is more complete, starting from the scattering by a single electron and proceeding to atom, to molecule and thence to assemblies of molecules. This strictly formal approach permeates the whole book, which is an impressive achievement from the mathematical physicist's point of view. The style may appeal less to some investigators than the broader approach to be found elsewhere. The diagrams, so important in this subject which deals with three-dimensional structures, are on the whole good, though some are not as clear as they might be because the elementary trick of breaking a line where it passes behind another line has not always been used. The X-ray diffraction photographs suffer by being printed on the same paper as the text; some are very poor.

The analysis of the structure of well organized crystalline regions receives little attention; although this makes the book less complete than its title implies, the omission is justified on the ground that this aspect is, on the whole, standard X-ray crystallography which is well covered in other books.

This book would be the choice, if they can afford it, of those who like a formal academic approach to the problems of semi-ordered structures.

C. W. BUNN

Laser Beams in Plasma

Laser Interaction and Related Plasma Phenomena. Edited by Helmut J. Schwarz and Heinrich Hora. Volume 2. Pp. xiv+583. (Plenum: New York and London, 1972.) $32.

INTENSE interest in laser fusion has been aroused recently by the declassification of some American work on the subject (*Nature*, **239**, 129; 1972). This work showed theoretically the feasibility of using laser beams to heat and compress matter to temperatures of the order 10^8 K and densities ten thousand times that of the initial solid state.

This book, dealing as it does with many of the key questions relating to laser fusion, is thus published at a very opportune time and is likely to be a best-seller. It is essentially the edited proceedings of the "Second Workshop" on the subject of laser interactions held at Rensselaer, Connecticut, in September 1971. There are thirty-eight research papers and some account of the apparently very abbreviated discussions which took place. Most of the material in these papers is now in the published literature, but it is nevertheless extremely useful to have it in a single book. Naturally the papers vary in standard and importance and the book would have benefited if some attempt had been made to show how the various aspects fit together in a summary article.

The papers are grouped in sections; in the first section on high intensity lasers there are two good papers by Beaulieu and de Maria on CO_2 lasers. But the rapid rate of progress in this field shows up here—there is, for example, no discussion of the new technique of electron beam excitation. There are half a dozen papers in the section on laser-induced breakdown, and the reader will no doubt be intrigued to discover that there is still no definitive answer to the question, "Where does the first electron come from?" In the section on diagnostics Kronast gives a good account of light-scattering experiments including a description of ways in which some more recent high resolution experiments show departures from the accepted theory.

Five papers make up the section on the interaction of laser plasmas with gases and magnetic fields. Probably the most fascinating is the account by Stamper of the spontaneous generation of magnetic fields in laser produced plasmas. A further five papers comprise the section which gives the book its title; that is, they deal with the interaction of laser light with plasma. This is possibly the most critical part of the laser fusion proposal because there is the danger that in the absence of non-classical processes the major fraction of the incoming laser light will simply be reflected. It is noteworthy that all the papers in this section are theoretical. Many of the possible non-linear absorption mechanisms are discussed here, although once again this is a subject on which new papers are appearing every week. Finally there is a section on fusion neutrons from laser-produced plasmas. This contains accounts of the much-publicized experiments in France, USSR, USA, Japan and Germany in which fusion neutrons have been detected.

In summary this book can give the near-specialist reader a very good feel for the state of the art in this subject as of late 1971.

R. J. BICKERTON

Information Diffusion

Invisible Colleges: Diffusion of Knowledge in Scientific Communities. By Diana Crane. Pp. x+213. (University of Chicago: London and Chicago, 1972.) £4.05.

ALTHOUGH half a dozen generations have passed since it was postulated that the proper study of mankind was man, the history of science increasingly supports the postulate. Darwin placed man firmly in the animal kingdom; Freud penetrated the recesses of his motivation; tomorrow we may spell out his genius in terms of atoms and molecules. But it is only in our generation that it was realized that man might not only look at himself through the eyes of science but that he might also look in the same way at science itself.

For two centuries science and society have interacted to give us technological man but only as we seem to approach the eleventh hour are questions being asked about the *modus operandi* of scientists. These two centuries saw science evolve from being the hobby of a few score gifted amateurs into a force subvented at a cost running into thousands of millions of pounds. Many questions have been asked about this activity since Bernal and Crowther concerned themselves with the social function and relations of science.

In her book *Invisible Colleges* Professor Diana Crane, a sociologist at Johns Hopkins, has addressed herself to one of them: how is scientific knowledge generated, and how does it diffuse? The question may seem naïve but her sociometric analysis shows that an answer to the apparently simple cannot be found at the drop of a hat.

Professor Crane selected two disciplines, mathematics and rural sociology, for her studies. This may seem idiosyncratic but lacking evidence from harder sciences—say, nuclear physics or molecular biology—there is no reason to question extrapolation to these areas. Her deduction is that the social organism that promotes the expansion of knowledge is, what she calls, "the invisible college", a côterie of researchers in contact though not necessarily working together, who exercise a measure of control on the expansion of knowledge in their speciality.

The growth of science has been deemed to follow a logistic curve: a slow start, exponential expansion followed by linearity, and then, as the new knowledge is absorbed into the body of science as a whole, a final stage of stagnation or even decline. Translated into human terms this means that a small but exciting nexus sets the pace, new blood is attracted and the field is set for exponential growth both in participants and publications. Extensive and intensive activity reaps its harvest and ultimately gives way to another up-and-coming region of endeavour.

We still have a long way to go before we fully understand the social institutions that produce ideas, be they in science or the arts. Professor Crane's significant and quantitative contribution to the subject reveals the ramifications of one—her invisible colleges. Readers in a hurry will appreciate the summaries at the end of most chapters which present the wood rather than the trees, but the quick synoptic vision will only partially sweeten the pill of having to pay more than £4 for somewhat less than 150 pages of text material.

ARCHIE CLOW