

breakdown in religious; the excessive physical demands of combining religious life and professional work. There could be raised eyebrows at the Sister who called her superior 'a big fat slob'. There should be knowing looks at Dr McAllister's warnings about 'the summer school romance'. Not all convents will install a punch-bag as Dr McAllister suggests. Perhaps, instead, Dr McAllister's book will become the

punch-bag!

Though Dr McAllister's book speaks mainly of female religious communities, it speaks to both sexes. From this lay doctor, bishops and priests may gain new understanding of themselves. They will certainly gain more realistic understanding of nuns. This would be a long-overdue advance on male domination of them.

DENIS RICE

**CONTEMPORARY SCIENCE AND RATIONALISM**, by Robert Blanché, translated by I. A. G. Le Beck. *Oliver and Boyd*, Edinburgh, 1968. 92 pp. 7s. 6d.

Everyday life, for want of a better phrase, is characterized physically by the experience of very small speeds—small compared with the speed of light, which is about 200,000 miles per second; and of distances which are enormous compared with the size of an atom (about 1/100,000,000th of one inch) and minute compared with the radius of (say) the Galaxy (about 100,000,000,000,000 miles). These sobering facts have, hardly surprisingly, forced on man a revision of the concepts he used to understand the world, when once that world became so much enlarged. The laws of physics which successfully describe phenomena at very great speeds, or over very small or very large distances, rely on ideas which are foreign to our intuitive, everyday ideas.

The years 1900–1930 saw these revolutions in physics, revolutions made possible by the use of greatly refined experimental techniques. The results of experiments involving speeds comparable with the speed of light were unaccountable for by nineteenth-century physics, and to account for them Einstein introduced a new theory of relative speeds involving a new strange conception of space and time. Observations on the atom until 1925 were also baffling to the understanding, and the combined efforts of now famous men resulted in a quantum theory to account for the experimental findings. This theory involved notions of discontinuity (energy exists in indivisible 'packets') and uncertainty; Heisenberg's Uncertainty Principle states that it is not possible to measure, simultaneously, certain pairs of coordinates with arbitrary accuracy. Finally, when considering the universe as a whole, we must revise our ideas of geometry. For example, the shortest path between two points is physically the path that light would follow. But over large tracts of space, light does *not* follow a straight line, so any physically useful geometry must to this extent be non-

Euclidean, and allow for such a 'curvature' of space naturally.

Professor Blanché describes these changes in theoretical physics in two of the three large chapters. Under 'The Coordination of Phenomena' he concentrates on the changes in our notions of space and time brought about by Einstein's two theories of relativity, the special theory for large speeds, and the general theory for gravitation and the universe at large. He has an enviable and deep understanding of these theories. The exposition is compact and lucid, and results in beautiful succinct statements. For example, he observes that absolute space and absolute time imply relativity of speed, and that Einstein's achievement was that in insisting on the *absolute* nature of the speed of light, he insisted also on the relative nature of space and time. This is an excellent way to teach relativity, but it requires concentration to follow. Generalized curved space is treated in the same way, and emphasis laid, quite correctly, on the revision of ideas that was going on in pure geometry at the time that Einstein was inventing his general theory. It was this that made possible Einstein's utilization of the intellectualization of the notion of space, and its detachment from geometrical intuition.

The next chapter, 'The Constitution of Experience', is devoted to a study of the paradoxes of quantum mechanics. This is a vexingly difficult subject, and is ground well trodden by cranks and bad philosophers of science. While it is clear that Professor Blanché is a philosopher, he must be greatly admired again for his understanding of the physics, which I at any rate cannot fault. The author characterizes one of the two paradoxes as the setting up of statistical, rather than deterministic, laws as basic laws on the microscopic level. This is good and true, because, as he says, the *probability* of an event on the atomic scale is completely determined, so there still is a place for deter-

minism—it's just intuitively a rather weird place. The second paradox is called 'the principle of permanence and the vanishing of substance' and at this point it seems to me that Professor Blanché's paradox is almost whipped up artificially. He appears to get carried away by the lack of conservation of mass and energy (no 'principle of permanence'), though he is not really comforted that rest-mass is absolutely conserved; and by the fact that 'the atom can only be symbolized by a partial differential equation in an abstract multi-dimensional space. . . . No material property whatever is ascribable to it' (Heisenberg). But perhaps it is just that comparative familiarity has blinded me to the essentially paradoxical nature of these things.

After these chapters the scene is set for the consideration in 'The Regulation of Thought' of how far logical principles have really been

assailed, not only by the theoretical physics described in the previous chapters, but by modern pure mathematics and formal logic. The conclusion is that it is actually reason (and not empiricism) that has seen man through these upheavals, but that reason is not what we thought it was. Logical principles are no longer devoid of content, they are dependent in a fundamental way on their context. There is a very interesting and informed tour of modern speculative mathematics and formal logic, of for instance the law of the excluded middle in mathematics and of the plurality of logics—but the unity of reason.

What distinguishes this excellent book most is the judgment of the author—not a quality shared by many philosophers of science, but a quality which gives this book great vigour.

LEWIS RYDER

**NAKED APE OR HOMO SAPIENS? A REPLY TO DESMOND MORRIS**, by John Lewis and Bernard Towers. *Garnstone Press*, London, 1969. 134 pp. 21s.; paper covers 8s. 6d.

Anyone who has been taught to admire the scientist for his objectivity and emotional detachment in the pursuit of truth, for his humble subservience to the facts and his willingness to abandon theories at the slightest whiff of contradictory evidence, would do well to explore the literature of the rapidly developing science of human behaviour, among which must now be numbered *Naked Ape or Homo Sapiens?*. Even a cursory examination of this literature will reveal that the scientific process is much less logical, mechanical, and fact-bound, and much more imaginative and personal than is commonly supposed; it will reveal also that scientific controversy, far from being the austere, dispassionate dialogue of popular belief, is, in reality, as lively, passionate, and clouded by prejudice, as any other kind of controversy. As Michael Polanyi remarks in his great work *Personal Knowledge*, conflicts in science very often do not appear as scientific arguments at all, but as conflicts between rival scientific visions.

*Naked Ape or Homo Sapiens?* is a good illustration of this point, for it presents, not a scientific argument about man, but a philosophical and scientific vision of human nature. Unashamedly one-sided, intensely passionate, its visionary preconceptions quite ineffectively disguised by a veneer of scientific objectivity, the book spiritedly condemns the views of a number of contemporary writers as scientific-

ally 'pseudo' and philosophically subversive, and offers in their place the magnificent Teilhardian vision of man as a 'refutation' of the trio of intellectual evils that the writings of Desmond Morris and others are thought to represent—'Pseudo-science' ('naked apery', man is a 'beast of prey', etc.), Reductionism (the philosophy of 'nothing buttery'), and Pessimism (a spirituality of hopelessness and despair). All three of these contemporary intellectual fashions are eminently deserving of refutation, and John Lewis and Bernard Towers claim to show how they can be refuted 'in the name of science, in the name of truth'. In the event, what does their offensive amount to?

Regrettably, it amounts to very little, because the tactics employed are, with one notable and valuable exception (Chapter Two), mismanaged. Passionate commitment is an essential ingredient of the scientific process, but it can never be a justification for confused argument, personal abuse, bad science, bad philosophy, or for the misrepresentation of an opponent's beliefs, and it is principally in these respects that *Naked Ape or Homo Sapiens?* must be judged both unsound and unprofessional.

No doubt the difficulties of joint authorship are partly responsible for the disappointing quality of this book. Certainly, the very different philosophical backgrounds of the two authors (Marxist and Christian respectively)