

although there are now enthusiasts in America convinced that a new generation of steam cars can seize back the initiative from the internal combustion engine.

It would, however, be wrong to give the impression that Anthony Bird is interested only in the story of the steam carriage. His book is much more than that. It provides a complete and compelling history of transportation on British roads between the coming of wheeled transport and 1910. It deals with both the legislative and practical side of road-building (how much the Industrial Revolution owed to Telford and Macadam!) and also with the vehicles which made their slow and painful way across the country. The coming of the mail coach service, which combined for the first time scrupulous honesty and a clockwork regularity, marked a turning point in British social history, and Anthony Bird recognizes it. The coming of the omnibus to London was, in its way, almost as important a landmark, and it gets full and perceptive treatment. Although Anthony Bird is a motoring historian, he is not one of those who believe that history began with the horseless carriage, and his treatment of the social implications of the motor car is particularly valuable. People who complain that the cost of motoring has become an intolerable burden can be consoled by the thought of what the early motorist had to pay; tyres alone cost one bus operator tenpence a mile.

Transport is a subject of crucial importance, worthy of much better treatment in print than it usually gets; in this book Anthony Bird fully rises to the challenge. Longmans have provided excellent illustrations, and have got their "Industrial Archaeology" series off to a splendid start.

NIGEL HAWKES

ARE WE ALONE?

Persons

A Study of Possible Moral Agents in the Universe. By Roland Puccetti. Pp. 145. (Macmillan: London, November 1968.) 50s.

"ANY discussion of persons should begin with human persons, the ones we know best. Whether it has to end there is the subject of this chapter; where it has to end is the subject of this book". So begins *Persons*, a philosopher's romp through the fields of astrophysics, biochemistry, ethology and the law. Roland Puccetti, professor of philosophy at Singapore, is on the lookout for non-human persons. True to his trade, he spends his first chapter deciding what a person is, and concludes that it is a feeling and thinking moral agent. This may not seem a very startling opinion, but Puccetti is persuasive about its virtues—unlike some previous formulations it includes gods while excluding dogs.

He then passes on to what is the meat of the book: a survey of three popular candidates for the role of moral agent—supercomputer, organic Frankenstein, and life on other planets. Puccetti rules out the first in an interesting way. He argues that computers will never be persons because they are not products of biological evolution. Pain, joy, sorrow, and all the other apparatus of feeling have logic only in the context of the struggle for survival implicit in growth and evolution: it is inconceivable, says Puccetti, that a machine put together by man could lay claim to them. And, of course, by Puccetti's criterion, without feelings they cannot be persons.

This argument is original, but is it so final? Puccetti may be right when he relates feeling to struggle and growth—it is no more than the message of Goethe's *Faust*—but why should struggle and growth for ever be denied to computers? Perhaps growth is incompatible with dry transistors and capacitors. Then make computers with wet components, with phospholipids and salty gels. This will be possible one day, and there seems no reason to deny such contrivances the possibility of feeling. Learning

programmes already grow in a non-trivial sense within traditional machines, and a wet computer might have powers of growth quite as rich as biological systems.

In a deeper sense, Puccetti seems to underplay the dialectic that is already taking place between man and his technologies, memorably expressed in McLuhan's dictum "Man is the sex organ of the machine". After all, man's most sophisticated machines are in some ways just as much products of evolution as man himself. As for organic artefacts, the Frankensteins, Puccetti contents himself with saying that they will not exist in the foreseeable future, and so they pose no problems.

Puccetti moves into much higher gear when he considers extraterrestrial persons. He handles the whole nexus of questions with dazzling ease. How many hospitable planets are there? What type of creatures will evolve on them? Can we visit or communicate with these creatures? Will they want to visit or communicate with us? What kind of personal relations might we have with them? Puccetti works a brilliant synthesis of ideas in this part of his book: there is little a reviewer can do except recommend it.

One thing Puccetti will not do is put science fiction writers out of business. The creatures he describes as inevitable outcomes of carbon and water evolution are all homiothermic, moralistic, technologically minded bipeds—they sound depressingly like White Anglo-Saxon Protestants. We may never meet them; it sounds a small loss. But, Puccetti argues, it should be a comfort of sorts for the earthbound humanist that he almost certainly has intelligent companions in the universe.

NICHOLAS EVANS

LITERARY ASTRONOMY

The High Firmament

A Survey of Astronomy in English Literature. By A. J. Meadows. Pp. x+207. (Leicester University Press: Leicester, January 1969.) 42s.

"WHEN I sitting heard the astronomer where he lectured with much applause in the lecture-room,—How unaccountable I became tired and sick": with these words, written by Walt Whitman in 1865, the author of this most attractive and much needed new book, using them as a "motto", leads his readers into a very positive astronomical world.

Nevertheless, we should take these words as a picturesque warning not to overrate intellectual achievement at the expense of the emotional impact of the starry firmament on those who even in our technological age are still able fully to "experience" the sky. After all, this is how Walt Whitman continues his poem beyond Meadows's quotation: ". . . Till rising and gliding out I wander'd off by myself,—In the mystical moist night-air, and from time to time,—Look'd up in perfect silence at the stars". It was just seventy years earlier, in 1796, that the German poet Friedrich von Schiller cried out despairingly in his four-line address: "An die Astronomen:—Schwatzet mir nicht soviel von Nebelflecken und Sonnen;—Ist die Natur nur gross, weil sie zu zählen Euch gibt?—Euer Gegenstand ist der erhabenste freilich im Raume;—Aber Freunde, im Raum wohnt das Erhabene nicht".

A. J. Meadows has the great merit of having unearthed from the realms of English literature a multitude of apt quotations and literary allusions, covering a range of some five hundred years up to 1900. In his lively manner he examines the ways in which scientific trends are reflected in non-scientific literature. He emphasizes that, on the one hand, because the scientific outlook has changed so fundamentally in recent centuries, "unless a special analysis is made many literary references become incomprehensible to a modern reader"; and, on the other