B. F. SKINNER

A Reappraisal

Marc N. Richelle

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I have abundantly quoted from Skinner's writings, because this is the best way to provide the reader with objective evidence of his thought, which has been so frequently misrepresented. Quotations from Skinner, 1938, 1957, 1968, 1972, are reproduced with permission given by the B. F. Skinner Foundation (Mrs Julie Vargas, President), which I thank for its courtesy. Quotations from Skinner, 1953, are reproduced with permission courteously granted by Macmillan Publishing Co, and quotations from Skinner 1948 with permission by the same publisher.

I am grateful to Lawrence Erlbaum Associates, England, for welcoming one more continental author, with all its implications for editorial work load : in spite of my efforts, the text cannot really compare with the standard of native English-speakers. I am most grateful to the publisher and to the anonymous referee for

their valuable assistance in improving my style. Remaining imperfections are, of course, my own.

Finally, the requirements made by modern publishers could not have been met without the help of my secretary, Mrs Andrée Houyoux. I thank her for her patient and expert exploitation of the word processor.

M. R.
October, 1992

Preface

When this book was in the process of being written, in the summer of 1990, Burrhus Frederic Skinner died in Cambridge, Massachusetts, on Saturday 18 August, at the age of 86. He had been informed, several months earlier, that he suffered from leukaemia. He continued to work serenely on his manuscripts until the day before he died.

Skinner's career as a psychologist had covered almost 60 years. He had gained exceptional influence, and had been named among the few most prominent psychologists of our century. He had also been by far the most controversial. He has been attacked from the most opposed sides of psychology, of science at large and of political ideologies. He has often been depicted as the last representative of the behaviourist school, and as such, presented as a sort of fossil, or, in the last 25 years of his life, as the obsolete and unique surviving specimen of an otherwise extinct species, now replaced by the new phylum known as *cognitivism*. He has been made responsible for keeping psychology, over more than 50 years, in the "long and boring night of behaviourism", as one famous philosopher put it.[1]

Echoing characterisations often heard in scientific circles, Skinner's obituaries have, once again, pictured him as the fancy experimenter who would waste his time teaching pigeons how to play ping-pong or as the dangerous scientific dictator who would have ruled society by coercion and punishment, had he been offered the chance to enter political practice. Fortunately, he was not offered such an opportunity, and new trends in psychology arrived in due time to neutralise the dragon.

Why, in that context, a book on Skinner? Can the man and his work be of any interest, except to historians of psychology?

It might be enough to answer: for the sake of truth, since any contributor to scientific or philosophical thought deserves an honest reading of his words, and if they have been widely misrepresented, the reasons should be analysed and a more correct appraisal should eventually be reached. The issue, however, is not just a matter of giving justice to an unjustly decried author. It has relevance to the current debates within psychology. By discovering or rediscovering Skinner and Skinner's views as they really are, psychologists could also put their own current reflections in proper perspective: that is, correctly appraise the roots of present research and theorising in the past, identify the problems that have remained unsolved in spite of the change in paradigm—as the cognitivist school is often thought of—and perceive those seminal aspects of Skinner's work which open new avenues of research or converge with most promising contemporary approaches. For some reason, psychologists tend to think of the history of their science as a sequence of *revolutions* rather than *evolution*: they like to emphasise ruptures rather than build on continuities. They seem concerned to attach their name to a theory that will replace previous views, and, to that end, they occasionally indulge in the strategy of building a straw man. Skinner has been a favoured target of that strategy. But in misrepresenting his ideas, his opponents have missed most of his genuine contributions to psychology, and have completely overlooked the fact that in many areas of theory and of practice, he was indeed a forerunner.

This book is about Skinner, not about the Skinnerians. The difference is an important one, since most of the controversies surrounding Skinner involve a permanent confusion between the two. As a school of thought, as an organised movement, often identified with the "behaviour analysts", the disciples of Skinner, or some of them, have had a quite distinct history in American psychology. Among other things, they have isolated themselves from the rest of scientific psychology by creating their own journals and societies, by closing themselves to open dialogue with other trends and developing a sense of orthodoxy, which has never proved to be fruitful in the progress of a science or in the dissemination of a theory.[2] Some of them have focused on the implementation of Skinner's social philosophy, with a mixture of naïve idealism and sect-like militantism. The links between Skinner and these movements are complex, but it is clear that he cannot endorse all that has been done or said with reference to his name. Anyhow, this book is not intended to give an historical account of the behaviourist movement and its ramifications.[3]

Nor is it intended to give an historical presentation of Skinner's life and work. I leave to other people the honour of linking their name to Skinner's as his recognised biographer, as Ernest Jones' is linked to Freud. Although I shall have to put some of Skinner's ideas into adequate historical context, in order to appraise their relevance to scientific debate as it progresses through time, the organisation of this book does not obey the historical course. It is, on the contrary, a selection of themes, which appear to me as most illustrative of Skinner's

contribution, or as especially misunderstood although crucial in his theory, or as generally neglected, because other, less important points have, for some reason, been emphasised.

The selection is, admittedly, a personal one. It is a selection by a *European* psychologist, with his idiosyncratic background. Maybe *European* is not a sufficient qualification: *Continental*, and even *French-speaking* should be added. Without indulging in autobiographical notes, I owe the readers some information so they can better understand my choice. After graduating in Philosophy and Letters in my home country, I took a degree in Psychology at the University of Geneva, whose Institute of Psychology was quite legitimately at that time considered as one of the best on the Continent. It was dominated by the figure of Piaget, although other names, such as Rey or Lambercier or Inhelder, deserve mention. When I came across Skinner and his work, to be precise at Harvard in 1958–59, I inevitably read it through the lenses of my own intellectual education, and I was naturally brought to confront it with major works in the European tradition. This has led me to locate major limitations in Skinner's views—limitations he might share with the North-American psychological tradition as a whole—to point to complementarities rather than contradictions or oppositions, to unveil unsuspected convergencies, to bring into quite different perspective some of the occasionally violent debates that took place around Skinner's conceptions, for example concerning verbal behaviour (in the debate initiated by Chomsky[4]) or ethology (in a rather harsh exchange involving one of Skinner's closest co-workers, Herrnstein[5]). I shall give ample space in the following pages to this exercise in confrontation and integration of two different psychological traditions. I only hope that the American reader will find the approach informative and stimulating. It is a widespread feeling among European psychologists that American psychology (with the exception of a few professional historians of the field), in spite of its outstanding development, or maybe because of it, has been ignoring most of the European major contributions to our science in this century, except for that part that has further developed on the other side of the Atlantic because of the emigration from Europe of some individuals,[6] or that part which has been transferred due to, often quite delayed, translations.[7]

As the way one reads an author's writings, be they scientific or literary, can obviously be influenced by the fact that one is personally acquainted with him, I admit that my own reading of Skinner might be biased by my personal encounters with him. It was my privilege to approach him first when I was a graduate student-fellow at Harvard, and later as a colleague, especially on the occasion of the first translation of some of his books into French, which I undertook with Graulich in the 1960s.[8]

Although what counts essentially, for all scientific purposes, are the ideas and empirical contributions as expressed in written words, I could not help being shocked by the *ad hominem* attacks addressed to Fred Skinner. For those who have approached him in his lifetime, it is difficult to understand how some of

his scientific opponents could resort to accusations of power-searching. In my long experience as a student, in which I was happy enough to be taught by a number of outstanding people, including men who have shaped scientific psychology in our century, namely Piaget and Skinner, I can testify that the latter is by far the least directive teacher I have ever met. I felt it appropriate to insist on that personal detail when I gave an interview to a Spanish news reporter the day after Skinner's death was announced, while I was staying at San Lorenzo del Escorial.[9] She got the message, and the title of her report referred to "the least authoritarian teacher" Richelle had ever had.[10] At least that particular Spanish daily paper did not convey, on that occasion, the usual distorted picture of Skinner.

I am especially grateful to the reporter for that: it appeared to me as predictive of the favourable context that Spain would offer me to complete this book during the winter of 1990–91. The prediction was confirmed beyond expectation, and I heartily acknowledge my debt to Spanish psychologists who have provided me with an ideally fitting environment for efficient, quiet writing, as well as with stimulating interactions, on the occasion of lectures, seminars and symposia on various aspects of Skinner's work and other themes.[11] A list of names would be too long and expose me to omissions. The following list of host universities will allow each of these colleagues and friends to capture my message: Granada and its Jaen campus, Madrid Complutense, Madrid Autonoma, Madrid UNED, Barcelona Central, Barcelona Autonoma and its campus of Gerona, Valencia, Sevilla, Oviedo, Salamanca, Santiago de Compostela, and, out of Spain but in the peninsula, Lisbon and Coïmbra. The universities of Granada and of Madrid Complutense deserve special mention for having provided me with all desirable facilities for periods of four months each.

NOTES

1. Bunge, M. (1980).
2. Skinner himself was aware of the self-isolation of behaviour analysts, which he traced to the difficulty in having papers on individual subjects accepted in scientific journals in the early 1950s and in finding places for gathering together if there was no officially allotted space and time at scientific meetings (see Skinner, 1989, Chapter 12). Proctor and Weeks (1990) have argued against that interpretation. See my review of their book (Richelle, 1991).
3. For the interested reader, various sources are available, including A. Schorr, 1984.
4. See Chapter 10.
5. See Chapter 6.
6. For example, the contributions of exiled Gestaltists, such as Max Wertheimer, before they left Europe, remained largely unknown in the US.

7. Piaget's work, starting in the early 1920s, was very little known in the US until some of his books were translated. Vigotsky's work, terminated by his untimely death in 1934, was brought to attention thanks to J. Bruner's initiative in 1962. Other prominent psychologists, such as P. Janet and H. Wallon, to mention only two examples in the French area, have been completely ignored until now, in spite of the importance of their work, probably matching Freud's and Vigotsky's respectively.
8. B. F. Skinner (1969a), *La révolution scientifique de l'enseignement*, and (1971), *L'analyse expérimentale du comportement*, Bruxelles, Mardaga, translations of *The technology of teaching* and *Contingencies of reinforcement*, respectively.
9. The occasion was a summer course, organised by the University Complutense of Madrid, on the theme "Freud and after Freud", in which I was due to deliver a lecture on Freud and scientific psychology, mainly devoted to Freud in Skinner's writings. This coincidence (Skinner would have noted: he was always fascinated by coincidences) brought me in contact with the Madrid press, in search of firsthand information on the late American scientist. A revised version of the talk delivered during that session has been used as part of Chapter 4.
10. *El Pais*, 22 August 1990.
11. There have probably been more papers published and more meetings on Skinner's work organised in Spain, in the year following his death, than in any other European country. As an example, see Roales-Nieto, Luciano Soriano and Pérez Alvarez, 1992. For a European approach to the experimental analysis of behaviour and to Skinner's work, see Lowe et al., 1985; Blackman and Lejeune, 1990 and Richelle, 1985.

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CONTROVERSIAL ISSUES AND UNQUESTIONABLE CONTRIBUTIONS

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1 A Matter of Controversy

A CONTROVERSIAL SCIENTIST

Burrhus Frederic Skinner was born on 20 March 1904 in Susquehana, a small town in Pennsylvania. He died on 18 August 1990, in Cambridge, Massachusetts. His will undoubtedly remain among the dozen great minds who have shaped twentieth-century psychology, side by side with his contemporaries, Piaget and Lorenz, or with Pavlov, Thorndike and Watson, his elders. He has been a leading figure of a school of thought, *behaviourism*, that has dominated the scene for more than half a century. His name is associated with a procedure designed to study the behaviour of animals in the laboratory, often labelled the "Skinner box" but more appropriately named a "conditioning chamber"; with a concept, *operant conditioning*, that is now part of familiar categories in a psychologist's mind; with a theoretical endeavour, aimed at the explanation of behaviour, be it in animals or in humans, in terms of *control by consequences*; and with a *social philosophy*, grounded, at least in Skinner's own view, in scientific evidence that has been largely overlooked, and is still overlooked today, to mankind's misfortune.

These various contributions to the science of psychology and to its philosophical by-products will be described and discussed at length throughout this book. It would seem at first sight that one can proceed with introducing Skinner's work as one would do for any other great psychologist, or, for that matter, any other great scientist: usually, one would have to describe a methodological approach, to recount an empirical or a conceptual breakthrough, or both—since it is rarely the case that facts are discovered independently from concepts—to evaluate a theory, and eventually to discuss attempts at deriving

some general philosophical view from the scientific work proper. To remain within the limits of psychology, all four levels of activity can be found in Pavlov's, Piaget's or Lorenz' long and impressive work, just as they are in Skinner's.

There seems to be something special about the latter, however, something that is not easy to capture and characterise, but that is reflected in the numerous and various expressions of hostility towards Skinner's ideas and person. Of course, scientific ideas, like other ideas, are exposed to criticism, and no one expects complete agreement on scientific issues, especially in a field still as precarious as psychology. But criticisms addressed to Skinner have been unusually violent and passionate. Their authors are not exclusively psychologists, presumably competent to appraise a colleague's work; many intellectuals pertaining to other fields of science, as well as laymen with very different, even opposite, ideological backgrounds, have crusaded against him.

A complete list of relevant quotations would cover more than half the present volume. A sample of selected opinions will suffice to illustrate the general spirit. The following are drawn from European and American sources, newspapers, political discourses, scientific journals or books. They were written or pronounced at various times of Skinner's life, or in obituaries shortly after his death:

> On behalf of a so-called "neo-behaviourist" psychology, exclusively focused on pure behaviour, a man called Skinner, a psychologist at Harvard, calls for robotisation.
> All radios make it a point of honour to invite this dangerous fool, close to Soviet Pavlovians, who asserts that man is no special state of nature; that he is but one animal among others; and that, as such, he must be trained in such a way as to react, as other animals do, to a number of external stimuli of the environment. Forget man. Consider only the animal. Analyse its conditioning by having the environment act upon it. Find out the most efficient of them and multiply them . . . Skinner calls that "operant conditioning". There is another word for it: it is Nazism.
>
> *Michel Lancelot*[1]

> Clearly, we in France are more cool-headed. Skinner's book [i.e. *Beyond freedom and dignity*] does not seem to have filled many here with enthusiasm or shock . . . This conception calls for strengthening of order; it provides an answer to criticisms against culture and society. It recommends control in order to ensure survival, hence reproduction of what exists. In contrast, freedom and dignity—core ideas of extremists—appear as bubbles of the past, based on prescientific theories. The America of Mr Nixon and Mr Agnew must take care of its own salvation, it must dare to punish and reward where and when it is needed.
>
> *Serge Moscovici*[2]

> America as a society was founded on respect of the individual and an unshakable belief in his worth and dignity . . . Skinner attacks the very precepts on which our

society is based saying that "Life, liberty and the pursuit of happiness" were once valid goals, but have no place in 20th-century America or in the creation of a new culture as he proposes.

Spiro Agnew[3]

. . . consider a well-run concentration camp with inmates spying on one another and the gas ovens smoking in the distance, and perhaps an occasional verbal hint as a reminder of the meaning of this reinforcer. It would appear to be an almost perfect world . . . Within Skinner's scheme there is no objection to this social order. Rather, it seems close to ideal.

Noam Chomsky[4]

What accounts for the success of Skinner's views in spite of all their logical pitfalls? In my opinion, it is their adherence to a set of American values that are largely exported by the government of the USA along with other goods.

J. Jacques Vonèche[5]

[the Skinner box] has been described as a bloodless method of decerebrating the animal. Some think the same could be said of the effects of Skinnerian theory on his adherents . . .

The Guardian, 28 August 1990

Finally, I do not deny that there are a few remaining Skinnerians; after all if you count fossils, there are still many dinosaurs in the world.

Stuart Sutherland[6]

While psychoanalysts believe in the complexity of the individual, and therefore in his freedom, behaviourists are not concerned with consciousness, and prefer to stick at scientific observable data, rediscovering altogether the virtues of authority and the recipes of the carrot and the stick. However, thanks to his cage, Skinner had yet succeeded in teaching birds how to play piano and dance.

Frank Nouchi[7]

This is obviously not the usual style of polemics about scientific theories, except when they deeply disturb the conception that man has of his nature and of the world around him, as was the case for Galileo or for Darwin, or when they hide some perverse misuse of science aimed at ideological domination, as is unfortunately sometimes the case in our civilised societies. In some of the quotations above, the latter interpretation is clearly suggested: some authors, like Chomsky, the famous linguist, did not hesitate to accuse Skinner of Nazism, by resorting to unambiguous metaphors.

European critics often discard Skinner's contribution as a typical product of American society, which does not fit in the context of European culture, or that should be looked at with suspicion in order to avoid contamination. These quotations from Moscovici and Vonèche illustrate this somewhat contemptuous

judgement. Those critics do not answer embarrassing objections to their ethnocentric appraisal of Skinner's work. They tend to ignore the fact that, like it or not, things which originate in the USA eventually invade Europe sooner or later—as with popular soft drinks, computers, or indeed the student revolution that received the 1968 date only because of a persistent European illusion of being at the start of everything important. They do not give their reasons for accepting sympathetically other American productions, such as humanistic or cognitivist theories, to remain within the field of psychology. (One explanation, as given by Vonèche, is to point to the European origins of those acceptable approaches, pointing to Piaget as the originator of American cognitivism! This explanation proceeds from the same Eurocentrism denounced above.) Above all, they do not explain why attacks against Skinner were far more numerous and violent in his home country than anywhere else, nor why personalities as different as Noam Chomsky and Spiro Agnew (the former a brilliant linguist and a famous active libertarian; the second a rather conservative Vice-President of the USA, who did not finish his term because of a financial scandal) joined in fighting against the Harvard psychologist, though resorting, of course, to quite opposite arguments.

When a man is attacked from many different horizons, by people usually opposed to each other, it is likely that he has disturbed all of them, possibly because he is saying important things that nobody wants to hear. His adversaries then resort to a common strategy: they overshadow his work. If the work is written, they convey a misrepresentation of it, or they themselves fail to read it correctly. Second-hand treatment makes for a generalisation of the distortion. Trusting prominent critics, people neglect to read the work first-hand, and unfounded arguments are reproduced and amplified. This mechanism has been at work with respect to Skinner's writings and ideas throughout his career, as we shall see. The main example, and undoubtedly the most decisive one, has been Chomsky's critique (1959) of Skinner's book *Verbal behavior* (1957).

But many other cases can be pointed out, notably in two important publications devoted, in the 1980s, to Skinner's contribution. One is a special issue of the highly praised journal *The Behavioral and Brain Sciences*[8] entitled *Canonical papers of B. F. Skinner*, in which more than 100 authors were invited to write "open peer commentaries" on Skinner's reprinted selected papers. The second is a book edited by S. Modgil and C. Modgil under the title *B. F. Skinner: Consensus and controversy* (1987). About two dozen authors argue for or against a number of aspects of Skinner's view. Both publications—besides acknowledging the place that Skinner still holds on the scientific stage—abound in misrepresentations and errors of interpretation, even under the pen of otherwise serious authors.

At this point, one might ask the question: How is it that Skinner has been so frequently misunderstood and misrepresented? The authors of a recent essay have a simple and straightforward answer: the reason is that his message was neither

clear nor consistent.[9] In other words, when readers misunderstand a scientific author, one can only conclude that the text is not clear, and only the author can be blamed for it. Readers' judgements are to be trusted. We are aware, however, of the various sources of bias that can bring readers, even of scientific material, to misinterpret what they have under their eyes. Readers are prone to perceive and read what they want to see. They do not easily give up stereotypes, and they occasionally go as far, in defending their own point of view, as to build straw men which replace the author they are actually reading. We shall see in Chapter 10 how Chomsky's criticisms, for example, illustrate these mechanisms, to a point that might pass intellectual honesty. But persistent misreadings surprisingly also focus on the most basic, almost classical and unequivocal aspects of Skinner's theory. For example, many psychologists have continued to characterise Skinner's theory as typical *stimulus-response* (S-R) psychology in spite of his perfectly clear statements to the contrary.[10] Skinner's style is especially elegant and unambiguous, and although several lines of evolution in his thinking can be traced throughout his writings (the contrary would indeed appear unusual in such a long career),[11] he has also made a point of re-stating his main ideas in several contexts, and at various levels of sophistication, for audiences with different backgrounds. Skinner cannot be blamed for obscurity, and we should look in other directions to account for misinterpretations.

If we want to know Skinner's ideas, we must go back to his writings rather than rely upon distorted or oversimplified second-hand accounts. This is also the only appropriate way if we want to elucidate the ties between "philosophical" (or "ideological") writings (those most widely read by non-specialists) and scientific writings (often misread by specialists themselves). Before dealing in some depth with what I consider to be the central issues in Skinner's theory and in the debates around it, let us take a general look at Skinner's work and point to some landmarks of his life and some features of his character.

SKINNER'S WORK: AN OVERVIEW

The first scientific papers by Skinner were published in the early 1930s. He never stopped writing from then until the day before he died, and his now closed bibliography amounts to more than 200 titles, including a dozen books.

His contributions, however, have not been only in words. It should not be overlooked (as sometimes happens) that he has provided the psychological laboratory with a new and exceptionally effective technique that is now part of the tools used by many researchers, whatever their theoretical inclination, not only in the experimental study of behaviour proper, but in various fields where behaviour is important at some stage of inquiry, such as neurophysiology or psychopharmacology.

While contributing many empirical facts, Skinner has clarified, if not always solved, a number of problems in which experimental and theoretical psychology

was sinking about 50 years ago. He has been seminal in the development of new applications, such as behaviour therapy and behaviour modification—now a well-accepted approach to helping people with psychological problems or suffering various handicaps—and programmed instruction (though their debt to Skinner is rarely acknowledged by those who apply his ideas today to computer-assisted learning).

Skinner's theoretical endeavour has mainly consisted in elaborating further the concept of psychology as the science of behaviour, originally formulated by Watson early in this century. He has enriched and refined *behaviourism*, by adding to the initial definition many qualifications derived from knowledge accumulated over time and from his critical reflection, expressed in a less passionate style than Watson's. But he has rigorously followed the basic principles of behaviourism more than any other psychologist after Watson, making that point clear by labelling himself a *radical* behaviourist. We shall elaborate on that point later.

Finally, Skinner has been bold enough to apply to human affairs at large the conclusions of his scientific analysis of animal behaviour. He has questioned the traditional view of human nature and man's relation to his physical and social environment. In his Utopian novel *Walden Two* and in several papers and books—of which *Beyond freedom and dignity* is the main one—he has denounced our unwillingness to deal with matters of human behaviour by resorting to the scientific approach which we feel is appropriate, and indeed effective, in technological or medical matters. This part of his work is certainly responsible for irritating many of his readers.

BEHAVIOURISM: A SHORT REMINDER

Behaviourism is a school of thought that originated early this century. Its birth is usually identified with J. B. Watson's famous paper "Psychology as the behaviorist views it" (1913). But, as is often the case, the idea was in the air. It had been explicitly stated in an historical lecture by the French psychologist H. Piéron in 1908.[12] And it had been practised for some years by scientists like Pavlov.

The core of the behaviourist's position is that the subject matter of psychology is *behaviour*—which can be observed from outside, as are the phenomena studied in natural sciences—rather than mental states subjectively apprehended by the subject himself. This was essentially a methodological change. Up to then, scientific psychology, a young field of science little more than half a century old, still relied on introspection as the main source of data in spite of successful efforts to develop experimental rigour and control, and in spite of its use of measurement and quantification. Although this was no major obstacle to progress in some domains, such as basic psychophysics or the study of elementary motor reactions in human adults, it proved to be quite unsatisfying when dealing with more complex phenomena, such as thought and problem-solving, or with subjects

who could not report on their internal life, or, even more simply, could not understand verbal instructions to do so, as is the case with animals, pathologically disabled persons, or individuals speaking another language.

At another level, though closely related to the methodological aspect, behaviourism had important epistemological implications. It put psychology in the realm of natural sciences,[13] dispensing with the old dualist distinction between Mind and Matter. The issue here is not between materialism and spiritualism or idealism, but whether psychology has more chance to progress by working with the hypothesis that its subject matter is amenable to the same approach as other aspects of the world, and more specifically of the living world.

Behaviourism, once formulated clearly by Watson, spread very quickly. It pervaded not only American psychology but European psychology as well. Most textbooks would, from then on and until recently, start with a definition of psychology as the *science of behaviour*. There seemed to be a sort of consensus on that point. This does not mean, however, that behaviourism eliminated other schools of thought. On the European continent, Gestalt psychology developed at the same time in Germany; in Geneva, Piaget started his monumental work about 10 years after Watson's manifesto, while the study of animal behaviour in the wild emerged as modern ethology in the 1930s, mainly under the influence of Konrad Lorenz. These approaches were not necessarily opposed to the behaviourist position, but they put the emphasis on other aspects.

French psychology offers a peculiar and interesting case with regard to behaviourism. As mentioned earlier, Piéron can be considered, historically, as the founder of behaviourism, if the date of the first formulation is to be taken as a criterion. He did not really start the movement, though his own work has undoubtedly been quite in line with the behaviourist position. One explanation might be that he was not assertive enough, compared with Watson. One could also argue that France was not ripe for that revolution, or that it was in some sense already beyond it: Pierre Janet, whose influence extended over several decades, had in fact developed a psychology of "conduct" that, in many respects, foreshadowed some tenets of Skinner's radical behaviourism. But on the other hand, French psychologists, with few exceptions, were never very receptive to radical behaviourism, and turned with enthusiasm to cognitivism when it emerged in the 1960s.

Behaviourism took shape mainly in the United States, where, following the impetus given by Watson, a handful of second-generation behaviourists—the so-called "neo-behaviourists"—developed their own versions of a science of behaviour during the second quarter of the century. One of the best known, and possibly the most influential, was Hull, who is still today taken as the main reference when behaviourist theses are discussed. He did not contribute any major methodological novelty, or any important empirical discovery. He was fascinated by formalisations, and engaged in building an ambitious hypothetico-deductive system of behaviour. One of the most severe critics of his book *Principles of*

behavior (1943) was Skinner (1944), which clearly shows that behaviourism was not a unified church! Looked at from a distance, Hull's endeavour appears rather sterile and premature.

Another prominent figure among neo-behaviourists was Tolman, whose name and work we shall meet again. Tolman is rightly considered to be one of the fathers of modern cognitivism. His main book, significantly entitled *Purposive behavior in animals and men* (1932), dealt with a crucial and difficult problem in scientific psychology: namely the organisation and anticipation of action towards an end. He also discovered that animals interacting freely with their environment in the absence of any biological need, such as hunger or thirst, would eventually learn something about it. As the situation in which he discovered this was the then familiar maze for rats, he suggested that his subjects built a *cognitive map*, obviously an ancestor of the internal representations of cognitive psychology. We shall comment further on that later on.

Skinner, the youngest of these second-generation behaviourists, and different enough from all of them not to be included among neo-behaviourists, took a totally distinct stand. On the one hand, he remained much more strictly attached to the essential tenets of Watson's conception. On the other, he moved away from Watson much more basically than the neo-behaviourists and elaborated his genuine brand of behavioural psychology. As we have seen, he called himself a radical behaviourist. As we shall progress, we shall grasp what this means. At this stage, a few landmarks might be useful to characterise the commonalities between the various brands of behaviourism, and to point to crucial issues about which Skinner developed original views.

For a behaviourist, psychology cannot claim scientific status if it does not take, as its subject matter, events that can be observed with methods in use in other natural sciences. Its task is to identify the variables of which these observable events are a function. This view had many opponents, because it appeared to reduce the realm of psychology to motor acts directly accessible to an observer and to leave out of account the innumerable internal events which each human individual knows to take place inside himself. This is seriously mistaking the basic methodological principle of behaviourism. Behaviourism does not deny the existence of internal events. But on the one hand, it denies the subject's capacity to give a scientific account of them (in that respect, it is close to Freud's or Janet's view); on the other, it denies that internal mental events have an essentially different status from behaviours easily observed from outside. The problem of psychology is to make them accessible for analysis—a problem encountered by any science—and to treat them as behaviour proper, rather than as the inferred and unverifiable sources of behaviour.

Antimentalism, a central theme in Skinner's thinking, is not a denial of mental events, but a refusal to resort to them as explanatory entities. A classical example will help in understanding the arguments for that position. Common sense tends to attribute an act to some causal internal source, often conceived of as a need

or drive. It sounds fairly correct to invoke hunger when an animal or a human being is eating or searching for food. It is tempting to extend the same explanation when someone is engaging in aggressive action, attributed to some aggression drive; when someone imitates another person, because of a need for imitation; or when a few individuals get together, because of their common need for affiliation. We are left with the task of explaining the need and soon discover that we have only placed the problem a bit further back. Scientific psychology was plagued with such "explanatory fictions" by the time Skinner started his reflection on mentalism, and developed his concept of reinforcement (which testifies that behaviourism was never quite as dominant as is often said). As he emphasised, the objection is not that these things are mental, but that they stop all further attempt to explain. Reading current psychological literature shows that the problem is still with us. Its resurgence in scientific psychology is linked with the rise of cognitivism, and there is no doubt that the status of mental events in psychological descriptions and explanations must be examined now in a far more subtle way than was the case 40 years ago. It is clear, however, that Skinner's attitude towards cognitivism is rooted in his traditional view of mentalism. We shall have to deal with that issue in some detail later, since it is, indeed, one of the central epistemological problems psychologists have to face.

Another much debated point about behaviourism is *environmentalism*. Behaviour would be said to find its explanation in the action of the environment upon the passive organism. It is true that behaviourists have shown systematic interest in the role of the environment. This should cause no surprise since, after all, psychology is concerned with the relation between an organism and its surroundings. It seems difficult to think of psychologists who would not, in some way or another, try to understand that interaction. However, they have various views on that matter. Some of them insist on innate endowment, that defines beforehand what part the environment will play in an organism's history; they see it as merely revealing pre-wired potentialities. This was the position taken by Lorenz, at least in his early work on animal behaviour. Others emphasise the organisation of the individual, i.e. the structure of the individual's intelligence, personality, unconscious, mind, and so forth, with no explicit reference to the environment. Structuralist schools of thought, which were so successful in human and social sciences in the 1960s, pertain to that category, as did a number of classical approaches in psychology much earlier. Others, like Piaget, look at the subject acting upon the environment, eventually failing to master it, then getting some feedback from it that enables him to correct his action, in a sort of dialectic interchange. This is typically the interactionist view.

Still others give the main role to the environment. It is conceived of as mechanically provoking the reactions of the organism, that is activated from outside, as a puppet with no genetic memory, no structure, no will. This view is supposedly typical of so-called *stimulus-response* (S-R) psychologies, which in turn are often identified with behaviourism. I shall not discuss here the question