; science et philosophie; épistémologie historique.

Summary: *This article describes my personal encounter with François Jacob's The Logic of Living Systems and Jacques Monod's Chance and Necessity. I became aware of the two books right at the beginning of my studies of biology in 1973, and Jacob's book in particular has accompanied my academic itinerary ever since. The paper follows the different stages of this itinerary from the 1970s onwards, starting from Louis Althusser's engagement with Monod and Jacques Derrida's with Jacob in the late 1960s and early 1970s, through my activities as a molecular biologist in the 1980s, to my engagement for a historical epistemology at the Max Planck Institute for the History of Science in Berlin since the 1990s.*

Keywords: Jacques Monod; François Jacob; Chance and Necessity; The Logic of Living Systems; Louis Althusser; Jacques Derrida; science and philosophy; historical epistemology.

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For this commemoration, I take the liberty of being personal. What I am going to contribute to the memory of the fiftieth anniversary of a remarkable couple of books is a very individual account of how I came across *La Logique du vivant* and *Le Hasard et la nécessité*, and of what followed, for my personal itinerary, from this encounter.

Constellations—A First Encounter

I must start, however, with two other encounters, with another two remarkable books, that preceded it. In the summer of 1970, shortly before Monod's—in October 1970—and Jacob's—in November 1970—books appeared later in that fall and instantly became bestsellers, I sat in the attic of a building in the rue de l'Estrapade near place de la Contrescarpe and was translating Jacques Derrida's *De la grammatologie* into German. We, that is, students of philosophy in their early semesters in Berlin at that time, had the feeling that what then preferably was called "theory"—not philosophy, and expressly so—was entering a new epoch, and we were electrified by French structuralism and by what did not yet carry that name, but later became known as poststructuralism. The context of that feeling and the role that historical epistemology and the life sciences played in and for it is splendidly laid out in a recent book by Onur Erdur, *The Epistemological Years—Philosophy and Biology in France, 1960–1980*.¹ Right at the beginning of his *Grammatology*, Derrida alludes, besides cybernetics, to the life sciences, when he states, in the context of a generalized concept of writing: "It is also in this sense that the biologist speaks today of writing (*écriture*) and program (*programme*) apropos of the most elementary processes of information in the living cell."² We can safely assume that Derrida was aware of and had read the inaugural lecture that François Jacob delivered to the Collège de France in May 1965.³

1 - Onur Erdur, *Die epistemologischen Jahre: Philosophie und Biologie in Frankreich, 1960–1980* (Zürich: Chronos, 2018). The book is not yet translated neither into French nor into English.

2 - Jacques Derrida, *De la grammatologie* (Paris: Les Éditions de Minuit, 1967), 19.

3 - François Jacob, *Génétique cellulaire: Leçon inaugurale prononcée le vendredi 7 mai 1965* (Paris: Collège de France, 1965), new edition, online, DOI: <https://doi.org/10.4000/books.cdf.1303>

A second encounter has to be reported here. I had another translation project at that time, which, however, did not materialize because I realized that a German translation of the book was already underway—*Lire Le Capital* by Louis Althusser and his epistemological circle.⁴ Instead, a critical analysis of Althusser's epistemology became my master's thesis. My reading of Althusser at that time centered around his effort to clearly distinguish between science proper—science of nature, science of history—and ideology, a distinction that Althusser saw operative in the writings of the mature Marx. It drove me out of philosophy into a study of biology as the natural science that appeared to be the liveliest and theoretically most appealing area of the study of nature at that time.

Finally, my encounter with Jacques Monod's *Chance and Necessity* and with François Jacob's *The Logic of Life*⁵ falls into my transition year from philosophy to science late in 1973. Both books had appeared in the late Fall of 1970 in Paris, and both were quickly translated into German where they appeared in 1971 and 1972, respectively. Jacob's book was prefaced by a fully appreciative physicist Carl Friedrich von Weizsäcker,⁶ Monod's book by a slightly skeptical chemistry Nobel Laureate Manfred Eigen.⁷ His foreword closed by the words: "I am perhorresced when thinking of a dogmatization of the objectivity postulate."⁸ Monod promptly returned in a lecture: "You know, the truth of the matter is that Manfred cannot conceive that evolution could have happened without the aim of creating Man...fred."⁹

4 - Louis Althusser, Étienne Balibar, *Lire Le Capital* (Paris: Librairie François Maspero, 1968). German version: *Das Kapital lesen I & II*. Translated by Klaus-Dieter Thieme (Reinbek bei Hamburg: Rowohlt, 1972).

5 - Jacques Monod, *Le Hasard et la nécessité: Essai sur la philosophie naturelle de la biologie moderne* (Paris: Le Seuil, [October] 1970); François Jacob, *La Logique du vivant: Une histoire de l'hérédité* (Paris: Gallimard, [November] 1970).

6 - François Jacob, *Die Logik des Lebenden: Von der Urzeugung zum genetischen Code*. Translated by Jutta and Klaus Scherrer and prefaced by Carl Friedrich von Weizsäcker (Frankfurt am Main: S. Fischer, 1972).

7 - Jacques Monod, *Zufall und Notwendigkeit: Philosophische Fragen der modernen Biologie*. Translated by Friedrich Griese and prefaced by Manfred Eigen (München: Piper, 1971).

8 - Manfred Eigen, Vorrede zur deutschen Ausgabe, in: Monod, op. cit. in n. 7, IX–XVI, on XVI.

9 - Jacques Monod, On the molecular theory of evolution, in: Rom Harré (ed.), *Problems of Scientific Revolution: Progress and Obstacles to Progress in the Sciences* (Oxford: Clarendon Press, 1975), "The Herbert Spencer Lectures," 1973, 11–24, on 22.

My copies of the German version date from 1973, right from the beginning of my study of biology, and both are heavily annotated, read over and over again. Both books stood high in the ranking lists of the early 1970s, not only in France, but also in Germany. They became bestsellers, although they differed markedly from that other bestseller of the time written by a Nobel-crowned scientist, James Watson's *The Double Helix*.¹⁰ The reception of the books of the two Frenchmen, however, was unequal. Whereas Monod's book aroused considerable controversy, not only in leftist circles,¹¹ Jacob's was almost unanimously praised as a historical feat. For me, both books became points of orientation in my trials and efforts to find a satisfying way to conceive of the relation between philosophy and science. I will come back to that. First, however, let me turn to Louis Althusser's engagement with Jacques Monod in the late 1960s and—for many this must come as a surprise—Jacques Derrida's engagement with François Jacob in the mid 1970s.

Louis Althusser's Monod

In 1973, when I first had Monod's essay in my hands, I was not yet aware of the fact that Althusser had, in the Winter of 1967 to 1968, already engaged in a critique of another inaugural lecture at the Collège de France in the context of his Course on Philosophy for Scientists. It was that of Jacques Monod, published by *Le Monde* on the thirtieth of November 1967 and a precursor to his later book. This I realized only when Althusser's lectures for this course were published shortly thereafter, but belatedly, in 1974.¹² When this book fell into my hands in 1974, I felt again inclined to do a translation, but gave it up after the first course. In this book, Althusser develops the concept of what he calls the "spontaneous philosophy of the scientists." It is, in contrast to the majority of reviews that the book resuscitated, both in the affirmative and in the negative, a strictly epistemological reading of Monod's text, not unlike the one he published on Jean-Jacques Rousseau's *Social*

10 - James D. Watson, *The Double Helix: A Personal Account of the Discovery of the Structure of DNA* (London: Weidenfeld and Nicolson, 1968).

11 - Compare for example, Wolfgang Harich's biting review "Alte Wahrheiten, neuer Bluff," *Der Spiegel*, 8 November 1971.

12 - Louis Althusser, *Philosophie et philosophie spontanée des savants* [1967] (Paris: François Maspero, 1974).

Contract in 1969 in the *Cahiers de l'analyse*.¹³ According to Althusser, the spontaneous philosophy of scientists is a battlefield in which two opposite tendencies fight against each other: a materialistic tendency derived from scientific practice, and an idealistic tendency derived from ideology. As is to be expected, in the case of Monod, Althusser sees the idealistic tendency dominating over the materialistic one. But it is evident that Althusser would have fully acknowledged Monod's caution in his introduction to the later published book: "It goes without saying that any confusion between the ideas *suggested* by science and science itself remains strictly to be avoided."¹⁴ Althusser's deep respect before the sciences remained unbroken throughout the years of self-critique of his own earlier so-called "scientistic" positions in philosophy. What changed was his view of the tasks that philosophy had to fulfill.

Jacques Derrida's Jacob

In contrast to Althusser, Derrida did not engage with a book of the Pasteur couple in a public lecture, but did so in a seminar. And in contrast to Althusser, he did not engage with Monod's pamphlet, but with Jacob's history of the logic of life. And Derrida did not publish his analysis of *La Logique du vivant* during his lifetime. His seminar, held in the Winter of 1975–76, was only posthumously and very recently edited.¹⁵ In the light of Derrida's remarks in his *Grammatology* already quoted, this does not come as a surprise. In a number of sessions of that seminar, Derrida analyses the central concepts of Jacob's *Logic of Life* revolving around the notion of reproduction and including Jacob's discussion of the phenomena of death and sexuality. The metaphors of program and of text stand central in this analysis.

Here we have again a philosopher reading the text of a scientist, and of a scientist who did not write this book for philosophers, but for a broader public. There is, in this respect, a parallel, and

13 - Louis Althusser, Sur le *Contrat social* (Les décalages), in: *L'Impensé de Jean-Jacques Rousseau*, issue 8 of *Cahiers pour l'analyse* (Paris: Éditions du Seuil, 1969), 5–42.

14 - Monod, op. cit. in n. 5, 13.

15 - Jacques Derrida, *La Vie la mort: Séminaire (1975-1976)*. Edition established by Pascale-Anne Brault and Peggy Kamuf (Paris: Le Seuil, 2019). For an analysis of the seminar, see Francesco Vitale, *Biodeconstruction: Jacques Derrida and the Life Sciences* (Albany: State University of New York Press, 2018).

Derrida was certainly aware of it. As already discussed, a year before that seminar, Louis Althusser published his *Philosophie et philosophie spontanée des savants*. Similar to Althusser's treatment of Monod, Derrida embarks on a critique of Jacob's "spontaneous philosophy," to use Althusser's term. What I found particularly interesting in Derrida's critique, was his discussion of Jacob's use of the concept of "model" in his engagement with the tropes of language, writing, and text in relation to the processes of hereditary transmission. If looked at more closely, the model displays a logic similar to the one the notion of "trace" has in Derrida's *Grammatology*: Put briefly, both play out their fruitfulness in leaving something to be desired. It is the logic of the supplement. And there is yet a further interesting aside to Derrida's engagement with the molecular biologist's book: He takes the pervasive function of the language of text and writing throughout the literature of molecular biology, and Jacob's in particular, as a sign for the approaching end of the two scientific cultures: "Therefore, how can we still oppose the science of nature to—to what?—to the science of culture, society, man, and spirit?"¹⁶

But whereas Althusser uses Monod's text to exemplify his conception of philosophy as an epistemology of drawing distinctions, Derrida uses Jacob's text to highlight the movement of "différance" as undermining them, including the actually dominating ones. Let us recall the famous passage on the notion of "program" in Derrida's *Grammatology*, where he anticipates a historical horizon to what he calls the "field of writing," a horizon extending only "until its historical-metaphysical belonging is also denounced."¹⁷ It certainly did not escape Derrida's attention that Jacob, too, at the end of his book, clearly saw his conceptualizations of the living and those of molecular genetics in general as marked by an indelible historical index: "Today the world is messages, codes and information. Tomorrow what analysis will break down our objects to reconstitute them in a new space?"¹⁸

16 - Derrida, op. cit. in n. 15, 4.15.

17 - Jacques Derrida, *Of Grammatology*. Translated by Gayatri Chakravorty Spivak (Baltimore: Johns Hopkins University Press, 1997), 9.

18 - François Jacob, *The Logic of Life: A History of Heredity*. Translated by Betty E. Spillmann (New York: Pantheon Books, 1973), 324.

My Seminars on Philosophy and Molecular Biology

After these detours, it is time to get back to my own engagement with Monod and Jacob's books. We have to recall the situation then. As a result of the student movement, the curricula of the natural science disciplines came under reform stress. This gave me the opportunity to teach, in the years between 1976 and 1980, a series of seminars on "Philosophy and Molecular Biology" for students of the life sciences at the Free University of Berlin. Besides texts of philosophers of science such as Stephen Toulmin, Thomas Kuhn, Paul Feyerabend and Wolfgang Stegmüller, books of scientists for a wider, philosophically interested public figured prominently in these seminars: Manfred Eigen and Ruthild Winkler's *Laws of the Game*,¹⁹ but most of all *Chance and Necessity* as well as *The Logic of Life* by Monod and by Jacob. Not unlike to what, but unknown to me at that time, Louis Althusser tried to do with his "Initiation to Philosophy for Non-Philosophers" that remained unpublished during his lifetime,²⁰ the aim of these seminars was to convey, to students of the life sciences, a feeling for what theoretical reflection could contribute, if not to become better scientists, but to become aware of the societal and philosophical dimensions of their discipline. And the lesson I learned from this teaching endeavor was that a historical approach such as the one that Jacob so masterfully presented in his *Logic of Life*, which I chose twice as unique reading for a whole semester course, was much more accessible to students of the natural sciences than more systematic, theoretically oriented approaches. The somewhat paradoxical formula I found in a summary of one of these seminars for the particular approach, historical as well as epistemological, that Jacob presented in his history of heredity was "analytical integration thinking" (*analytisches Integrationsdenken*). I never used this formulation later, but I think it is an apt circumscription of what made the book accessible to natural science students.

As far as Monod was concerned, it appeared clear to me, at that time, that his immense and continuing public visibility was not least due to the fact "that an important natural scientist, himself

19 - Manfred Eigen and Ruthild Winkler, *Laws of the Game: How the Principles of Nature Govern Chance*. Translated by Robert and Rita Kimber (New York: Alfred A. Knopf, 1981).

20 - Louis Althusser, *Initiation à la philosophie pour les non-philosophes* (Paris: Presses Universitaires de France, 2014).

once an active communist, claimed to denounce Marxist theory, materialistic dialectics, once forever as an unscientific track leading astray, as a dangerous illusion, and this with *arguments out of his own science*.”²¹ That much about the public impact of the book. But as far as content is concerned, what impressed me then and what continues to impress me is Monod’s uncompromising insistence on the role that chance played in evolution and in mankind’s history for that matter. We can surmise that it did also have an impact on Louis Althusser’s later “aleatoric materialism” that he found “necessary in order to be able to think the opening of the world towards the event, the unprecedented imagination, and also every living practice, including politics.”²²

There was, however, another dimension to this enterprise. Coming from philosophy, one of the most intriguing and pressing questions for me became, throughout my study years in biology, the question of the relation between science and philosophy, clearly but indeterminately reflected in the seminar title “Philosophy and Molecular Biology.” Back then, I tried to formulate the lesson I took after these years in the form of the question “Why and how does philosophy exist in its relation to the sciences?” and answered it as follows in a survey on “Why philosophy, and what for?” of the German periodical *Dialectics: Contributions to Philosophy and the Sciences*:

“The natural sciences are and continue to be about the empirical investigation of forms of movement and the evolution of matter and about conceptualizing them analytically. From a certain stage of their development, the empirical sciences realize a self-regulatory dynamic of experiment and theory formation, in the sense of an open system for which, as is generally known, the so-called ‘boundary conditions’ are constitutive in respect to its maintenance as well as its development. I would like to claim that philosophy [of science] is a moment of these boundary conditions, therefore co-constitutive for the maintenance and development of the sciences. It has, however, as a knowledge form *sui generis*, no place at the level of the empirical acquisition

21 - Hans-Jörg Rheinberger, Review of Hermann Ley, *Über die Schwierigkeiten des Einzelwissenschaftlers* and Guy Besse, Philippe Cazelle, Pierre Jaegl et al., *Kritische Betrachtungen zu Jacques Monods „Zufall und Notwendigkeit“*, series “Zur Kritik der bürgerlichen Ideologie,” Nos. 25 and 30 (Berlin: Akademie Verlag, 1973), *Sozialistische Politik [SoPo]*, 34/35 (1976), 227–31, on 227.

22 - Louis Althusser, *Sur la philosophie* (Paris: Gallimard, 1994), 46.

of scientific knowledge and its conceptualization. It leads into blind alleys if philosophical categories are substituted for scientific concepts. I would therefore also answer in the negative the question whether in the research process of the empirical sciences problems are being set free that need the means of philosophy for their solution. What, then, could co-constitutivity of philosophy for the sciences possibly mean? In philosophical thinking—it is perhaps better to speak of philosophical thinking instead of *the* philosophy—scientific knowledge and explanation of the world is being digested. This digestion confronts the sciences with different interpretations of scientific knowledge and explanations of the world: as positivistic, critical-rationalist, or materialist philosophies of science. And these interpretations clearly belong to the theoretical ‘boundary conditions’ of the maintenance and development of the sciences. On the part of the sciences, they are usually represented as spontaneous philosophy of the scientists. A form of philosophical thinking that presents itself as *accessible* to such spontaneous philosophy could, in a reversal of the question denied above, set free, in the research process of the empirical sciences, *new* problems of a sort that require the *means of the sciences* for their solution.”²³

Another History of Science

For my personal itinerary, a consequence of this—in the last resort—*marginalization* of philosophy was my transition from philosophy of science to a theoretically demanding history of science. It coincided and went alongside my first contact with and experience of experimentation in a molecular biology laboratory, in which I completed my diploma thesis and my dissertation in molecular biology between 1978 and 1982. The following sentences from the introduction of Jacob’s book became guiding lines for my forays into the history of the life sciences that I undertook along with and in parallel to my experimental laboratory work during the following decade:

“For a biologist, there are two ways to envisage the history of his science. On the one hand, one can see in it the succession of ideas and their genealogy. One seeks then the thread that has guided thought to the theories today in function. Such history presents itself so to speak upside down, by extrapolation of the

23 - Hans-Jörg Rheinberger, Warum und wie existiert die Philosophie in ihrem Verhältnis zu den Wissenschaften?, *Dialektik: Beiträge zu Philosophie und Wissenschaften*, 1 (1980), 164–5.

present toward the past. Step by step, one looks for the precursor of the actual hypothesis, then the precursor of the precursor, and so on. In this manner, the ideas gain an independence. They behave a bit like living beings. They are born, they engender, they die. [...] But there is another way of envisaging the history of biology. It consists in searching how the objects became accessible to their analysis and thus allowing for new domains to be constituted in the sciences. Such history is about specifying the nature of these objects, the attitude of those who study them, their manners to observe them, the obstacles that their culture dresses before them. [...] Every epoch is characterized by the field of the possible defined not only by the current theories and beliefs, but also by the nature of the objects themselves accessible to analysis, the equipment to study them, the way to observe them and to talk about them. Logic can only develop within that zone. Only within the limits thus fixed the ideas can maneuver, be tried out, be opposed against each other.”²⁴

A fundamentally non-teleological way of conceiving the history of the sciences thus. Jacob barely mentions any historian of science as a reference in his *Logic of Life*, but the allusions toward Gaston Bachelard, Georges Canguilhem, and Michel Foucault, thus the background of French historical epistemology at that time, cannot to be overlooked.

Experimental Experiences

In 1987, another book written by François Jacob appeared, his autobiography in which he describes in vivid strokes his own laboratory experience.²⁵ This book accompanied me when I left the laboratory of the Max Planck Institute for Molecular Genetics in Berlin for a sabbatical in the Program of History and Philosophy of Science at Stanford University in 1989, where I started to work on what later became my book *Toward a History of Epistemic Things*.²⁶ For this historical epistemology of protein biosynthesis research after World War II, Jacob’s remarks on

24 - Jacob, op. cit. in n. 5, 19-20. Compare Hans-Jörg Rheinberger, Wissenschaftsgeschichte als Zugang zur methodischen Reflexion wissenschaftlicher Arbeit? Einige Bemerkungen und ein Beispiel aus der Geschichte der Biologie, in: Friedemann Schmithals (ed.), *Wissen und Bewußtsein: Studien zu einer Wissenschaftsdidaktik der Disziplinen* (Hamburg: Arbeitsgemeinschaft für Hochschuldidaktik, 1982), 134–48.

25 - François Jacob, *La Statue intérieure* (Paris: Seuil, 1987).

26 - Hans-Jörg Rheinberger, *Toward a History of Epistemic Things: Synthesizing Proteins in the Test Tube* (Stanford: Stanford University Press, 1997).

experimental practice stimulated me greatly in my efforts to characterize the dynamics of experimental systems, as did my own laboratory experience. One passage of Jacob's autobiography in particular became a kind of motto for that work:

"In analyzing a problem, the biologist is constrained to focus on a fragment of reality, on a piece of the universe which he arbitrarily isolates to define certain of its parameters. In biology, any study thus begins with the choice of a 'system.' On this choice depend the experimenter's freedom to maneuver, the nature of the questions he is free to ask, and even, often, the type of answer he can obtain."²⁷

In my book, a chapter is devoted to the experimental work of Monod and Jacob that led to messenger RNA, described in the perspective of a fusion of two experimental systems with unprecedented outcomes and consequences.

Later Contacts and Impacts

I had left the laboratory in 1990, after my sabbatical in Stanford, and settled in the Institute for the History of Science and Medicine at the University of Lübeck. For a series of workshops on the experimentalization of life, on scientific objects, and on spaces of knowledge,²⁸ I thought of daring to win François Jacob as a participant. He answered the invitation letter promptly and declined with polite words, but decidedly. Whoever has read Jacob's autobiography must know why. I could thus have known. I met Jacob several times later in Paris, but we never talked about this episode.

Ten years after his autobiography, in 1997, Jacob published *La Souris, la mouche et l'homme*.²⁹ Only a year later, the book appeared in German.³⁰ I was asked to write an afterword for this

27 - François Jacob, *The Statue Within: An Autobiography*. Translated by Franklin Philip (New York: Basic Books, 1988), 234.

28 - Hans-Jörg Rheinberger and Michael Hagner (eds.), *Experimentalisierung des Lebens: Experimentalsysteme in den biologischen Wissenschaften 1850/1950* (Berlin: Akademie Verlag, 1993); Michael Hagner, Hans-Jörg Rheinberger and Bettina Wahrig-Schmidt (eds.), *Objekte, Differenzen, Konjunkturen: Experimentalsysteme im historischen Kontext* (Berlin: Akademie Verlag, 1994); Hans-Jörg Rheinberger, Michael Hagner and Bettina Wahrig-Schmidt (eds.), *Räume des Wissens: Repräsentation, Codierung, Spur* (Berlin: Akademie Verlag, 1997).

29 - François Jacob, *La Souris, la mouche et l'homme* (Paris: Éditions Odile Jacob, 1997).

30 - François Jacob, *Die Maus, die Fliege und der Mensch: Über die moderne Genforschung*. Aus dem Französischen von Gustav Roßler (Berlin: Berlin Verlag, 1998).

edition, which I gladly accepted. In this book, we find the remarkable sentences: "The danger for the scientist consists in not recognizing the boundaries of his science, and with that, his knowledge. [...] But above all, it consists in the certainty to be right."³¹ For which reason I gave the afterword the title "The experiment and the ethics of ignorance."³² We remember that these sentences were written in the context of Jacob's discussion of eugenics and, by the way, at the height of the years of the science wars.

In 2002, this book was followed in Germany by a new edition of *The Logic of Life*, to which I contributed another afterword.³³ The publication of this new edition coincided with the apotheosis of the Human Genome Project, which let its last chapter, "The Integron," appear as an admonition and of a particularly heightened interest.

Both Jacques Monod and François Jacob were, besides science, masters of language, each in their own manner. Jacob once characterized Monod and himself in the following way:

"There was a difference of nature between us. Jacques wanted to be logic. Purely logic even. As far as I was concerned, he found me mainly intuitive. [...] To nature, Jacques attributed Cartesianism and elegance. Hence his taste for unique solutions. I myself found the world less strict, less rational. What surprised me was neither its elegance nor its perfection, but rather its state. That it was how it is and not otherwise."³⁴

This difference in nature and in the view of nature also impacted on their manner of writing, one more Cartesian, the other more, it might be said, Pascalian. But both books to be discussed here, *Chance and Necessity* as well as *The Logic of Life*, are, besides their content, also literary events. It is not least this aspect that let them become so successful, and let them stand out between the legion of books that were written by molecular biologists around 1970 and later, most of them remaining obscure and read only by specialists. In the genre non-fiction books written by scientists, these two books of Monod and Jacob simply stand out.

31 - Jacob, op. cit. in n. 29, 187-8.

32 - Hans-Jörg Rheinberger, Das Experiment und die Ethik des Nichtwissens, in: Jacob, op. cit. in n. 30, 199-204.

33 - François Jacob, *Die Logik des Lebenden: Eine Geschichte der Vererbung*. Aus dem Französischen von Jutta und Klaus Scherrer. Mit einem Nachwort von Hans-Jörg Rheinberger (Frankfurt am Main: Fischer Taschenbuch, 2002).

34 - Jacob, op. cit. in n. 25, 356.