Note first how taking success in a business bureaucracy as their sole model of success in science leads them to interpret scientific recognition:

> Recognition in science is the functional equivalent to property; and the right to "recognition" is indeed an inalienable one for scientists [p. 45].

> The scientist who is located at Harvard or Brookhaven, who is the head of the National Science Foundation, who has won a Nobel prize, or whose life work has made a wide impact on his field, is a "rich" man in science. He has property. Correlatively, the scientist who has not been widely honored, who is located at a small, relatively unknown college, has little property [p. 46].

This sort of analogy may be useful for some purposes, but note its result when combined with a standard assumption of politically conservative functionalists—that property accumulation adequately indicates the value to a society of its various socioeconomic strata. Applied to science, this assumption allows one to conclude that citations, as the most tangible indicator of scientists' "property accumulation," adequately indicate the value to science of its various sorts of members. And, just as the most conservative political observers are ready to assume that social strata receiving little or no income are *ipso facto* of little or no value to their society (and hence deserving of little or no public support), conservatively oriented observers of science might conclude that scientists receiving very few citings are of little or no value to science. Whether in the Coles' case it is because of some political inclination or not, they reason in precisely this fashion, concluding that citation data make it reasonable to suppose that the somewhat over half of all research physicists who are rarely cited could be eliminated with no loss to the development of knowledge or opinion in physics.

An alternative model of how scientists' opinions are formed is well developed in the works of Kuhn and Ziman, and especially in the interesting sociological elaboration of Kuhn's work by Crane (*3*). These authors assume that influence in science is transmitted through something basically analogous to informal group interaction, but which includes remote contacts through publications and through other colleagues' conversation, as well as through face-to-face interaction. With this sort of model of scientific influence available as an alternative to "property accumulation," it seems to me that only a really doctrinaire sort of functionalism could ever lead one to reason as though citations tell the entire story of the influences on scientific opinion formation.

Despite the problems growing out of the Coles' sometimes rigid functionalism, however, it should be noted that their book contains a great deal of painstakingly collected data, and it will be unfortunate if its faults cause it to be ignored by social scientists concerned with understanding science's social organization or with extending key attributes of this organization to other parts of society.

Jerry Gaston's book is less ambitious than the Coles', in that it does not pursue any one aspect of science's organization quite so thoroughly. But to a nonphysicist it conveys a much stronger sense of what one community of physicists may actually be like. Gaston interviewed and surveyed a good sample of British high energy physicists, and rather artfully explains the many subtle forms of status, competition, and cooperation that obtain among them, separating and allying abstract, intermediate, and phenomenological theorists, bubble chamber and counterspark experimentalists, scientists located at Oxbridge, Redbrick, and Scottish universities, and so on. The book is exceptionally well written and contains good, refreshingly brief summaries of much of the preceding work in the field. Some of Gaston's most interesting analyses deal with the effect of the centralized British system of funding science, as compared with the more decentralized American system, and with the effects that experimentalists' need for large organizational efforts has on increasing the importance of administrators among them and in causing them to concentrate on "news" in scientific papers rather than on detailed analyses. Gaston reports a number of original survey results, but the book is more interesting for its explanations of what underlies these results. As Ziman's introduction indicates, Gaston's work is perhaps better seen as a kind of anthropology of physicists than as a purely sociological treatment.

In sum: two useful books—about physicists, and possibly about a good deal more.

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References and Notes

1. An example of the Coles' insensitivity to such questions shows in their several comparisons between physics and sociology. They are aware that physics journals accept approximately 85 percent of everything submitted to them, while sociology journals typically reject almost that percentage. But in several mentions of how little conflict there seems to be between established elites and other scientists in physics, the Coles never remark that this has not also been true of sociology in recent years, much less that there might be some connection between this difference and differing availability of journal space in the two sciences. For a suggestive study of journal acceptance in different scientific fields see H. A. Zuckerman and R. K. Merton, "Patterns of evaluation in science," *Minerva* **9**, 66 (1971).
2. See letters from S. A. Goudsmit, J. D. McGervey, and R. J. Yaes, *Science* **183**, 28 (1974), and the Coles' reply (*ibid.*, p. 32). See also E. Garfield, *ibid.* **182**, 1197 (1973).
3. T. S. Kuhn, *The Structure of Scientific Revolutions* (Univ. of Chicago Press, Chicago, ed. 2, 1970); J. Ziman, *Public Knowledge: The Social Dimension of Science* (Cambridge Univ. Press, Cambridge, 1968); D. Crane, *Invisible Colleges: Diffusion of Knowledge in Scientific Communities* (Univ. of Chicago Press, Chicago, 1972).

Lasers and Their Uses

Laser Handbook. F. T. Arecchi and E. O. Schulz-Dubois, Eds. North-Holland, Amsterdam, and Elsevier, New York, 1973. Two volumes. xlviii, 1948 pp., illus. $175.

These two volumes constitute a handbook in the *Handbuch* sense, "a scholarly book on a specific subject, often consisting of separate essays or articles," rather than a reference handbook of data and formulas (the latter need being met for the laser field by the Chemical Rubber Company's *Handbook of Lasers* edited by R. J. Pressley). This handbook contains 40 chapters by 53 authors, nearly half from outside the United States. The first volume covers theory and practice for lasers and nonlinear optical devices under four broad headings: basic theory and laser physics, classes of lasers (gas, solid, liquid, and semiconductor), laser devices and techniques, and materials for nonlinear optics and light modulation. The second volume reviews laser applications divided broadly into "physical" (that is, scientific) applications—light scattering (Rayleigh, Raman, and Brillouin), nonlinear and coherent optical phenomena, two-photon spectroscopy, and plasma formation—and "technical" (that is, practical or technological) applications—metrology, holography, optical information processing, photography, material processing, ranging, communications, and medicine.

It would be difficult to improve on a perceptive and detailed review by Peter F. Moulton, Helge Kildal, and Paul L.

Kelley in the June 1973 issue of the trade magazine *Laser Focus*, which summarized these volumes as "ambitious, but of varying quality." The editors of the book judge the laser field to be still young, in absolute terms (the first laser operated in 1960) and in the continuing emergence of new laser systems and new scientific and especially industrial applications, but also to be reasonably mature in the development of the basic theory and the understanding of the general properties of lasers. This seems a valid judgment. Their objective given this situation has been to provide "an encyclopedic review . . . of the more mature areas of laser research, and also a contemporary survey of the more youthful areas of laser applications."

The editors' efforts in selecting and organizing their material to meet this objective have been largely successful, although one can find fault with some of their inclusions and some of their omissions. Many though not all of the reviews and surveys are excellent. It is a particular pleasure for American readers to obtain access to the outstanding foreign contributions. In general the detailed coverage of specific laser devices is limited, and there are some important new laser devices that have emerged even since this handbook was prepared. On the other hand, the reviews of basic principles, of basic phenomena produced in and by lasers, and of an incomplete set of laser applications are often excellent and of lasting value. The technical level of the contributions does vary. Some are the kind of survey and review to which one could send a new graduate student as a starting point for his introduction to a field. Others are aimed at considerably more advanced experts.

The editing on a microscopic scale is also excellent. The format is unified throughout; the organization is generally clear and careful (with some exceptions); and the production is excellent.

Given considerably more space, it would be possible to review and criticize these volumes chapter by chapter (as did Moulton, Kildal, and Kelley). The key question, however, is whether or not your library should buy this handbook, at its price of 9¢ a page. If your organization is large and actively engaged with lasers the answer will probably have to be yes. For others there is a serious question of cost-effectiveness. There are enough significant omissions in coverage and enough articles aimed primarily at experts that it is unlikely these volumes can serve as the one and only laser encyclopedia for a small library. Standing in competition for coverage of the laser field are at least 150 other books (see A. E. Siegman, "Laser book list," *Applied Optics* **10**, A38 [Dec. 1971] and updates)—texts, translations, trade books, handbooks, reprint volumes, "advances" series, books on subspecialties—with an average price of around 4.7¢ a page, and with more than 75 percent of the group under 6¢ a page. The buyer with $175 to spend on laser information might consider buying instead the CRC *Handbook of Lasers* (4.2¢ a page); A. F. Harvey's massive survey *Coherent Light* (Wiley-Interscience, 1970, 3.5¢); one or two basic texts (Lengyel, Maitland and Dunn, Roess, Siegman, Yariv, 3.3 to 5¢); one or two reprint collections (for example, Barnes at 3.2¢); perhaps a book on laser applications (Beesley, Charschan, Ready, 3.8 to 6.5¢); and a selection of some of the *Lasers: A Series of Advances* volumes (Ross, Goodwin, Levine and DeMaria, 4.0 to 6.4¢).

The *Laser Handbook* is reasonably well done. At a more reasonable price it would be a very much more attractive purchase.

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Early Domestic Animals

Domestikationsforschung und Geschichte der Haustiere. Proceedings of a symposium, Budapest, April 1971. JÁNOS MÁTOLCSI, Ed. Akadémiai Kiadó, Budapest, 1973. 402 pp., illus. $20.

Domestikationsforschung und Geschichte der Haustiere is the proceedings of a symposium that approaches domestication and the origin of domestic animals by way of both analysis of faunas associated with prehistoric sites and studies of the biology of domestic forms and their ancestors. It includes 41 papers (25 in German, two in French, and the rest in English) grouped according to six major topics: biological and historical questions of domestication, biological consequences of domestication, history of animal husbandry, analysis of faunal assemblages and a comparison between animal husbandry and hunting, history of different breeds of domestic animals, and methods of analysis of faunal material in archeological context. Most of the papers report on studies from Europe and the Near East, and a number of contributions are included on work in Eastern Europe which draw upon sources that are less familiar to American readers.

The spread both temporally and spatially of the older, most enduringly important domesticates, the sheep, goat, cow, and pig, is discussed in a number of papers. Thorough coverage is also given to some of the more recently domesticated forms such as the house cat, ferret, and pigeon. The origin and development of domestic horses are discussed in a number of papers, by Boessneck, Nobis, Karaiwanow and Petrow, Matolcsi, and Firouz. The history of horses is traced in Spain, Bulgaria, Germany, and Hungary, and the miniature Caspian horse is compared to early representations of Iranian horses. An important development of these studies is the correlation that has been found between the dimensions of the phalanges and the height of the horse at its withers. The working out of relationships between the size or weight of skeletal elements and that of the whole animal has contributed to a better understanding of the early domestic animals.

It is, in fact, the use of a number of such new analytical methods that makes this book a particularly valuable contribution. The potentially most important discovery for the identification of domestic forms is that the bone mineral crystallites are oriented randomly in wild animals and uniformly in domestic ones. The technique by which these differences are revealed is described by Daly, Perkins, and Drew. Once the skeletal remains are identified by this method or conventional morphological techniques, the data have to be evaluated to reconstruct prehistoric animal use. A number of techniques are suggested for more accurately assessing faunal remains. In addition to the traditional use of number of identified specimens or minimum numbers of individuals, the advantages of basing analyses on weights of bone identified for each species and for unidentifiable remains, percentage of identifiable and unidentifiable remains, and relative frequencies are discussed in papers by Perkins, Kubasiewicz, and Uerpmann. The contribution each of these techniques can make to a more accurate understanding of a past subsistence system