

STOCHASTIC MODELS FOR SOCIAL PROCESSES, by D. J. Bartholomew. *John Wiley and Sons*. 60s.

The book under review is highly specialized, but it seemed to me to be an example of the sort of work that could be made to show how very abstruse mathematical techniques can have philosophical implications that concern us all.

D. J. Bartholomew is Professor of Statistics at the University of Kent at Canterbury. He has systematically applied a particular branch of statistics ('Stochastic Processes') to various groups in society and the relations between them.

Social science is a misnomer. Though it implies precise and mathematical techniques, it is still fumbling in the dark. One could ask any econometrician, economist, mathematical sociologist or even demographer whether he was entirely happy about his work and the answer would be an emphatic No! What he would say, and this is crucial, is that he is building a 'model'.

A model is a picture; it represents the world, though a considerably simplified version of the world as we know it. It is 'laid against reality like a ruler' (Wittgenstein). The econometrician would hold many variables constant; the economist would mutter something about *ceteris paribus*; the mathematical sociologist would doubt whether his assumptions were correct and the demographer would say: 'Well, I'm only dealing with population—not people.' A model, however, can be a very precise thing, as we shall see later.

Even from this, therefore, it begins to become clear that any model has its strictly rigorous part and its questionable part. As Professor Bartholomew put it: If 'our model provides an adequate description of actual societies then their future development depends only on their *initial structure* and the transition matrix' (my italics). This very loosely means that the future to some extent depends upon the past, to a much greater degree than we perhaps thought.

But only 'If'. A model contains several things, which we indiscriminately call assumptions, axioms, postulates or hypotheses. These are juggled about by the statisticians and mathematicians and results are derived. But the internal logical structure of models, their calculus or logic, is one matter; whilst their assumptions, axioms, postulates another, and these we can challenge if we find the results a bit much to swallow. Which is where the non-specialist rejoins the specialist. For it is the results that we lay against reality like a ruler,

and any inadequacy may be due as much to the initial assumptions as to a flaw in the calculus. And this remains true even though a stochastic model is one where our assumptions are not of the form: such and such is always the case, but: such and such is always the case 90 per cent of the time. A stochastic process is a system (people, engines, ants, a person, economics, societies, hospitals, armies, churches, etc.) moving from state A to state B or state C with differing probabilities of getting from state A to B; from state A to C; or remaining in state A. The concept is simple and applies to many different systems—crowd behaviour, queues, growth of membership in clubs, movements of people from one class to another, from one job to another, from one city to another, etc.

Hence the use of maths need not be a shibboleth for the layman. It pertains essentially to the aspect of the *calculus* and not that of the *initial assumptions* of the model, its configuring form as it were. The use of maths does not preclude choice. This much is fundamental. One hears things like 'the brutality of measurement', and 'social determinism'. These are two separate issues and I would like to deal with both.

Measurement is merely a generalization of the notion of a relation—John is taller than Jane. Measurement is a question of *ordering* things—whether this involves counting them and putting them in an arbitrary order or measuring attributes of them along a precisely defined scale, as is used in psychology to achieve analyses of personality. The 'brutality' of measurement is no brutality at all, since it *either* deals with people as aggregates, i.e. concepts, or as bundles of roles. In the final analysis, what we do, act, say, cogitate, buy, eat, marry, etc., we do in different roles. No social science has yet emerged which can treat people as anything other than aggregates of something. And no social science ever will.

As to the question of choice. As Professor Bartholomew puts it, we can always say something has changed, we are always hard pressed to account for it in terms of other, previous changes. It is self-evident that we, or movements we engage in, are not pre-determined. Man is a free, rational being, as existentialists have maintained. However, this does not prevent us from saying that some things are more likely to occur than others. This is where statistics comes in. Rationality does not pre-suppose determinism. And statis-

tics is precisely the discipline that comes to terms with the sheep and the goats.

It makes sense to say that the priest will be less likely to be involved in a pub brawl, whilst a psychotic is more likely to fight. One does not say to a student: You will fail; one gives him the odds.

The time has come for a few technicalities. *Very loosely* Professor Bartholomew's book, for a large part, assumes we know the probabilities of going from one state to another over time. Such an assumption allows us to see whether, for instance, labour turnover will stabilize, how many people will hear a news item, and whether expanding business organizations will become top heavy. (In expanding organizations such as large business firms, any factor that introduces different lengths of service whilst on the average the length of service is kept constant 'is likely to increase the size of the higher grades at the expense of the lower'.)

The problem Professor Bartholomew faced is the notorious problem of induction. There are no real grounds for supposing that the sun will rise tomorrow. By an *act of faith*, which all scientists must make and stick to if they want to find the proof of the pudding in the eating, they believe in induction—that we can generalize from a small sample to a large population.

(Here the past rising of the sun is the small sample and the total number of times the sun rises is the large population—these are just statisticians' slang.)

In the light of this attempt to discriminate between the part of the specialist where his speciality must be respected and the part where he can be challenged, we are in a better position to consider what to my mind is the most fascinating result of the whole book, namely that 'the attainment of equal promotion prospects is an impossible goal in [a type of organization found in many business firms]'. I hope Professor Bartholomew will forgive me for my naive generalization of his cautious and, to my mind, over-modest claims! But is there something intrinsic, something essential, in the nature of human society that creates class divisions, stratifications, and inequality, say, of opportunity? I just don't know.

This is a very important book; it is also a very difficult book. Professor Bartholomew has compassionately italicized the key results he obtains in non-numerate language. I can only recommend, as a non-mathematical introduction, the first chapter of Karl Popper's *The Logic of Scientific Discovery* and the last chapter of R. Harré's *Theories and Things*.

NICHOLAS LAFITTE

IGNATIUS THE THEOLOGIAN, by Hugo Rahner, S.J., translated by Michael Barry. *Geoffrey Chapman*, 238 pp. 35s.

In what sense can Ignatius of Loyola be properly called a theologian? Despite the uneasy spectre of Stephen D., a great many would agree with the sixteenth-century Dr Bartholomé Torres: 'As God is my witness, for thirty years I have been studying and teaching theology, yet in the whole of this time I have not made such progress as during the few short days of the *Spiritual Exercises*.' Now, although Ignatius followed a course of scholastic theology as a mature and very serious student in Paris, it can hardly be for this that we look to him for enrichment. Elements of that learning appear systematically in the *Exercises* and his other writings, but with no great originality of expression. With Ignatius 'we do our theology on our knees' and find inspiration in a few fundamental insights leading to action, culled from the living experience of the man, the experience of a true mystic, long before he commenced formal theological training. Anyone who reads the narrative sources of Ignatius' life, his voluminous correspondence or his remarkable *Spiritual Diary*, will be struck by

the highly personal and unified vision of the faith by which he lived. 'I beheld, sensed within myself and penetrated in spirit all the mysteries of the Christian faith', he says with characteristic boldness and restraint. Ignatius was no poet, he invariably expresses himself baldly, often obscurely, especially in those strange trinitarian visions which appear so prosaic yet are vital to an interpretation of the saint. We need a guide. So an examination of Ignatius's basic theological principles by such a master as Fr Hugo Rahner is to be welcomed in English translation. It is part of a longer study published in German in 1964.

From a careful analysis of the sources and the fruits of recent Ignatian scholarship, Fr Rahner sketches out a vision strung in a fine balance between tensions that are very relevant to the Church today: tensions between the urging of individual charism and obedience to hierarchical authority; between the vital importance of personal experience and a profound respect for traditional guides; between the sovereign claim of grace and human