

time distribution. A 'simple' stream is defined to be one which displays stationariness, absence of after-effects, and orderliness; that is, the probability of k arrivals in any interval of time depends only on the length of the interval, and not on any arrivals before the start of the interval, and there cannot be two or more arrivals at the same instant. The theory of the simple stream is developed, and then extended by relaxing one or more of the conditions just stated. In particular, some properties of the stream without orderliness are obtained, and streams with limited after-effects are investigated.

In Parts 2 and 3 problems of service are considered. In a queueing system with several lines of service (in parallel) a customer on arrival may find that there is no service immediately available. He may wait until service is available, or may leave the line without waiting. In the former case one speaks of a "system allowing delay", in the latter case of a "system with loss". It is perhaps worth pointing out that Chapter 11 (the last) presents the general theory of a single-line system with an arbitrary service-time distribution. The distribution function for the waiting time is found in principle by a fairly simple method. The contents of the chapter are taken from a paper by the author, published in 1932, and present material which will be new to many readers.

The theory of queues has undergone considerable development in recent years. Some mathematicians think the development has gone too far. Whether this is so or not the book under review will serve to show that the phenomenon of queueing represents another human experience which has bowed to the forces of applied mathematics; the concepts that have been built around this experience have proved to be of the right kind, and sufficient in number, for the mathematical development to go 'with a bang'. Anyone who is in doubt as to whether applied mathematics is a living subject will find it rewarding and reassuring to read this book.

L. S. GODDARD

ARCHAEOLOGY OF OLD SMYRNA

The Annual of the British School at Athens
Nos. 53-54, 1958-1959. Pp. xii+312+74 plates.
(London: The British School at Athens, 1960.)
105s. net.

WITH this number begins the serious publication of Old Smyrna, dug some ten years ago. Most of the articles on other subjects, to take these first, are also rather austere. Sinclair Hood and Piet de Jong describe a Minoan kitchen, Sinclair Hood, G. Huxley and N. Sandars a cemetery of the Late Minoan III Period, both near Knossos. Analysis of amber beads leaves their provenance uncertain. J. Leatham and Sinclair Hood describe some submarine work on sunken fish-ponds and harbours; work which, like the Mycenaean boat off Lycia, confirms that at present diving offers the bleakest prospects in archaeology. R. Hope Simpson finds the rag of a Mycenaean settlement near Menidi, in Attica. J. M. C. Toynbee describes four interesting Roman portraits, dating from the Claudian to the Decian Period, in the Piræus Museum; and John Boardman describes a farmhouse inhabited about

450-350 B.C. at Pindakas in Chios, a site remarkable chiefly for a coin-hoard of about 350 B.C. Boardman has interesting things to say about the first-named 'magistrates' issues of Chios, and about her earliest bronze coins, which he would date about 375 B.C.

J. M. Cook introduces Old Smyrna in a topographical and historical résumé—a model of masterly brevity badly needed in this volume. The settlement at the north-east end of the Gulf goes back to Protogeometric times. "Aeolic" at first, it had become Ionic by about 800 B.C., which might agree with the story of its seizure by Colophon. The eighth century was the era of rounded houses. An earthquake about 700 B.C. destroyed the walls, which were not immediately replaced, while the new houses were rectangular. About 600 B.C., when a new wall had scarcely been finished, a new temple only begun, the Lydian Alyattes raised a siege-mound (still surviving, to the north-west) and took the city. After that, though quite densely inhabited by the fourth century, Old Smyrna never recovered its status, and was deserted for the present site before 300 B.C. J. K. Anderson, who describes the Corinthian pottery found, shows that Alyattes sacked the town well before the Early Corinthian style had run its course. Prof. Cook finds space for a mass of topographical information, subsidiary but never irrelevant.

John Boardman describes the Attic vases, some from good workshops. But the core of this instalment is an extremely painstaking hundred pages, by R. V. Nicholls, on the City Walls. The illustrations, through all their intricacies, maintain a high level of scientific exactitude and consistency; although even Mr. Nicholls grows weary in time of using all the symbols and *sigla* recommended by Sir Mortimer Wheeler, and finds (for example, in Figs. 7 and 10) that he can simplify with advantage. Somewhere in the text are many excellent points; for example, that the mound to the south-east of Gordium could also be a siege-mound, that the staked ditch of Iliad XII is more likely to be Iron Age than Bronze Age, that the step on the inner face of our Walls 2 and 3 might have supported a wall-plate to drain the walls' *chemi-de-ronde*, and that mud-bricks in the mid-seventh century changed to a size and shape more suitable for the new two-storey houses. It is, alas, typical that this last sensible conclusion should be mixed up with pages of metrological discussion (Nicholls believes, prematurely I feel, that only two constant lengths of foot existed and are known for the Classical Period.) These reach no firmer conclusions than one might expect, and lead by the way (p. 105) to such things as single bricks with dimensions on conflicting scales. Even Le Corbusier has not got to that. On important matters, like the arrival in the Greek World of the true arch, the citation of authorities seems most one-sided. For all its acuteness, the article is almost impossible to read. Page after page, one has to endure sentences like this: "The brick dimensions quoted on p. 101 are also of great interest in this regard, notwithstanding that it is not always possible to evaluate the different degrees of reliability with which they have been taken". Mr. Nicholls evidently knows his Herodotus and Homer. Yet, as stylists, they must mean nothing to him. Similarly, modern Athens has the most wonderful museums in the world, and the ugliest streets. Humanity, in its own home, has been sterilized.

HUGH PLOMMER