

sion that Professor Fehl has his own notion of *li* which cannot be substantiated by the significations of the word as it occurs in the texts cited.

But then, not knowing Chinese well and, possibly, not knowing modern semantics, Professor Fehl soldiers on. Part one of the book displays the author's weakness most mercilessly. Not a single observation or conclusion is borne out by primary sources. Creel, Eberhard, Cheng Te-k'un, Ho Ping-ti, the early Kuo Mo-jo, and even Liang Ch'i-ch'ao, *et al.*, are heavily relied upon. One is left wondering why the author, instead of writing a book, has not simply published a reading list. Nor does the author have the abilities of a Toynbee to absorb, to digest, and to present with confidence a clear and reasonably accurate picture. I was constantly astounded by the bewildering account of ancient Chinese history presented in Part one (I was also reminded of Fan Wen-lan's far superior *History* first published as far back as 1949, which apparently never crossed Professor Fehl's path).

This leads to the question: what readership did the author have in mind? (Consider the style of writing and compare, e.g., footnote 54 on p. 16 and the next on p. 50). For the layman the work is too heavily laden with 'learned' references. For the student of 'world history' without expert knowledge of Chinese history, it is deficient in basic background information, especially where the author refers to persons and places. For the sinologist, it would be sheer impudence. And all three classes of reader would be irked by the lengthy and laborious regurgitations of 'pre-historic' Chinese legends (compare for example pp. 10-11 and 53). Further, the historian would feel insulted by the parallels drawn, such as the comparison between Mencius and Jesus (pp. 90-7) and others (pp. 24, 63, 218). The sinologist would be perturbed by the author's ignorance of the fact that *T'ien-wen* is part of *Ch'u-tz'u* and not a separate work (cf. pp. 15 and 49). The layman would, on the whole, be baffled and confused.

Professor Fehl also places himself in an awkward situation by occasionally venturing into making unqualified statements—watch out wherever there is an undocumented assertion. 'A new age was ushered in with the enthronement of Wu-ting who outlived three queens and dealt fairly with six concubines' (p. 50; incidentally, the style of writing is telling). 'All the scholars from Mo-ti to Liu Hsin were historians' (p. 58). 'In general I am disposed to take the *Odes* as a largely contemporaneous description of Chinese culture in the Spring and Autumn era...' (p. 105). And there are many other similarly question-begging pontifications.

There are good moments in the study. Professor Fehl is almost as profound as, though far less articulate and elegant than, Roland Barthes when he says, 'Civilization is a learning that has its roots in a literature, a written code, that is the heritage

of generations, the distillation of the wisdom of the past made available to the future. . . . Writing is itself a refinement—man's assurance against the waste of experience' (p. 99). Similarly, 'Quotations from the classics are possibly the least trustworthy evidence for dating and the history of ideas in pre-Ch'in literature' (p. 109).

But Professor Fehl really approaches Socratic wisdom when comparing himself with the late Joseph Levenson and admitting to 'lacking the precision of his [i.e. Levenson's] mind, with no hope ever of the breadth and depth of his sinological scholarship. . . .'

The essential part of my impression of Professor Fehl's work concludes appropriately, I think, with an unfinished quotation.

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Science and civilization in China. Vol. 5, Chemistry and chemical technology; Pt. II: Spagyric discovery and invention: magisteries of gold and immortality, by JOSEPH NEEDHAM, with the collaboration of LU GWEI-DJEN. London: Cambridge University Press, 1974. xxxii, 510p. Plates, tables, bibliographies, index. US\$35.00, £12.00.

A SCHOLAR equally competent in Western and Chinese languages, physical sciences and biochemistry will perhaps never again be found. The peculiar importance of Needham's massive work lies simply in this. Its scope is far greater than merely the history of Chinese science and technology. Because of the immense range and variety of knowledge available and comprehensible to a single mind, the principal author is able to put his story in its proper setting and in so doing to rewrite and reinterpret the history of related developments in other parts of the world. Even more important, the technical terminology and procedures have been interpreted by one having actual practical knowledge of laboratory work. Much that was obscure to Chinese commentators of later ages, qualified only in a literary sense, is now made plain or at least plausible.

The present tome contains only the early parts of Section 33, 'Alchemy and Chemistry', which will be continued as Volume five, Parts three to five. Although containing the whole apparatus of bibliography, etc., it is thus not in itself an organic whole. The bulk of the book is concerned with concepts and terminology and with metallurgy, although there is substantial discussion also of elixirs. A scheme of ideas recognizable as 'alchemy' is present from the time of TSOU YEN 騶衍 in the 4th century B.C. The particular combination of theories which characterizes that pseudoscience is peculiarly Chinese in flavour and probably also in origin. We are all familiar with the idea of alchemy

as the search for the twin objectives of the philosopher's stone (capable of changing base metals into gold) and the elixir of life. Needham's contention is that while the first was the aim of researches equally in Hellenic and Chinese cultures, the latter was absent in Classical times around the Mediterranean, appearing suddenly in the twelfth century, whereas it had developed steadily in China alongside the very rich tradition of herbal and mineral 'medicines' and under the influence of Taoist ideas on the possibility of an immortal, incorruptible body. Much of the evidence is of a kind unfamiliar to students of the Hellenic era—that is to say, books which have been in print for a thousand years or so, many of which have commentaries accompanying much earlier texts.

It is not claimed that each and every discovery was made in China, though some may well have been. The evidence for importation of ideas and materials is, in fact, very strong. But the peculiar fusion of ideas into one theoretical system must apparently have taken place in that country.

Probably the most valuable parts of the book concern the alloys and surface-treatment effects used to simulate gold or silver. Needham here makes a valuable distinction between aurification—the deliberate imitation of gold either with the intention to deceive or merely for decorative effect—and aurifaction—the self-deluding manufacture of what is held to be true gold. It has been technically possible to identify and assay true gold (by cupellation) for almost 3,000 years. The difficulty about universal application of this test was that before the growth of modern chemistry it was not at all clear why the cupellation test should be absolute. For aurifaction, it was only necessary to redefine gold by reference, say, to its appearance only, and the artificial material might then be equal or even superior to the natural.

For making many alloys it was not necessary, even not possible, to isolate first the constituent elemental metals. An easier if less certain route was to smelt a mixture of ores (or a naturally mixed ore) or to add the ore of the alloying metal to a melt of the bulk metal. All were certainly done in ancient China. Gold-like brasses, arsenical copper alloys (which may resemble gold or silver depending on the arsenic content), and silvery cupronickel were all made, as is clear from the literary descriptions and from recent analytical work, whereas zinc metal was only isolated much later and arsenic and nickel were never isolated at all. Interestingly enough, zinc metal and cupronickel (paktong 白銅) were significant exports in recent times; the latter may even have been exported to Hellenic Bactria in the 2nd century B.C. to form the basis of the earliest known cupronickel currency. One can well imagine the origin of the alchemical 'projection' theory in observations of the remarkable effects of small amounts of a mineral (i.e. a Stone!) on the colour

of copper; even more so, perhaps, in regard to the infinitesimal amounts of foreign material required to induce some surface effects.

The story in respect of gold is on relatively solid ground and belief in aurifaction easily understood. It is much harder to understand the persistence of belief in elixirs, many of which were extremely poisonous, as Needham emphasises, and must have led to rapid death or an abbreviated and miserable life. Medical knowledge remains to this day very inexact. It is not possible to say that the explanations advanced for a possible initial benefit when taking mineral-based elixirs are definitely wrong (chemotherapeutic cure of parasite infestations, replacement of deficient trace elements), only that neither is definitely correct. To digress momentarily, doubt would attach even to whether antimony-containing elixirs could have produced detectable clinical benefit to those suffering from schistosomiasis—and people wealthy enough to afford elixirs would probably have minimal contact with that particular disease. Medical science remains inexact because it is peculiarly difficult to establish facts in the face of the capacity for self-deceit of patients and physicians alike. The persistence of belief in elixirs must presumably, then, be sought chiefly in the 'religious' ideas of the people, coupled with the quite definite psychopharmacological effects of a few drugs which were used in Taoist religious ceremonies to induce abnormal states of mind. Needham mentions a few preparations which may possibly have had genuine detectable effects of the desired kind (for example putative concentrates of steroid sex hormones), but even here it must be seriously questioned whether this was the basis of the usage. It seems more likely that the basis was really a species of magic depending on 'sympathy' and 'signatures', such as appears in other areas of Chinese traditional medicine. One must not go too far. It may at some time become possible to assess accurately the probably therapeutic benefit of elixirs and other traditional medicines, and it may prove that the doubts here expressed are unwarranted. But, for the moment, profound scepticism remains a justifiable attitude.

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Chinese literature: an anthology from the earliest times to the present day, edited by WILLIAM McNAUGHTON. Tokyo: Charles E. Tuttle Company, 1974. 836p. US\$15.00.

It has been pointed out that this anthology has used only those translations which will appeal to the Western reader on literary grounds and as a result, the works in this collection are as alive and exciting to an English-speaking reader as are the great classics in his own language. The translators