

宋遼金元

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SUNG STUDIES NEWSLETTER

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All correspondence with regard to manuscripts and subscriptions should be addressed to the Editor at: Department of History, Cornell University, Ithaca, N. Y. 14853. Subscription rates are \$5.00 annually for individuals and \$8.00 for institutions. Checks should be made payable to: Sung Studies Newsletter.

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FROM THE EDITOR

There is one important announcement to make with regard to the Newsletter, that with this issue it is shifting from a semiannual to an annual publication schedule. The target period for publication will be fall. Old habits die hard, particularly for the devotees of Chinese civilization. However, the reasons for making this change are compelling. Costs, always a factor in any enterprise, can be significantly reduced by undertaking only one printing and one mailing per year. Equally important, for an enterprise lacking any permanent staff, the sheer labor of assembling the material for two issues a year is to say the least excessive. Indeed, as long as the SSN is edited by individuals serving in full-time faculty positions, it is difficult to imagine how, without regular editorial assistance, more than one respectable issue could be published per year.

The subscriber should not on the whole suffer from this change. With subscription rates remaining the same, the annual issue will equal the volume and, I trust, quality of two of the old issues. For example, the present issue goes well beyond doubling the former average size of a single number. (Of course the size of any particular issue is always dependent on the availability of publishable material.) The major disadvantage of the new schedule is that useful announcements and bibliographic information may not reach readers quite as early as they may have need for them.

The change does, however, have important implications for treatment of the "conquest dynasties" of Liao, Chin and Yüan. The publication of but one issue per year means no special supplement for those dynasties such as the issue published as no.10. As the present issue indicates, material on them will be integrated with that on the Sung. Students of late Yüan history might conceivably object, but I cannot seriously entertain the idea that there are many Yüan specialists who are not also interested in important aspects of Sung history. There will, incidentally, be no inclination to feature work on one dynasty over that on another; the material will decide. But a problem of

nomenclature is imposed, for with the integration of Yuan (as well as Liao and Chin) studies can we properly continue calling this the "Sung Studies Newsletter?" Or would the simple addition of subtitle suffice? I await your advice on this subject.

Finally, I am pleased to acknowledge the expression of good wishes and encouragement which many of you have been kind enough to make in response to the resuscitation of the SSN. Personally and practically, the reaction thus far has been excellent, revealing the existence of a strong foundation for publication in this field. May I remind you, however, that the Newsletter is dependent not only on your reading but also on your writing support? We are always in need of information bearing on bibliography, research projects, professional activities and the like, and not least we need good manuscripts.

Valuable services for the publication of this issue have been provided by the China-Japan Program and also the Department of History, Cornell University. Their assistance is gratefully acknowledged.

NEWS OF THE FIELD

Proposed Session on Sung Studies at 1978 AAS Meeting in Chicago

Brian E. McKnight, of the University of Hawaii, is attempting to organize an informal session on Sung studies which would feature "state of the field" reports by three or four scholars. At time of writing it is not clear whether AAS can provide the necessary space or not; but those attending the Meeting should carefully examine the program in order to ascertain time and place (if indeed a place is available).

Conference on Multi-State Relations in East Asia. 10th-14th Centuries

This conference, supported by the Committee on the Study of Chinese Civilizations of the ACLS, will convene from July 9 to 14, 1978 at Providence Heights, a conference center near Seattle. The focus will be Chinese foreign relations in the tenth to fourteenth centuries. The last major collaborative study of Chinese foreign relations, The Chinese World Order edited by John K. Fairbank, dealt primarily with Ming and Ch'ing China, a time during which China was united and relatively powerful. During the period proposed for study, however, China was weak and unable to impose its will on neighboring states. The study of China's relations with other states at this time may well challenge some generally accepted views of China's foreign relations in traditional times.

Participants and Anticipated Paper Topics

Thomas Allsen, University of Minnesota, rapporteur, will also contribute a paper on "The Mongol Grand Qans and the Uighurs of Turfan in the 13th Century."

Igor de Rachewiltz, Australian National University, "Turks in the Early Mongol Period."

Herbert Franke, University of Munich, "Sung Travellers to Neighboring Foreign Dynasties."

E.I. Kychanov, Leningrad Oriental Institute, topic not yet submitted.

Gari Ledyard, Columbia University, topic not yet submitted

Luciano Petech, Rome, Italy, Aspects of Sino-Tibetan relations.

Charles A. Peterson, Cornell University, "Sung's Policies toward the Collapsing Chin and the Mongols."

Michael C. Rogers, University of California at Berkeley, "National Consciousness in Medieval Korea: the Impact of Liao and China."

Morris Rossabi, Case Western Reserve University, "Interpreters and Translators in Sung China."

Shiba Yoshinobu, Osaka University, "Sung Foreign Trade--Its Scope and Organization."

Tao Jing-shen, University of Arizona, "Barbarians or Northerners? Sung Views of the Ch'i-tan."

Klaus Tietze, University of Munich, topic not yet submitted.

Wang Gung-wu, Australian National University, an aspect of Chinese relations with Southeast Asia.

Oliver Wolters, Cornell University, "Diplomatic Relations Between Qubilai Qan and the Vietnamese Court."

Edmund Worthy, American Historical Association, topic not yet submitted.

Observers

Hok-lam Chan, University of Washington, Seattle.

Keith Pratt, School of Oriental Studies, University of Durham.

Additional information about the Conference may be obtained from Professor Morris Rossabi, Department of History, Case Western Reserve University, Cleveland, Ohio 44106.

NEH Summer Seminar on Chinese Painting

Among the approximately 100 summer seminars for college teachers sponsored by the National Endowment for the Humanities in 1978 will be one on Chinese Painting of the Sung and Yüan Dynasties, to be held in the Kress Foundation Department of Art History, University of Kansas, Lawrence, from June 12 to August 4, 1978. A group of twelve participants will be selected for the eight-week seminar, each of whom will receive a stipend of \$2000 plus some travelling

expenses. The seminar will focus on the excellent collection of Chinese painting at the Nelson Gallery of Art in Kansas City. For more details, please write to the director of the seminar: Professor Chu-tsing Li, Chairman, Kress Foundation Department of Art History, University of Kansas, Lawrence, Kansas 66045.

Symposium on Chinese Calligraphy

Papers from this conference, which was held at Yale University in April 1977 and of which we took notice in our last issue, are being ready for publication. Of the fourteen presented, the following are relevant to developments in the Sung and Yüan periods:

- Fred Fang-yu Wang, "The Development of Chang-ts'ao (Chang- cursive Script)."
Shen C.Y. Fu, "Some Elements in the Relationship between 'Period Style' and the Styles of the 'Great Masters'.
Thomas Lawton, "An Introduction to the Sian Pei-lin ('Forest of Stelai')."
Tseng Yu-ho Ecke, "An Aspect of Spirituality in Chinese Calligraphy--A Historical Investigation."
Wai-kam Ho, "Mi Fu (1051-1107)."
Wen C. Fong, "Ni Tsan's Calligraphy."
Gunther Debon, "Lines in the Sand: Some Basic Terms and Ideas in Chinese Calligraphy."
Yoshiaki Shimizu, "Transmission and Transformation: Chinese Calligraphy and Japanese Calligraphy."

A handsome catalogue was prepared for the exhibition which was held in conjunction with the conference at Yale and also later at Berkeley. Traces of the Brush, written by Professor S.C.Y. Fu and three colleagues, contains six essays on themes of the exhibition and some 250 plates. In short supply, it has been available from the Sales Desk of the Yale University Art Gallery, 1111 Chapel Street, New Haven, Conn. 06520, for \$13.50 (Late bulletin: o.p.)

THE EXPANSION OF EDUCATIONAL OPPORTUNITY IN THE REIGN OF HUI-TSUNG OF THE SUNG AND ITS IMPLICATIONS*

by
Edward A. Kracke, Jr.

I. The Questions to be asked

In the evolution of institutional patterns, in China as elsewhere, education necessarily plays a key role, whether positively or negatively. More highly evolved forms of political and economic activity require larger numbers both of simply literate men, and of those with mental training on a somewhat higher level; further, they require for the potential leaders a kind of education that may help to advance the boundaries of speculative thought. Originality of mind is related to the quantity of education as well as to the quality: it gains to the extent that larger numbers are brought into the intellectual life, providing greater funds of talent from which the truly contributive thinkers may emerge.

If significant changes were taking place in Chinese institutions during the Sung, we should expect to find this reflected in the qualitative and quantitative growth of education. If we find such growth, it may serve as a partial index of the rapidity with which other institutional advances were taking place. If educational change seems to be lacking, or unduly slow, or poor in quality, we may well have found a factor inhibiting development in other spheres.

In probing the effective character of Sung education, we may conveniently distinguish several significant aspects. Qualitatively, the role of education was affected by the kinds of subjects and texts studied, the approaches and methods of study, the nature of the examinations by which proficiency was tested, and the future career rewards awaiting those who displayed different kinds of

*This paper was originally presented at the Conference on Institutional Change in China, 750-1350, (so-called Sung I) held at the University of Chicago in September of 1965. It is published here with the kind permission of Mrs. E.A.Kracke, Jr. Professor Krack did not publish it himself because he regarded it as only a part of a larger study which, alas, he was unable to complete.

proficiency. Quality relied also on the number, training, and keenness of the teachers available. Quantitatively, it was affected by the numbers of public and private schools available, the number of students admitted, their social origins, the financial support available to them in school, the way in which they were chosen for admission, and the geographic accessibility of schools. Pertinent also was the availability of pre-school or primary school training, the lack of which might severely curtail the opportunity of the impecunious.

We have not a little evidence touching on all of these questions. In the present paper, however, I shall focus primarily on a body of materials largely ignored until now: that on public education at its high point which was reached during the first quarter of the twelfth century. Even here I can give no more than preliminary results of a study that still has some way to go. The present evidence bears especially on the quantitative aspects of education and its availability, but it throws some light also on subjects of study and on the quality of teachers. As background, it will be useful to sketch very briefly the development of public and private education in the Sung before the twelfth century.

2. The development of Sung education before 1100

Sung educational enterprise rested, of course, on old foundations. The school for officials at the capital founded by Wu Ti in the Han had grown in the next two centuries to a huge university (whether or not its students numbered the 30,000 recorded in the Han Shu). Succeeding dynasties had further ordered the establishment of schools under governmental auspices in the prefectures; under the T'ang such schools were called for in the subprefectures as well. There had been some doubt how far these orders were implemented. The capital schools of the early T'ang had cumulative quotas of 342 students; if the enrollments in the prefectures and subprefectures averaged fifty and thirty respectively, the students in the schools of the empire might have numbered nearly 65,000. At their high point in the eighth century the quotas of the schools at the capital rose to a total of 2,210 but fell sharply after 750. At the end of the T'ang and during

the Five Dynasties we learn of the rise of large privately-endowed academies (shu-yüan), some of which are said to have numbered their students in hundreds if not thousands.

At the opening of the Sung, such academies and other privately conducted schools evidently trained almost all of the scholars and officials. There are very few early records of them, and later reports from the pens of Southern Sung writers may have invested these traditional ancestors of later academies with slightly spurious glamour. Early Sung literati have left few of the wen-chi that tell so much of later schools, and surviving local histories are late. Most early references to private schools are in occasional official documents recording special recognition or gifts to this or that institution. From these we gain a picture of schools as somewhat informal, established by enthusiastic teachers and often fading away at the founder's death. Only a few came to governmental attention, but we can guess from hints of their character that they were of all kinds and sizes (enrollments of hundreds seem not rare) and may have been very numerous. We may distinguish official and private activity in their promotion and support, but we cannot easily separate them into government and private schools. The emperor might bestow a set of classics or other gifts on a school. He might accord it an official designation, perhaps accompanied with a name plaque. He might confer on the school-head a civil service title (and pay?). He might vaguely direct the local authorities to watch over the welfare of the school. A local official might start and support a school with his private income; he might, perhaps, take steps in his official capacity to found a school; possibly he even provided it with public funds, without special authorization from the capital. The local Confucian temple seems to have been a traditional place for the forgoing of students and for teaching, however supported. The state at times took over the support of a school privately begun, retaining on occasion the name of shu-yüan. References to activities of these various sorts appear as early as the first decade of the dynasty, when recognition or gifts are accorded to Stone Drum Academy at Heng

Chou and the Yüeh-lu Academy at T'an Chou. These are followed by awards to the White Deer Grotto Academy at Nan-k'ang Chün and the Sung-yang Academy at Ho-nan Fu, and to others with increasing frequency in the opening decade of the eleventh century. In several cases the state apparently assumed greater responsibility for school support (Yen Chou and Chen-ting Fu in 1006, Ying-t'ien Fu in 1009.) From about 1034 there was a rapid transition from a haphazard encouragement of individual schools toward a policy seeking to provide consistent and comprehensive educational opportunity in all parts of the empire.

Throughout this period the state and private individuals obviously shared nearly identical practical interests and very similar motivation. For both, the promotion of learning was pleasing to heaven and conformed with classical admonitions. Education, together with virtuous example, was the classically sanctioned method of securing the ideal social order. Its advancement enhanced the popularity of the dynasty and the prestige of the generous donor. The state had shown its desire for better-trained officials and greater competition in recruitment through rapidly extended use of the doctoral examinations. The private donor shared in the benefits to his community and family from the better representation in officialdom promised by local schools. Buddhist temples and Taoist phalansteries provided education to train their adepts, and perhaps as an act of virtue as well. Su Shih tells us he studied for three years as a child (about 1040) in a Taoist elementary school, with some hundred pupils. Some at least of the later schools occupied buildings of former temples, and may perhaps in some cases have grown from their teaching activities. Clan and family schools must have supplied a large proportion of elementary education from the first and surely more regularly after the charitable estates of the Fan and other clans allocated funds for this purpose in the later eleventh century. Ou-yang Hsiu describes the building of the prefectural school of Chi in Chiang-nan Hsi in 1044. "The prefecture of old had a Confucian temple to the Northwest of the city. The current prefect Li Hou, a man of

utmost scope, in consultation with the people of the prefecture moved and enlarged it to house the school. . . . In his building of the school the literati of Chi marshalled 15,000,000 cash of their Private funds as contribution; they used manpower to the extent of 22,000 kung, but the people did not feel it to be toil; they used good timbers and hard glazed tiles to a total of 223,500, but did not feel it to be much." We may sense something beyond mere literary flourish in the tablet proudly erected by the administrator of Sheng subprefecture in Yüeh Chou, after completing the school buildings there in 1048: "The new gates rise like cliffs," he said. "The main doorway is impressive, perfectly balanced the two wings, perfectly level the central hall. Subprefect and students perform the libations in spring and autumn; there are ceremonial visits to the school at new moon and full-moon. Can one fail to do these things? . . . If heaven and earth are destroyed, only then may the way of the sages come to an end. Can one fail to ponder this?"

For nearly ninety years after 1034 the expansion of state education moved forward. There were periods in which efforts relaxed and progress was slower, but each new push carried the system to more ambitious levels both in scope and in articulation. The times of most rapid development seem to fall in the decade after 1034 under Jen-tsung, the opening years of Shen-tsune's reign after 1067, and the first decade and a half of the twelfth century under Hui-tsung.

During the years 1034-39 successive proclamations sanctioned the establishment of government-supported schools in a long list of individual prefectures. During this time at least twenty-eight allocations of land for support of these schools are recorded, in most cases five ch'ing of fields per school, but in the cases of the Sung-yang Academy in the Western Capital Ho-nan Fu, the Academy of Ying-t'ien, the Southern Capital, and Ts'ai Chou in Ching-hsi North ten ch'ing were granted. At the end of 1037 it was determined in principle to limit government schools to important prefectures of the regional-command (chieh-tu) class, but within a year other populous prefectures were included.

By the third month of 1044 the founding of schools was urged not only in all prefectures of whatever size, but in subprefectures "with 200 or more scholars."

In the meanwhile, attention was turned also to the improvement of education at the capital. From the great University and other schools there at the height of the T'ang, there remained at the beginning of the Sung only a modest school for sons of officials with 70 students in 1075. This number was soon raised to 154, and a "School of the Four Gates" opened in 1043 admitted commoners, but it was not until 1045 that more ambitious plans for a National University were conceived. They were long delayed in execution. The university enrollment rose slowly from 100 to 200 regular students supported by the state. In addition, a number who could not gain entrance were permitted to attend lectures informally.

With the accession of Shen-tsung and the rise of Wang An-shih to power, the whole educational expansion received new impetus. Wang complained that the local schools, inadequately staffed, failed entirely to carry out the spirit of their original conception. In 1071 he raised the stipulated size of prefectural school-land allocations to 10 ch'ing. Under his promotion or that of his followers more teachers were appointed; but Ma Tuan-lin two centuries later held that by 1078 the number of schools with preceptors (chiao-shou) was only 53. Wang reorganized the National University into three levels, through which the students were promoted successively. To the original 200 (now the middle level) the new upper level added 100 places and the lower 700; under the more comprehensive "three-level law" of 1079 the numbers rose to 2,000 at the lower level, 300 at the middle, and 100 at the upper. The concept of education was evidently a pyramidal one, in which the students would form a gradually smaller and more select group as they went on to the more advanced levels. Students were admitted to the lower level (the wai-she or "outer houses") by competitive examination and assurance of good moral conduct. They were tested monthly during their studies, and might annually take competitive examinations through which the best were selected to fill vacancies in the middle level (the nei-she or "inner

houses"). In alternate years, there were similar examinations to fill vacancies in the upper level (the shang-she or "upper houses") from the middle level.

It has been argued -- as by Professor Yen Keng-wang -- that the prefectural and subprefectural school programs both of 1044 and of Shen-tsung's reign were only partly implemented, and that real teaching was limited to the fifty some schools with preceptors reported for 1078. This view may be unduly conservative. Other schools, without preceptors, may still have afforded substantial educational opportunities. We have seen that governmental contributions were in fact supplemented by private contributions to government schools. We have specific evidence that, in certain places that supposedly lacked preceptors in 1078, school buildings and books had been provided before this, or that assistant preceptors (chu-chiao) or teachers of other kinds were appointed. Some of these places were specified as recipients of school land allocations in proclamations of the thirties. Conceivably government schools once active had been permitted to lapse, though this seems contrary to the general trend. In sum, it seems that by about 1080 very substantial progress had been made toward implementing the ambitious conception of forty years earlier: effective schools in all prefectures and larger subprefectures as well as in the capital. But the realization of the plan must still have remained incomplete in important respects, both in numbers of schools and in the quality of their instruction.

3. The background of Hui-tsung's educational program

In the development of education up to 1067, there had been occasional obstructions from competing interests (as when in 1045 the premises first assigned to the University were diverted to other uses for which, it was argued, they were indispensable, and the University was left with cramped quarters). But no voice was raised in opposition to the principle of educational expansion. Similarly, the educational scheme of Wang An-shih was perhaps the part of his program least calculated to provoke opposition.

Nevertheless, his specific measures suffered from the general antagonism he aroused so successfully, and when the "three-level law" of 1079 was suspended the educational progress met a temporary setback. Progress began to gather momentum once more after 1094, under Che-tsung's direct rule, and in 1098 new developments in local education were announced, but his death at the beginning of 1100 cut short any further plans he might have entertained.

It was left for his brother and successor Hui-tsung to carry the development to its climax. This accomplishment, in a reign commonly remembered chiefly for the ruler's esthetic preoccupations and the corruption of his chief ministers, poses for us interesting questions of motivation, and as we probe the character of Hui-tsung and his reign we confront not a little that is paradoxical. He was the heir of more than a century of effort and progress. The attainments during this time in material technology, economic development, critical thought, and administrative method had been formidable. He could draw on the ample and varied lessons of political experience, and China's resources had for some decades been free from the strains of serious wars. Yet within twenty years his reign saw the rise of unprecedented political persecutions, gross administrative abuses, the most serious rebellion that ever threatened his dynasty (in general notably free from such), and within another decade disastrous foreign invasions, the loss of North China to the Jurchen, his own abdication, and his death in foreign captivity, together with that of his empress and his son and successor.

What light we can throw on his character from the story of his accession and his early reign does not prepare us for the later story. He lost his father, the Emperor Shen-tsung, less than three years after his birth; his mother, the Lady Ch'en, a young concubine reputed for her intelligence and sensitivity, died soon after, seemingly from grief. He grew to maturity as a younger brother of the reigning emperor, perhaps chiefly under the care of the Empress-Dowager Hsiang. When he was only eighteen his brother Che-tsung died suddenly in his twenty-sixth year.

There had evidently been no arrangements to anticipate such an event; at an emergency midnight conference the Empress-Dowager Hsiang and the leading ministers sought a prompt arrangement for the succession to forestall damaging intrigues. The chief counsellor presented arguments for choosing either of two brothers of Hui-tsung (or Prince Tuan, as he then was), on grounds of precedent and tradition. The Empress-Dowager (herself without sons) pressed for Prince Tuan. Prince Tuan, returning late from a holiday, argued in favor of his brothers. But in the end the officials turned to support of his candidacy and the throne was more or less thrust upon him.

It is interesting to note that when the Empress-Dowager died the following year, Hui-tsung showed unusual grief and accorded extraordinary honors to her family and her ancestors. His relations with his consorts are interesting also. His first empress, whom he had married the year before his accession, bore his son Ch'in-tsung, but died in 1108 at the age of twenty-four. His second empress, the talented daughter of a minor official, and a favored concubine, he married three years thereafter. Her father was raised to high honorary rank. Fifteen years later she followed him to his place of captivity, where she died. He had no less than seventeen other concubines and sixty-three recorded children (more, it would seem, than the first five Sung emperors together). In these scattered facts we seem to glimpse a young man scarcely puritanical and not driven by any urge to busy himself with political matters, but not quite the irresponsible voluptuary. There are hints that he was capable of enduring and loyal attachments and human warmth, and possessed of other qualities that could evoke the confidence of those who knew him well.

In his administration Hui-tsung not only applied at an early time a number of Wang An-shih's controversial measures intended to promote public welfare; he soon carried them further than ever before and embarked on other similar innovations as well. In 1002 he established new hospitals for the needs of commoners without resources, at first in every prefecture but soon extended

to the subprefectures as well. They provided special wards for infectious diseases. At the same time he established relief homes for destitute children and aged persons, where these could stay for unlimited periods. Nurses were supplied for abandoned infants. Such institutions had existed in scattered places before this, but the widespread and uniform institutionalization was new. In 1104 he went still further to establish these institutions not only in prefectures and subprefectures but in all towns and settlements (ch'eng, chai, chen, shih) that counted a thousand or more households. The idea of a public paupers' burial ground had been conceived and carried out by a sympathetic scholar some twenty years earlier; such facilities were also included in the comprehensive system of 1104. Buddhist monks, already accustomed to varied benevolent activities on a more limited scale, were to be employed in operating all these institutions.

Hui-tsung's activities as a painter and a patron of the arts and of archaeology need no mention. But we cannot overlook other political actions taken almost simultaneously with the public benefits we have seen. The promotion of Wang An-shih's policies was accompanied by the well-known proscriptions of all opponents of these policies, posthumous deprivals of dignities, and political disqualifications for the descendants of opponents, more bitter than anything seen before. It was even ordered, for example, that all printing blocks of the writings of Su Shih and his father and brother should be burned. These actions were bad enough; the outrageous administrative acts and delinquencies that helped to bring on the rebellion of Fang La were to come years later. How account for the paradox? Ts'ai Ching, related by family to Wang An-shih and moving under his banner, held influence while most of the actions and policies we have noted were conceived and implemented. The pursuance of Wang's policies and the vindictiveness toward Wang's opponents might understandably find some inspiration in him. But there is less clear reason for his new innovations in the public interest, unless his reputation as an unscrupulous opportunist represents a radical

misunderstanding by historians. Was he concerned with his "public image" as a virtuous statesman? Or did the actual inspiration come from the Emperor himself? From what we have seen of Hui-tsung's character, it is not difficult to imagine that the new measures for social welfare stemmed from his outgoing and imaginative mind, or were suggested by Ts'ai with the motive of pleasing him. The acrimony of the persecutions, on the other hand, seems less in harmony with his character as we sense it. Must we perhaps explain the contradictions as the mere outcome of a rather complex interplay between two very different personalities? These facts and these questions will in any case be pertinent if we are to understand the educational developments of the reign.

4. Hui-tsung's educational plan and its implementation

The new forward movement in education was heralded in a detailed plan submitted by Ts'ai Ching in the eighth month of 1102. It began with a request that education be made the prior business of the time (chin-jih hsien-wu) and contained thirteen main headings. The total purport was a proposal for educational expansion all along the line: there should be more levels of instruction under governmental support, more students on each level, more facilities, more and better qualified teachers, closer supervision locally and greater attention to the program centrally.

In addition of new schools, a major innovation was the insistence on schools in every subprefecture (except for those that were prefectural seats). There was also insistence on providing prefectural schools wherever these were still lacking. Where prefectures were small or had too few students to justify schools, groups of two or three prefectures should establish schools jointly. Another step of great significance was the proposed provision of primary schools (hsiao-hsüeh) in connection with all of the local schools. Such schools had before this been conducted privately, and also to some extent by the government, not only at the capital but as early as 1044 in connection with a local school. It is obvious that, with the growing availability of education on the middle and higher levels, the difficulty of

attaining the preliminary preparation to enter such schools would be one of the main obstacles for the talented child from a poor and unlettered background.

Still another novelty was the regularizing of functional relationships among the local schools and between them and the National University. The subprefectural schools were to provide primary and lower middle level instruction only, while the prefectural, it would seem, included both these and a kind of upper-middle level, the latter more or less equivalent to the lower level at the University. After one year's study in the subprefecture the student should, if qualified, be promoted to the prefecture. After two years of study there he would be eligible for recommendation to take the next triennial entrance examination for the National University at K'ai-feng. According to his grade in the examination the student might be admitted to the second or third grade of the upper level, or to the middle or the lower university level. In cases with specially strong recommendations from the local schools, special tests might be given to those who failed the examinations. All these proposed rules were stated in some detail.

As to faculty, it was proposed that each prefecture should have at least one preceptor, or more if its students exceeded a hundred. Each subprefectural school should have a head (hsüeh-chang) and an instructor (hsüeh-yü). All local schools were to be supervised by intendants of education (t'i-chu hsüeh-shih ssu) responsible to the Directorate of Education, two for each province. These should inspect the schools in their jurisdiction once annually. Prefectural administrators, vice-prefects, subprefects, and their assistants should inspect the schools in their places every ten days, and would be rewarded to the extent that their students did well afterward at the University.

Policies for the allocation of additional lands for school support were laid out in rather specific terms, to be elaborated later.

The University at K'ai-feng was to be separated into two major divisions. The first, to be the University proper, was to

contain the upper and middle levels. The upper level was to be expanded from 2,000 students (if indeed it had so many at this time) to 3,000. It was renamed at first the "Outer School" (Wai Hsüeh); two months later it received the more elegant and classical name of "Pi-yung", after the supposed schools of the Chou kings described in the Li-chi.

Other details will be mentioned later.

The State Planning Office (Chiang-I Ssu) was forthwith directed to draft more detailed plans for carrying out the proposal, and immediate steps were taken to begin the expansion of the University. The Vice-Director of Construction Li Chieh was ordered to take personal charge of erecting the new buildings for what would become the Pi-yung, outside the southern gate of the city-wall (whether the inner or outer wall seems unclear).

Li Chieh, better known as the author of the earliest existing manual of Chinese architecture, the Ying-tsoo Fa-shih, was a man of unusual scope. He left a reputation for wide learning and abilities in many fields. The writings in his library numbered several ten thousands of chapters. A fine painter and calligrapher, he won special praise from the Emperor for a painting of horses he was commissioned to do. He wrote supplements to the Classic of Mountains and Streams and to the Record of People with the Same Name, and small works on the p'i-p'a, in horses, on the game of liu-po, and on an old version of the Shou-wen in seal characters. His work on architecture was a requested rewriting of an earlier unsatisfactory work. In his document presenting the completed work, in the first month of 1103, his titles include that of "Intendant of the Preparation of the Outer School." Apparently the construction of the Pi-yung was completed some time during the year or soon after, and resulted in his promotion to Director of Construction. Its plan is said by Wang Ying-lin to be that of a square within a circle. It included four lecture halls and a hundred chai (dormitories?) each accommodating 30 students. Each chai measured five ying (a commonly used unit of this time, evidently the space between pillars, and perhaps similar to the chien space-unit of later times). The whole establishment

measured 1,872 ying. A comparison of this figure with the 1,200 chien attributed to the university at the T'ang capital might help to suggest one aspect of the trend. The Emperor visited the completed buildings, as well as those of the University, in the eleventh month of 1104 and conferred special signs of favor on the Director of Education and other school officials.

With respect to the plans for local education, we now face again the problem we have met earlier: were the plans really carried out on the intended scale, or did the orders remain merely laudable gestures buried in government files? There can be no categorical answer to this question. But we do have some significant statistics, as we shall see. And to these we can add expressions of the Emperor's continued barrage of decrees adding new details and developments of the policy, and the records of successive official actions implementing the orders in individual cases, over the following decade or more. A few instances may serve as illustration.

At about the time the new Pi-yung was built, Hui-tsung raised the formal status of school administration by reviving a lid title for its head, that of "grand formator" (ta ssu-ch'eng), a title used in the Book of Rites for the heads of instruction under the ancient kings and employed briefly during the T'ang. This office was now given a much higher place in the protocol order, above such dignitaries as the chief councillor of the Heir-Apparent, the reviewing policy advisors, policy critic-advisors, Secretariat drafting officials, and the senior lords of the various courts (the Kuang-lu ch'ing etc.), while the director of education came after all of these.

The provincial intendants of education were promptly appointed (though seemingly one to a province, not two). In the first month of 1103 it was ordered that preceptors who have evidenced good teaching method and produced students who did well at the universities should not be transferred to other duties in the normal way, but be reappointed where they were. Three months

later the education intendants were directed to add three preceptors in provinces then having ten and one in other provinces. (According to Ma Tuan-lin, one province had in 1078 six preceptors, two had five each, and the rest one had three; seven provinces had each added one in the Yuan-yu period. The extent of the increase since 1100 is evident even without precise figures.) Special reports should be made on preceptors 80% of whose students passed the examinations for the upper level at the university. They should receive special promotions within the educational system.

In the meanwhile we see further clues to the numbers and size of the prefectural schools at this time. In the third month the Planning Office recommended, and the Emperor approved, quotas of a hundred students for places that had previously (over the years) placed 200 or more men in the final doctoral examinations, and apparently the same where two or more prefectures combined to establish a school. There were still places with less than 200 past final examinees, which had not yet received quotas. These now received quotas of two-thirds of the number of such scholars in the past. (The implications of these numbers of past final examinees require further study.) Two months later quotas of a hundred students were fixed for places establishing schools but without teachers of preceptor rank. Increases in the student bodies of subprefectural schools were directed in the first month of 1104; according to the size of the subprefecture it should enroll fifty, forty or thirty students. Later that year a proclamation expressed concern over deficiencies in the conduct of the schools. Students were not progressing rapidly enough. Many buildings were mean or in poor condition, and the food and drink rations for students were inadequate. The supervisory officials were ordered, on pain of penalties, to visit all schools and enforce the regulations.

In 1109 Ko Sheng-chung, the Director of Education, submitted a report in twenty-five volumes, giving detailed data and statistics on all governmental schools and educational activities in the Empire. The report is lost, but the accompanying memorial, preserved in his collected papers, mentions some of the statistical

totals, excluding the universities at the capital. Some of the figures will not be too illuminating until we can fit them better into a broader context. But the following items are quite clear in their significance:

Students taught and supported at primary and other school:..167, 662
 Regular school buildings (hsüeh-she).....95, 298 ying
 Subsidiary buildings (fang lang).....155, 454 ying
 School fields.....105, 990 ch'ing

The number of students in schools, since it includes primary students, evidences to some extent an increase in the length of state-supported education, and not entirely an increase in the number of persons who at some time received state education. Even allowing for this, however, it suggests a far larger number of scholars benefiting from state education than any earlier dynasty or period evidences. It may also be compared, mutatis mutandis, with Professor Ho Ping-ti's estimate of 32,500 students in the Ming government schools of the 15th century, before these became agencies for examination and control rather than teaching institutions. *

The school fields provided only a portion of the financial support of education, but the figures again are suggestive of the growth in state provisions for the schools and the living expenses of the students. Only some forty years earlier an allocation of ten ch'ing per prefectural school represented a high goal; if every prefecture and subprefecture in the Empire received this much, the total would have been less than a sixth of the field areas mentioned in the 1109 report. As for school buildings, while the ying or "bay" was very probably a somewhat variable unit of measurement, the total listed for regular school buildings might make nearly the equivalent of fifty schools on the scale of the great Pi-yung in K'ai-feng.

Some glimpses of individual schools help to bring the picture into somewhat better perspective. We saw earlier that the school

*Ladder of Success, p. 173 ff. Cf. also T.Grimm, Erziehung und Politik in Konfuzianischen China der Ming-Zeit, esp. p. 47.

of Sheng subprefecture, in the prefecture of Yüeh in Liang-che, was founded in 1048. The Sung local history tells us that the local school buildings there were extended in 1103. For reasons unstated the school was closed in 1106, but reopened after two months. The primary school, with 40 students, had a primary school head and an instructor (chiao-yü). The regular school, with 50 students, was staffed by a head, an instructor, and a school auxiliary (chih-hsüeh). The students all followed civilian courses; there were none with military speciality. (In this it seemingly differed from some other schools of the kind.) The prefectural school of Chi in Chiang-nan West we have also met already in its opening years. Its students had numbered "over 300" about 1044. In 1114 the provincial intendant of education reported that the number of students in actual residence was 634, and "according to quota it supported 792 students." (Either some were out of residence or the quota was not filled.) He secured approval for the addition of another preceptor to the two already there, to conform with a rule of 1007. Another interesting example is the prefectural school of Chien in Fukien. This had been allocated five ch'ing of land in 1039, and the school was opened 1044. A preceptor was appointed in Shen-tsung's reign (the only one in Fukien). In 1114 it had two preceptors, and received approval for a third on the basis of its quota of 1,328 students. These three cases certainly do not represent the average; all were no doubt outstanding schools of their respective categories. But they indicate on the one hand the kind of expansion that had taken place in three quarters of a century, and on the other hand the great variations in size according to the needs of population and the conditions of local demand.

The school development under Hui-tsung did not move forward at an even rate and without pause. There had been, and would be after 1109, occasional retrenchments in one aspect or another. But the innovations did not cease for another decade. One facet receiving further attention was the provision of primary education. We read that in 1114 the administrator of Ch'üan-chou complained of the quota limitations for primary schools, which permitted only fifty pupils in schools of large prefectures, forty in subprefectures

of 30,000 households, and only five in smaller places. He requests quota expansion and additional instructors where population is large or the level or potential ability is high. Later we learn that after investigation by the provincial educational supervisors the student quota of Tzu-chou was raised from fifty to sixty-five and that of Wen-chou from forty to seventy. In the same year it appears that at the capital the primary students numbered nearly 1,000, and were still increasing. They had ten university-student instructors (kung-shih chiao-yü). Approval was given to a division of the students into ten halls and an increase of instructors' monthly stipends by two strings of cash; but the acceptance of student gifts by teachers (shuo-hsiu) was expressly forbidden.

The revised rules for primary school teaching issued at this time contain interesting details. The teachers in local prefectures and subprefectures should comprise the school head plus another teacher where there were more than thirty pupils. The entering pupils should be eight or more years of age (Chinese style). (Earlier the age had been ten.) They might not be accepted if there was evidence of their past disobedience, infraction of rules, or unfilial or un-younger-brotherly conduct, either public or in the family. ("Infraction" was interpreted as including robbery, theft, falsification, or immorality.) The examination for promotion to the middle-grade school was given at the age of fifteen (Chinese style), but they should be permitted to take it earlier if they wished. Pupils received food and provisions or one half the allocation for the middle-grade students. When the quota of pupils was filled, further applicants could be received for instruction but without the living allowances: a very important provision. Students in the school were placed in three levels, similar to those of the universities. To be promoted to the middle level, lower group, they should be able to recite one classic and "write 200 characters daily" (?). To move to the upper group of the level they had to recite a large and a small classic and "write 300 characters." For the upper level, lower group, they must add another large classic and another 100 characters, and be at least ten years of age. For the upper group, they added still another large classic and 200 characters, and had to be twelve. The age

requirements might be waived, however. Examinations were to hold quarterly. They were tested on their understanding of the classics, and a grade of 70% was considered passing.

Another development was the stress on specialized education, particularly in medicine. Special schools in law, mathematics, writing, and military science had existed since the T'ang, and were continued or revived. Hui-tsung not surprisingly added to teaching in calligraphy courses in the different kinds of painting. The establishment of a special faculty of medicine in the Office of Imperial Medicine was conceived under Shen-tsung. In addition to a supervisor and two assistants it provided for two preceptors in each of the three branches of medicine and 300 students. It seems, however, that the plan was not really carried out. Hui-tsung had shown an enthusiasm for medicine in his ambitious program of local hospitals, and whether or not his influence was instrumental, the interest in medical study was particularly conspicuous in his reign. There was complaint that the study of medicine lacked encouragement, the quality of physicians was low, and the cultured and dedicated avoided entering the profession. To remedy this situation a separate School of Medicine, on the pattern of the universities, was established in 1103. There were to be four professors (po-shih), each teaching his specialty. There were 200 students in the lower level, sixty in the middle level, and forty in the upper. The curriculum and examinations are described in detail. A degree of "graduate in medicine" (i-hsüeh ch'u-shen) was awarded. The best graduates were to become physicians of the Emperor, the next best, professors of medicine, and so on down through lesser staff of the Medical School, medical preceptors of large prefectures, of lesser prefectures, etc.

There was concern also with the quality of medicines obtainable, since those sold on the open market were hard to differentiate. A T'ang practice was revived, and special medical gardens were developed near K'ai-feng.

By 1111 rules were provided for regular establishment of medical schools in the various prefectures. The prefectures of the capitals and others of the upper and middle class were each to have a medical professor and an assistant preceptor; those of the lower class were

to have a professor only. The number of medical students in the capital and regional-command prefectures should be ten, and in others seven. A measure of this time decries abuses in the appointment of the teachers and emphasized the requirement of proper qualifications. In 1115 a group including Ts'ao Hsiao-chung, supervisor of the Palace physicians and currently a compiler of a new medical compendium, proposed a measure extending the system to include subprefectural medical schools also. The intendants of education should select medically qualified men already on the prefectural staffs and give them concurrent positions as medical preceptors. The quota for promotion to the capital schools should be 15% of the regular provincial promotion quota, supplementing the latter. The memorials and proclamations supply rather detailed provisions concerning the subjects and texts to be studied and the methods of examination.

The prospects for these varied and promising experiments were not favorable, however. After 1120 the Empire entered a period in which the long-accumulating economic, political, and foreign difficulties mounted rapidly to a stage of continual crisis, ending in the foreign conquest of northern China in 1127. The end of the adventure in educational improvement was foreshadowed in radical curtailments of the program. Educational administrative and teaching posts were eliminated, including the educational intendants and even the faculty of the Pi-yung, in 1121. When order was restored in southern China after 1127 many features of the governmental program were revived, but gradually and cautiously, and never on the scale reached in the early 12th century. The task of education was taken up rather by the private academies, which now entered their period of great development. Thus the end of Hui-tsung's reign marked the end of one phase in China's educational growth and the beginning of another.

5. The significance of Hui-tsung's educational experiment

These scattered pieces of evidence show the magnitude of educational effort during the first two decades of the 12th century, and the striking progress actually made in broadening educational

opportunity and increasing the flow of trained men from the government-supported schools. But they cannot readily answer some of our more fundamental questions on the real significance of these facts for China's social and technological change in this period of unusual fluidity. How good and how valuable was the education that was provided? And what were the real implications of all this activity for educational opportunity and the supply of educated men, when it is viewed in the total historical context of the time? Are there motives and influences, beyond those already mentioned, which shaped or limited the development in particular respects? And what was the total impact of the episode on the events of the time? If we shall ever be so bold as to venture answers to these questions, the need for further research will become painfully evident. But some observations are possible even on our present limited data.

The concern of the time with the quality of school education has been evidenced in some of the statements already cited. The increasing appointments of full-time teachers, with higher rank and pay, and the rewards for superior performance, all must certainly had their effect. There is also some biographic evidence that teaching tended to form a career within the government service, to which more able men were directed.

Ch'en Yü-yi, for example, graduated from the University with high honors (chia k'o) in 1113, at the age of about 23. He became a preceptor in a superior prefecture, and then professor at the University; later he was transferred to other kinds of work. Ch'iang Yüan-ming, a doctoral graduate of 1085, served successively as preceptor in Chi-chou and Hang-chou, then went into other work, later became Director of Education, and still later Grand Formator.

Ko Sheng-chung, a doctoral graduate of 1097, after a local judicial post was recommended, got a special examination for documentary experts and that for school officials, and served successively as preceptor in a prefectural school and as an administrative official of the University. After work in other fields and temporary demotion through differences over policy, he became Director of Education and then a prefectural administrator. Once more under attack, he was defended by the

Emperor; he later lost his job through refusal to cooperate with the scandalous favorite Chu Mien in seeking out rare birds for the Emperor's collection. Later he served effectively in defense against the Jurchen and relief of local famine. He was offered the office of Grand Formator, but declined on the ground of insufficient scholarly eminence.

The careers of Chiang Ching, Wang Tsao, and the noted scholar Yeh Meng-te also illustrate this trend of the period in different ways. A variant case was that of Liu Ssu-ming. He won special distinction in the University, and after various offices became Grand Formator. Hui-tsung dismissed him for "favoring the powerful and honored" in student promotions and "pressing down indigent scholars."

In the subject matter of studies, the continued emphasis on classical study and ethics in the main curriculum presumably reflected in part the primary goal of the system: the training of officials for a government service that was still forced to assign very broad responsibilities to most positions. In teaching and examinations, the practical application of principles was stressed. Purely literary exercises were discouraged. Parallel with the dominant classical stress, however, a trend toward greater specialization was evidenced, particularly in the striking growth of medical education. We can only guess how far and how fast this trend might have progressed had the experiment not been so rudely interrupted. It seems that free exploration of ideas was not encouraged in one important respect, and this was in the heart of the curriculum: political thought. We have seen the systematic effort to prevent all circulation of the writings of Wang An-shih's opponents, early in Hui-tsung's reign. At this time the Spring and Autumn Annals served to support unacceptable political ideas. The professorship in this classic was abolished, and its teaching was forbidden. In 1103 the doctrines of Ch'eng Yi were condemned as biased and heterodox. That philosopher, it was said, regarded lightly the ideas of the Emperor Shen-tsung and ventured to put forth his "private views." Whatever the merits of the views in question, such an attitude would not seem to encourage explorative efforts among the students.

What was the real impact of Hui-tsung's experiments on educational opportunity in China and in particular on that of boys from obscure and unprivileged backgrounds? Expressions of interest in the "chilled and valiant scholar from the country village" were not new and had already figured in the early Sung educational expansion. Motives for this interest were practical as well as idealistic. Impoverished scholars had in fact benefited. Under Hui-tsung, we find further measures of practical assistance to less privileged groups. At the homes for pauper children, for example, it was directed that "small boys who are teachable should enter the primary schools to hear and read. If their clothes are ragged, supply them from the public relief funds. Exempt them from the school entrance fees." In the school plan of 1102, sons of officials on local duty might enter local schools but for admission to the universities were required to compete with students at the capital, rather than with those from provincial places. We have seen the removal of Liu Ssu-ming for discrimination against "indigent scholars."

The statistical evidence on education under Hui-tsung, persuasive as it is, needs interpretation, for it tells us only of the governmental segment of the larger educational process. The relative silence of contemporary sources about private academies may lead us to assume that the larger private academies either became government schools or faded away. But private teaching and private study must still have played an extremely important role. The number of students who attempted the local doctoral examinations around 1100 would seem to be two or three times the number we should expect from Hui-tsung's primary schools. And what of the numbers of literate men needed to carry on the economic life of the cities, or fill the minor clerical posts but without intensive study of the examination sort? And what of the education of women? They evidently had no place in the government schools, but we know that those of literati families were often well educated and not infrequently taught their sons. It seems rather likely that women of bourgeois families would often be literate also. Clearly the story of government education was not that of Chinese education as

a whole.

Yet the multiplication of government schools certainly helped significantly to widen opportunity. They probably gave better financial support to their students. The private academies tended clearly to be largest and most numerous near the southeast coast, in Chiang-nan East and West, and in the northern regions nearer to K'ai-feng. The government schools, while they also favored these populous and cultured areas, certainly had a greater impact in the more backward areas. Here they not only added schools where there were none, but also afforded better instruction where the private variety was makeshift. It may be pertinent to remember Ou-yang Hsiu, who did poorly in the doctoral examinations until he gained entrance to the government school at the capital and then passed them with highest distinction.

In the matter of motivation, some of the cases already seen suffice to demonstrate the presence of political factors in the operation of the schools as well as in their teaching. Political bias no doubt detracted from the effectiveness of the experiment. But it seems an inadequate explanation of the huge effort. Beyond factional ends, the experimenters must have sought a solution for their administrative difficulties in the improvement of China's intellectual resources.

The rapid pace of events brought disaster when the generation that began its training in the new primary schools had only begun to enter public life. They could have had little effect on policy. The university students added their strident voices to the political debates of the crucial invasion months, evidencing their zeal but not necessarily helping to meet the emergency. Actually, the mounting expense for education may well have contributed heavily to the critical economic difficulties of the period--far more than the Emperor's esthetic and other personal indulgences. In the years after 1127, too, the disrupted economy and continuous warfare scarcely encouraged the graduates of Hui-tsung's schools to develop long-range solutions for the nation's problems. Would the result have been still worse without their presence? In the non-political sphere they may have added their share to the prolific cultural

productivity that Southern Sung intellectuals somehow maintained amid hardships and frustrations. Their presence should be remembered when we study the history of those years.

A Note on Sources

I must apologize for the lack of exact documentation. The statements in this paper concerning education under Hui-tsung rest for the most part on the following sources, according to approximate frequency of use:

Sung Hui-yao Chi-kao. Ch'ung-ju section, esp. chs. 1-3.

Hsü Tzu-chih T'ung-chien Ch'ang-pien Shih-pu, *passim*.

Ko Shen-chung, Tan-yanh Chi, ch.1 la ff.

Kao Ssu-sun, Yen Lu (gazetteer of Sheng hsien in Yüeh chou), (1214), ch. 1, 14a-20a.

Ch'en Chün, Huang-ch'ao Pien-nien Kang-mu Pei-yao, *passim*.

T'ö T'ö, Sung Shih, biographies.

Statements on the earlier Sung rest for the most part on these and in addition on:

Li Tao, Hsü Tzu-chih T'ung-chien Ch'ang-pien, *passim*.

Collected papers of individual authors, especially:

Ou-yang Hsiu (SPTK ed.), ch.39, 11b-13a, et *passim*.

Chu Hsi (SPTK ed.), ch.13, 20b-21b, et *passim*.

Su Shih (SPTK ed.), ch.52, 5b-6b.

Tseng Kung (SPTK ed.) ch.18, 12b-14b.

Yin Chu (SPTK ed.), ch.4, 8b-10a.

Fan Chung-yen (SPTK ed.), ch.7, 1b-2b.

Ma Tuan-lin, Wen-hsien T'ung-k'ao, chs.42-46.

Wang Ying-lin, Yü Hai, chs. 111-113.

Sung Feng-chi, Chih-kuan Fen-chi. ch.21.

SHEN KUA: A PRELIMINARY ASSESSMENT OF HIS SCIENTIFIC
THOUGHT AND ACHIEVEMENTS
Nathan Sivin

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Our and Professor Sivin's aims in reprinting this article are twofold. First, we wish to place this extended treatment of one of the most brilliant and fascinating figures in Sung (indeed in Chinese) history into the hands of those most likely to use it. The reference section of the library, where most of us would normally have access to The Dictionary, can sometimes be quite out of the way. Second, as Professor Sivin has embarked on a long-term study of Shen Kua, he is hopeful that circulation of his essay among Sinologists will stimulate such suggestions and criticisms as any serious study of the subject must consider. Communications will reach Professor Sivin at Oriental Studies, University of Pennsylvania, Philadelphia 19174.

SHEN KUA¹ (b. 1031, registered at Ch'ien-t'ang² [now Hangchow, Chekiang province], China; d. Ching-k'ou, Jun prefecture³ [now Chinkiang, Kiangsu province], China, 1095), *polymathy, astronomy*.

Shen was the son of Shen Chou⁴ (ca. 978-1052) and his wife, whose maiden name was Hsu.⁵ Shen Chou came of a gentry family with neither large landholdings nor an unbroken tradition of civil service. He spent his life in minor provincial posts, with several years in the capital judiciary. Shen Kua apparently received his early education from his mother. A native of Soochow (the region of which was known for its flourishing manufactures, commerce and agriculture). She was forty-four or forty-five years old when he was born. Shen's background made possible his entry into the imperial bureaucracy, the only conventional road to advancement for educated people of his time. Unlike colleagues who came from the ancient great clans, he could count on few advantages save those earned by his striving and the full use of his intellectual talents. Shortly after he was assigned to the court, he became a confidant of the emperor and played a brilliant part in resolving the crises of the time. But within slightly over a decade his career in the capital was ended by impeachment. After a provincial appointment and five years of meritorious military accomplishment, he was doubly dis-graced and politically burned out. The extremes of Shen's career and the shaping of his experience and achievement in science and technology become comprehensible only if the pivotal circum-stances of his time are first considered.

Historical Background. Shen's tie was in man senses the climax of a major transition in the Chinese polity, society, and economy.

Three centuries earlier the center of gravity in all these respects still lay in the north, the old center of civilization of the Han people. Wealth and power rested in the hands of the old aristocratic landowning families. Governmental institutions incorporated the tension between their private interests and the inevitable desire of their foremost peer, the emperor, to concentrate authority. The civil service examination system was beginning to give the central government a means to shape a uniform education for its future officials; but since birth or local recommendation determined who was tested, the mass of commoners remained uninvolved. The social ideals prevalent among the elite were static; the ideal past was cited to discourage innovation; and the moral example of those who ruled, rather than responsive institutions or prescriptive law, was held to be the key to the healthy state. The classicist's paradigm of a two-class society—self-sufficient agriculturalists ruled and civilized by humane generalists, with land as the only true wealth—did not encourage commerce, industry, or the exploitation of natural resources. The wants of the great families, whose civil servant members were becoming city dwellers by the middle of the eighth century, nonetheless gave momentum to all of these activities; but the majority of the population still took no part in the rudimentary money economy.

The T'ang order began a long, slow collapse about 750, until in the first half of the tenth century the empire of "All Under Heaven" was reduced to a succession of ephemeral and competing king-

doms. When the universal state was reconstructed in the Northern Sung (960-1126), its foundations were in many important respects different from those of the early T'ang. A new dynasty was not only, as classical monarchic theory had it, a fresh dispensation of the cosmos; it was also the occasion for institutionalizing a new distribution of power in society. The cumulative result of changes in taxation had been to make the old families accountable for their estates as they had not been earlier, and to encourage smaller landholdings—and, thus, a wider diffusion of wealth.

The center of vitality had moved southeast to the lower Yangtze valley, which had long before emerged as the major rice-yielding region. By this time its fertility, combined with its relative freedom from restrictive social arrangements, had bred a new subculture that was more productive in industry than elsewhere and hospitable to the growth of commerce and stable markets, the beginnings of a uniform money economy, and the great broadening of education that printing had just made possible. The new southern elite was, on the whole, small gentry, and lacked the military traditions of the ancient northern clans and of power holders in the period of disunion. Their families were often involved in trade for them to despise it. Although conservative, as all Chinese elites have been, they were prepared to think of change as a useful tool. The novelties of attitude and value were often slighter or subtler than such a brief account can convey, but within the established limits of Chinese social ideals their consequences were very considerable.

In Shen Kua's time the old families still provided many of the very highest officials and thus wielded great influence, positive or obstructive, in discussions about the future of China. But they had become merely influential members of a new political constellation that brought a variety of convictions and interests to that perennial debate. An especially obvious new element was that many southern small gentry families like Shen's established traditions of civil service, either as a main means of support or to protect and further their other concerns. Once a family's social standing was achieved, one or more members could enter the bureaucracy freely because of experience as subordinates in local administration or because they were amply prepared by education for the examinations. Their sons could enter still more freely because special access to both direct appointment and examination was provided to offspring of officials.

Not sharing the old vision of a virtue-dominated social order fixed by precedent, men of the new elite were willing to sponsor institutional renovation in order to cope directly with contemporary problems. Dependent on their own talents and often needing their salaries, they were dedicated to building a rational, systematic, and in most respects more centrally oriented administration. They were willing to make law an instrument of policy, and insisted that local officials be rated not only on the moral example they set but also quantitatively on how effectively they made land arable and collected taxes. In the name of efficiency they devoted themselves to removing customary curbs on imperial authority and (with only partial success in the Sung) to dismantling the structures of privilege that underlay regional autonomy. Only later would it become clear that they were completing the metamorphosis of the emperor from paramount aristocrat to autocrat. At the same time they were successfully demanding more policy-making authority as the emperor's surrogates, although at the cost to themselves of greater conformity than officials of the old type had willingly accepted.

This irreversible transition did not lead to a modern state, but only to a new and ultimately stagnant pattern. The most accelerated phase of change was the activity of what is called the New Policies⁶ group (actually a shifting coalition) between 1069 and 1085. Its leader Wang An-shih⁷ (1021-1086), was brought to the capital in 1068 by the young emperor Shen-tsung, who had just taken the throne. Within two years Wang had become first privy councillor. He resigned for nine months in 1074, when pressure from his antagonists persuaded the emperor to be less permissive, and returned permanently to private life in 1076. The New Policies continued to be applied and extended, but with less and less attention to their founding principles, until Shen-tsung's death in 1085. Under the regency of the empress dowager, enemies of the reform attempted for eight years to extirpate Wang's influence and take revenge upon his ad-herents. When Emperor Che-tsung came of age in 1093, the New Policies were revived, but were so bent toward selfish ends and administered so disastrously that the word "reform" is hardly applicable.

Wang An-shih's opponents were many: the old aristocrats, career bureaucrats of the sort who would oppose any change as disruptive, officials whose individual or group interests ran in other directions—and men of high ideals who found his proposals

ill-advised and his personal style too intolerant.*

No institution had evolved through Chinese history to work out and resolve conflicts of political viewpoint. This lack was filled by cliques, intrigues, and appeals to imperial intervention. Division and corruption among ardent supporters of the New Policies also had been a problem from the start. The scope of Wang's program was so large that he had to take competent support where he found it. The new access to power that he offered attracted ambitious men, many of whom had little real sympathy for his convictions and dedicated themselves primarily to manipulation and graft. Once Wang was gone, the leadership of his group tended to become a battleground for aspirations of this kind. The internal and external enemies of the New Policies left the program a shambles by the time the Chin Tartars drove the Sung south in 1127.

A primary aim of the reforms was financial security of the state, which prompted initiatives in water control and land reclamation, encouragement of extractive industries and agriculture, intervention in commerce, and rationalization of taxes. Another goal, particularly at the emperor's insistence, was military strength. There had been a long confrontation between the Chinese and the powerful Khitan empire, pastoral masters of mounted combat to the north (renamed Liao in 1066). Seventy years of fitful peace were punctuated by humiliating Chinese failures to recapture territory south of the Great Wall and maintained by large annual bribes. For three decades the Tangut people of the northwest had posed an almost equally unpalatable demand for appeasement. Victory or detente through strength, the emperor hoped, could be bought on both fronts with the wealth that the New Policies generated from man's exploitation of nature. Here too expertise was needed in cartography, strategic theory and tactical doctrine (both of which contained cosmological elements), design and manufacture of war materiel, fortification, troop organization and training, and development of a stable economy in border regions.

*In the successive reform movements of the Northern Sung there were considerable differences in the alignment of men with different beliefs and backgrounds. See the discussion in James T. C. Liu. "An Early Sung Reformer: Fan Chung-yen." In John K. Fairbank, ed. *Chinese Thought and Institutions* (Chicago 1957), 105-131. Esp. 107-109. The generalizations of the present article and of current scholarship as a whole are crude and tentative, pending the "comparative analysis of the inter-relationships between ideology and family, class, status-group, and regional interests" that Robert M. Hartwell has called for in "Historical Analogism. Public Policy, and Social Science in Eleventh and Twelfth-Century China." In *American Historical Review*, 76 (1971), 690-727.

Shen Kua contributed to nearly every field of New Policies activity, both civil and military. His social background and political commitments cannot be considered responsible for his scientific talent or curiosity; the antecedents and loyalties of other major contemporary scientific figures were very different from his. But a review of his career and of his work will show how regularly his involvement with particular technical themes and problems grew out of his activities in government.

Life. From about 1040 Shen traveled through his father to successive official posts from Szechwan in the west to the international port of Amoy. He was exposed not only to the geographical diversity of China but also to the broad range of technical and managerial problems—public works, finance, improvement of agriculture, maintenance of waterways—that were among the universal responsibilities of local administrators. Because his physical constitution was weak, he became interested in medicine at an early age.

Late in 1051, when Shen was twenty, his father died. As soon as the customary inactivity of the mourning period ended in 1054, Shen received the first of a series of minor local posts; his father's service exempted him from the prefectural examination. His planning ability became almost immediately apparent when he designed and superintended a drainage and embankment system that reclaimed some hundred thousand acres of swampland for agriculture. This was the first of a series of projects that established his reputation for skill in water control. In 1061, as a subprefect in Ning-kuo⁸ (now Fu-hu,⁹ Anhwei province), after a cartographic survey and a historical study of previous earthworks in the region, he applied the labor of fourteen thousand people to another massive land reclamation scheme that won the recognition of the emperor. In a series of floods four years later, Shen noted, it was the only such project not overwhelmed. He wrote characteristically that in the first year it returned the cost of the grain used, and that there was more than a tenfold profit on cash expended. In 1063 he passed the national examinations. Posted to Yangchow, he impressed the fiscal intendant (a post then equivalent to governor), Chang Ch'u¹⁰ (1015-1080), who recommended him for a court appointment leading to a career in the professional financial administration. *

* The succession of fiscal posts that often led to a seat on the Council of State in the eleventh century has been documented by Robert M. Hartwell in "Financial Expertise, Examinations, and the Formulation of Economic Policy in Northern Sung China," in *Journal of Asian Studies*, 30, 281-314.

Shen apparently used the time not occupied by his early metropolitan appointments, which were conventional and undemanding, to study astronomy. In reply to the informal questions of a superior, he set down clear explanations, still extant, of the sphericity of the sun and moon as proved by lunar phases, of eclipse limits, and of the retrogradation of the lunar nodes. They demonstrate an exceptional ability to visualize motions in space, which were at best implicit in the numerical procedures of traditional astronomy and seldom were discussed in technical writing. In 1072 Shen was given an additional appointment as director of the astronomical Bureau. With the collaboration of his remarkable commoner protegee Wei P'u¹¹ and the aid of other scholarly amateurs, using books gathered from all over the country, he undertook a major calendar reform. He planned an ambitious series of daily observations to extend over five years, using renovated and redesigned instruments. When he took office, the bureau was staffed with incompetents. He forced the dismissal of six whom he caught falsifying records of phenomena, but the obstruction of those who remained doomed his program of observations and kept his new system of ephemerides computation from being among the two or three most securely founded before modern times. Shen's personal involvement in later stages of the reform undoubtedly was limited by his gradual movement into the vortex of factional politics.

Shen was early known to Wang An-shih, who composed his father's epitaph while a young provincial official; Shen eventually came to be publicly identified by enemies of the New Policies as among the eighteen members of Wang's intimate clique. In late 1072, in support of Wang's program, Shen surveyed the silting of the Pien Canal near the capital by an original technique, dredged it, and demonstrated the value of the silt as fertilizer. Until mid-1075 he spent much time traveling as a troubleshooter of sorts, inspecting and reporting on water control projects, military preparations, and local administrations—and, it has been conjectured, providing encouragement to Wang's provincial supporters. Shen was put in charge of arsenal activities and, in 1075, was sponsored by Wang (then head of government) to revise defensive military tactics, a task the throne had proposed for Wang himself.

In 1074 the Khitan were pressing negotiations to move their borders further south. Incompetent and timorous Chinese negotiators were conceding unfounded Liao assertions about the language and substance of previous agreements. Shen built a sol-

id Chinese case to going to the archives, as no one had bothered to do before. His embassy in mid 1075 to the camp of the Khitan monarch on Mt. Yung-an¹² (near modern P'ing-ch'üan,¹³ Hopei) was triumphant. He described himself surrounded by a thousand hostile onlookers, calling on his staff, who had memorized the old documents of the Khitan themselves, to cite without pause or flurry the exact reference to refute one historical claim after another.

Shen returned to China—with biological specimens and maps of the territories he had passed through—to become a Han-lin academician, to be given charge of a large-scale water control survey in the Yangtze region, and then to become head of the Finance Commission. While in this very powerful position he untangled a variety of contradictory policies, producing in the process some of the most penetrating writings before modern times on the operation and regulation of supply and demand, on methods of forecasting prices in order to intervene effectively in the market, and on factors that affect the supply of currency (varying through hoarding, counterfeiting, and melting) as the value of the metal in it fluctuates about its controlled monetary value. In the autumn of 1077, just as his revision of critical fiscal measures was well launched, he was impeached by the corrupt and vindictive censor Ts'ai Ch'ueh¹⁴ (1036-1093). The charge was that Shen had opposed a New Policies taxation measure in an underhanded, inconsistent, and improper way. It was credited by historians for centuries, but its truth has been refuted in every detail by recent Chinese research. His protector Wang An-shih had just left government: it is believed, given the mood of the time, that by threatening an established budget item in order to ease the burdens of the poor, Shen became an easy victim of factional maneuvering.

The emperor was not only the ritual synapse between the political and natural orders; he was a human being whose likes and dislikes were indulged within broad limits that could be further widened by force of his personal charisma and will. The closer to him an official penetrated, the more achievement and even survival became subject to imperial whim and the intrigue of colleagues. Although the record is fragmentary, it gives the impression that Shen Kua was maneuvered by Wang An-shih into the proximity of the throne because of his brilliance, judgment, and effectiveness at complicated tasks. Nothing indicates that he was adept at protecting himself. He attracted the most damaging animosity not from opponents of the

New Policies but from designing members of his coalition. Once the emperor qualified his support of the New Policies in 1074, the risk of debacle remained great and imminent. Many officials who had risen with Wang fought furiously for the power that would keep them afloat even though the program sank. They did not wish to be deterred by a colleague who judged issues on their own merits. They probably also felt, as other did, that a man of Shen's age and rank did not deserve the emperor's confidence.

Ts'ai Ch'ueh was rising into the vacuum that Wang's retirement had left. The emperor depended increasingly on Ts'ai's monetary counsel and could not easily disregard what he insisted upon. For Three years it was impossible to overcome his objections and those of another censor, and to rehabilitate Shen. Finally Shen was sent to Yen-chou¹⁵ (now Yanan, Shensi province), on the necessary route for military operations by of against the Tanguts, as commissioner for prefectural civil and military affairs.¹⁶ The Tangurs were then divided and weakened, minor Chinese conquests around 1070 had set the stage for a war, and the treasury had ample funds. Shen played an important part in organizing and fortifying for the victorious offensive of the autumn of 1081. In extending Sung control he showed a practical as well as a theoretical mastery of the art of warfare. He was cited for merit and given several honorary appointments. It was probably at the same time that he was ennobled as state foundation viscount.¹⁷ In his sixteen months at Yen-chou, Shen received 273 personal letters from the emperor. His standing at the court was in principle reestablished. Whether he had become shrewd enough to survive there was never tested.

Shen and a colleague followed up the victory by proposing fortifications to close another important region to the Tanguts. The emperor referred the matter to an ambitious and arrogant official who, ignoring the proposal, changed the plan to provide defenses for what Shen argued was an indefensible and strategically useless location. Shen was commanded to leave the vicinity of the new citadel so as not to share in the credit for the anticipated victory. When the Tangut attack came, the emissary's force was decimated while Shen with imperial permission, was successfully defending a key town on the enemy invasion route to Yen-chou. The campaign thus provided the Tanguts with no opening for advance-but Ts'ai Ch'ueh was now a privy counselor. As titular military commander Shen was held responsible for the defeat and con-

siderable loss of life. At the age of fifty-one his career was over. The towns he saved were later abandoned by the anti-New Policies regime to no advantage, just as the lands he had saved from the Khitan through diplomacy had since been lost by another neighbor.

Shen spent six years in fixed probationary residence, forbidden to engage in official matters. He used at least two of these years to complete a great imperially commissioned atlas of all territory then under Chinese control. He had been working on this atlas intermittently since, as finance commissioner a decade earlier, he had had access to court documents. His reward included the privilege of living where he chose.

Ten years earlier Shen had bought, sight unseen, a garden estate on the outskirts of Ching-k'ou. In 1086, visiting it for the first time, he recognized it as a landscape of poignant beauty that he had seen repeatedly in dreams, and named it Dream Brook (*Meng chi*,¹⁸ alternately read *Meng hsi*). He moved there in 1088. Despite a pardon and the award of sinecures to support him in his old age, he spent seven years of leisure, isolation, and illness until his death there.*

Shen's writings, for which only a few are extant even in part, include commentaries on Confucian classics, two atlases, reports on his diplomatic missions, a collection of literary works, and monographs on rituals, music, mathematical harmonics, administration, mathematical astronomy, astronomical instruments, defensive tactics and fortification, painting, tea, medicine, and poetry. Of three books compiled during his last years at Dream Brook, one, "Good Prescriptions" (*Liang fang*)¹⁹ was devoted to medical therapy, theory, and philology; the other two belong to particularly Chinese genres. "Record of Longings Forgotten" (*Wang hui lu* ²⁰), a collection of notes on the life of the gentleman farmer in the mountains, contains useful information on implements and agricultural technique and, unlike more conventional agricultural treatises up to that time, on the culture of medicinal plants.

"Brush Talks From Dream Brook" (*Meng chi pi t'an* ²¹) and its sequels, extant and well-edited in modern times, is by any reckoning one of the most remarkable documents of early science and technology. It is a collection of about six hundred recollections and observations, ranging from one or two sentences to about a page of modern print—"because I had only my writing brush and ink slab

*For a translation that conveys the flavor of Shen's autobiography, see Donald Holzman, "Shen Kua," 275-276.

to converse with, I call it Brush Talks." They are loosely grouped under topics (seventeen in all current versions), of which seven contain considerable matter of interest in the study of nature and man's use of it: "Regularities Underlying the Phenomena"²² (mostly astronomy, astrology, cosmology, divination), "Technical Skills"²³ (mathematics and its applications, technology, medicine), "Philology"²⁴ (including etymology and meanings of technical terms), "Strange Occurrences"²⁵ (incorporating various natural observations), "Artifacts and Implements"²⁶ (techniques reflected in ancient objects), "Miscellaneous Notes"²⁷ (greatly overlapping other sections), and "Deliberations on Materia Medica"²⁸(most of it on untangling historic and regional confusions in identities of medical substances).

Notices of the highest originality stand cheek by jowl with trivial didacticisms, court anecdotes, and ephemeral curiosities under all these rubrics; other sections were given to topics conventional in collections of jottings-memorabilia, wisdom in emergencies, and so on. Shen's theoretical discussions of scientific topics employed the abstract concepts of his time-yin-yang, the Five Phases (wu-hsing²⁹), ch'i, ³⁰ and so on. A large fraction of the book's contents is devoted to fate, divination, and portents, his belief in which has been ignored by historians seeking to identify in him the prototype of the modern scientist. The author of "Brush Talks" has been compared with Leibniz; and in an era of happier relations with the Soviet Union, Hu Tao-ching, the foremost authority on Shen, referred to him as the Lomonosov of his day. But Shen was writing for gentlemen of universal curiosity and humanistic temperament; custom, wisdom, language, and oddity were as important themes as nature and artifice.

Because Shen's interests were multifarious, the record unsystematic, and its form too confining for anything but fragmentary insight, only accumulation can provide a fair impression of what constitutes his importance. What follows is the mere sample that space allows of his attempts to deepen the contemporary understanding of nature, his observations that directed the attention of his educated contemporaries to important phenomena or processes, and his own technical accomplishments. They are grouped to bring out contiguity of subject matter without interposing the radically different disciplinary divisions of modern science. These samples will become the basis of discussion-which, given the state of research, must be highly

tentative-of the epistemological underpinnings of Shen's work, and of the unity of his scientific thought with elements that today would be considered unscientific, primitive, or superstitious. Finally, it will be possible to evaluate Shen's life as a case study in the reconcilability of Confucianism and science, which the conventional wisdom among sinologists for over a generation has tended to place in opposition.

Quantity and Measure. Mathematics was not the queen of sciences in traditional China. It did not exist except as embodied in specific problems about the physical world. Abstract thought about numbers was always concerned with their qualities rather than their properties, and thus remained numerology. This art, although it blended into arithmetic, was only partly distinct from other symbolic means (in the anthropologist's sense: magical, ritual, religious, divinatory) for exploring the inherent patterns of nature and man's relation to it. Computation, on the other hand, was applied to a great variety of mensurational, accounting, and other everyday tasks of the administrator in a coherent tradition of textbooks. Occasionally curiosity and skill pushed beyond these pragmatic limits, but never very far. Some of the problems that Shen presented in "Brush Talks" had no application, but his enthusiasm for them was in no way qualified.

In addition to this accumulation of individual problems there were two exact sciences, in which mathematics served theory to advance knowledge of the patterns underlying the phenomena. One was mathematical harmonics (*ü ü* ³¹), which explored the relations between musical intervals and the dimensions of instruments that produced them. In ways analogous to the Pythagorean art. Its appeal was much the same in both China and Greece: it demonstrated how deeply the power of number was grounded in nature. For this reason in China mathematical harmonics was often put into the same category as mathematical astronomy, which also had foundations in metaphysics. Astronomy, by far the more technically sophisticated of the two exact sciences, was normally employed on behalf of the monarch. Unpredictable phenomena and failures of prediction were either good or bad omens. Bad omens were interpreted as warnings that the emperor's mediating virtue, which maintained concord between the cosmic and political orders, was deficient. Successful prediction of celestial events was symbolic preservation or enhancement of the charisma of the ruling dynasty.

The annual calendar (or almanac) issued by authority of the throne was thus of great ceremonial importance. It encompassed all predictable phenomena, including planetary phenomena and eclipses. The utilitarian calendrical aspects—lunar months and solar years—had long since been refined past any practical demand for accuracy, but astronomical reinforcement of the Mandate of Heaven called forth endless attempts at greater precision of constants. As it became conventional to institute a complete new system for computing these ephemerides when a new emperor was enthroned, technical novelty was at a premium. When new ideas were unavailable, trivial recasting of old techniques was usually substituted. Repeated failures of prediction were another motive for reform of the astronomical system. In such cases too the system was in principle replaced as a unit rather than repaired. Most systems survived or fell on their ability to predict eclipses, particularly solar eclipses. These were the least amenable of all celestial phenomena to the algebraic, nongeometric style of mathematics. Prior to Shen's time little effort had gone into predicting the apparent motions of the planets, which lacked the immediacy of solar and lunar phenomena. This was, in fact, an omission that Shen seems to have been the first to confront.

General Mathematics. As wood-block printing became widespread, the government used it to propagate carefully edited collections of important ancient textbooks for use in education. This was being done in medicine at the time Shen entered the capital bureaucracy. In 1084 a collection of ten mathematical manuals, made four centuries earlier and reconstituted as well as extant texts allowed, was printed. The authority of these projects served both to fix textual traditions, preserving selected treatises from further attrition, and passively to encourage the fading into oblivion of books left out. Shen thus lived at a pivotal period in the development of mathematics, and his judgments on lost techniques and disused technical terms (such as 300, 306) have played an important part in later attempts to interpret them.*

* Numbers in parentheses are item numbers in the Hu Tao-ching edition of *Meng ch'i pi t'an* (the latter is referred to hereafter as "Brush Talks"). Roman volume numbers followed by pages numbers refer to translations in Joseph Needham *et al.*, *Science and Civilization in China*. Where my own understanding differs considerably from Needham's, an asterisk follows the page reference. All quotations below are from Shen, and all translations are my own. Full bibliographical data are given in the notes only for sources of too limited pertinence to be included in the bibliography. Chinese and Japanese family names precede personal names throughout this article.

"Brush Talks" is also an essential source for the study of pre-Sung metrology, currency, and other subjects related to computation.

Shen used mathematics in the formulation of policy arguments more consistently than most of his colleagues; examples are his critique of military tactics in terms of space required for formations (579) and his computation that a campaign of thirty-one days is the longest that can feasibly be provisioned by human carriers (205). But of the computational methods discussed in his "Technical Skills" chapter, those not related to astronomy are almost all abstractly oriented.

This original bent emerges most clearly in two problems. One departs from earlier formulas for computing the frustum of a solid rectangular pyramid. Shen worked out the volume of the same figure if composed of stacked articles (he mentioned go pieces, bricks, wine vats) that leave interslices (301). Since Shen intended this "volume with interslices" (*ch'i chi*³²) method to be applicable regardless of the shape of the objects stacked, what he gave is a correct formula for the number of objects, which are thus to be considered of unit volume. His presentation has several interesting features. Needham has suggested that the concern with interslices (and, one would add, unit volumes) may have been a step in the direction of geometric exhaustion methods (III, 142-143)—although it was tentative and bore fruit only in seventeenth-century Japan. Second, instead of the worked-out problem with actual dimensions that is conventional in early textbooks. Shen simply gave a generalized formula: "double the lower length, add to the upper length, multiply by the lower width," and so on. Third, this was the earliest known case in China of a problem involving higher series. Built on earlier numerical approaches to arithmetical progressions, it provided a basis for more elaborate treatment by Yang Hui³³ (1261) and Chu Shih-chieh³⁴ (1303).

The second problem of interest was said "in a story" to have been solved by one of China's greatest astronomers, the Tantric Buddhist patriarch I-hsing³⁵ (682-727): the number of possible situations on a go board, with nineteen by nineteen intersections on which any number of black or white pieces may be placed. Whether I-hsing actually solved this problem we do not know; Shen's single paragraph was the first and last known discussion of permutations in traditional mathematics. It stated the order of magnitude of the answer—"approximately speaking one must write the char-

acter wan³⁶ (10,000) fifty-two times in succession" — adding exact answers for smaller arrays, three methods of solution, and a note on the limited traditional notation for very large numbers (304).*

Mathematical Harmonics. The Pythagoreans were fascinated by the relations of concordant intervals to the plucked strings that produced them, since the lengths between stops were proportionate to simple ratios of integers. The Chinese built up a similar science in a gamut of standard pipes. Beginning with a pipe eight inches long and 0.9 inch in diameter, they generated the lengths of subsequent pipes by multiplying the previous length alternately by 2/3 and 4/3, making twelve pipes within an approximate octave. The dozen were then related to such categories as the twelve divisions of the tropical year, in order to provide a cosmic basis for the system of modes that the pipes determined. A pentatonic scale, which could be used in any of the twelve modes, provided similar associations with the Five Phases. This basis was extended to metrology by defining the lengths and capacities of the pipes in terms of millet grains of standard dimensions. Shen provided a lucid and concise explanation of these fundamentals of mathematical harmonics, and corrected grotesque complications that had crept into a canonic source through mis-copying of numbers (143,549). He also experimentally studied stringed instruments. By straddling strings with paper figures, he showed that strings tuned to the same notes on different instruments resonate, as do those tuned an octave apart on the same instrument (537; cf. IV. 1, 130). His two chapters on music and harmonics³⁷ are also a trove of information on composition and performance.

Astronomy. Shen's major contributions in astronomy were his attempts to visualize celestial motions spatially, his arc-sagitta methods that for the first time moved algebraic techniques toward trigonometry, and his insistence on daily observational records as a basis for his calendar reform. The first had no direct application in computation of the ephemerides, although it may well have inspired (and at the same time have been inspired by) the second, which grew out of traditional mensurational arithmetic. It has been suggested that the clarity of Shen's cosmological explanations led to his appointment to the Astronomical Bureau,

* This was translated in part by Needham (III, 139). The extant text, even in Hu's edition, is very corrupt. It has been edited and considerably emended by Ch'ien Pao-tsung in *Sung Yuan shu-hsueh-shih lun-wen-chi*, 266-269.

which provided opportunity for his contributions in the second and third areas. But circumstances that arose from the bureaucratic character of mathematical astronomy made these contributions futile in his lifetime.

Shen's discussions of solar, lunar, and eclipse phenomena (130-131; excerpts, III, 415-416) have been mentioned. By far the most remarkable of his cosmological hypotheses attempted to account for variations in the apparent planetary motions, including retrogradation. This concern is not to be taken for granted, since traditional astronomers preferred purely numerical approaches to prediction, unlike the spatial geometric models of Greek antiquity, and showed little interest in planetary problems. Noting that the greatest planetary anomaly occurred near the stationary points. Shen proposed a model in which the planet traced out a figure like a willow leaf attached at one side to the periphery of a circle (see Figure 1). The change in direction of the planet's motion with respect to the stars was explained by its travel along the pointed ends of the leaf (148).* The willow leaf, in other words, served one of the same functions that the epicycle served in Europe. It is characteristic that, having taken a tack that in the West was prompted entirely by geometric reasoning, Shen's first resort should have been a familiar physical object. Use of a pointed figure doubtless would not have survived a mathematical analysis of observational data, but this remained an offhand suggestion.

Another early outcome of Shen's service at the court was a series of proposals for the redesign of major astronomical instruments: the gnomon, which was still employed to measure the noon shadow and fix the solstices; the armillary sphere, with which angular measurements were made; and the clepsydra, used to determine the time of observations (and to regulate court activities). Shen's improved versions of the latter two apparently were not built until late 1073, after he had taken charge of the Astronomical Bureau. The armillary at least was discarded for a new one in 1082, a casualty of his personal disgrace.

Shen's clepsydra proposals represent a new design of the overflow-tank type (Needham's Type B; III, 315-319, 325), but the most significant outcome of his work on this instrument was a juggling in problems of calibration. Day and night were by custom separately divided into hours, the

* Translated by N. Sivin, *Cosmos and Computation in Early Chinese Mathematical Astronomy* (Leiden, 1969), also published in T'oung Pao, 55(1969), 1-73 (see 71-73), from which The figure is reproduced with permission of E. J. Brill.

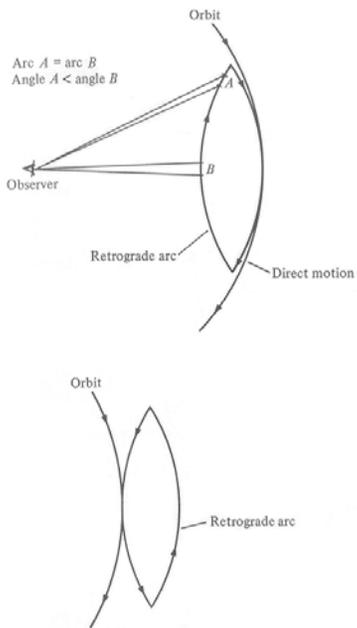


FIGURE 1. Shen Kua's explanation of planetary anomaly. He suggested that the "willow leaf" could be either inside or outside the orbit. No drawings appear with the text in "Brush Talks." length of which varied with the season. The time was read off graduated float rods, day and night sets of which were changed twenty-four times a years. Shen pointed out that this crude and inadequate scheme amounted to linear interpolation, "treating the ecliptic as a polygon rather than a circle," and argued for the use of higher-order interpolation (128).

The best armillary sphere available in the central administration when Shen first worked there was based on a three-hundred-year-old design "and lacked ease of operation" (150). The most interesting of Shen's improvements was in the diameter of the naked-eye sighting tube. At least from the first millennium B. C. a succession of stars had been taken up and abandoned as the pole star. In the late fifth century of the current era Tsu Keng³⁸ discovered that the current polestar, 4339 Camelopardi, rotated about a point slightly more than a

degree away. This determination of the true pole was incorporated in subsequent instruments by making the radius of their sighting tubes 1.5 Chinese degrees (each $360/365.25^\circ$). The excursion of the pole star just inside the field of view thus provided a nightly check on orientation. Six hundred years later Shen found that the polestar could no longer be kept in view throughout the night. He gradually widened the tube, using plots of the polestar's position made three times each night for three months to adjust aim, until his new calibration revealed that the distance of the star from "the unmoving place at the celestial pole" was now slightly over three degrees (127; III, 262). Shen's successors followed him in treating the distance as variable, although the relation of this secular change to the equinoctial precession was not explored. Aware of the periodic retrogradation of the lunar nodes, Shen also discarded the armillary ring representing the moon's path, which could not reflect this motion; it was never used again.

Calendar Reform. On the accession of Shentung in 1068, a new computational system was expected. The inability of the incumbent specialists to produce one left Shen with a clear mandate when he took over the Astronomical Bureau in 1072. The situation became even more awkward when he was forced to bring in Wei P'u and others from outside the civil service, although few of the incompetents already in the bureau could be dislodged, in order to begin work on the calendar reform. It is not yet possible to tell what part of the work was done by Shen and what part by his assistants, although it is clear that Wei took responsibility for compiling the system as Shen became increasingly occupied elsewhere in government. Wei, a commoner whose connection with Shen was first reported in 1068, bore the brunt of fervent opposition within the bureau. He was even formally accused of malfeasance.

Shen knew that previous Sung astronomical systems had suffered greatly from reliance on old observations, and had a clear conception of what new data were needed for the first major advance in centuries. Unabating opposition within the bureau and his own demanding involvements outside it limited the number of innovations of lasting importance in his Oblatory Epoch (*Feng-yuan*³⁹) system. It was the official basis of calendar computation from 1075, the year of its completion, to 1094, a period very close to the average for systems of the Northern Sung. That the system was not used longer has little to do with its merits, since except in cases of spectacular failure, Sung astronomical

systems changed as rulers changed. Shen's was replaced when a new era was marked by the coming of age of Che-tsung. The immediate vicissitudes and long-term influence of three special features will give a general idea of the limits that historical actuality set upon Shen's astronomical ambitions.

The boldest aspect of Shen's program was the attempt to master the apparent motions of the planets—not merely their mean speeds and prominent phenomena—for the first time. This could not be done with a few observations of stationary points occultations, and maximum elongations. Shen and Wei therefore planned a series of observations of a kind not proposed in Europe until the time of Tycho Brahe, five centuries later: exact coordinates read three times a night for five years. Similar records were to be kept for the moon's positions, since previous Sung systems had still used the lunar theory of Hsing, which after 350 years had accumulated considerable error. These records were the most unfortunate casualty of the antagonism within the Bureau. Shen and Wei had no recourse but to produce a conventional planetary theory based mainly on old observations. They were able to correct the lunar error, but even this proposal provoked such an outcry that it could be vindicated only by a public demonstration using a gnomon (116).

A second issue was the central one of eclipse prediction. Previous attempts to add or subtract correction factors showed the futility of this approach. It was Wei P'u who "realized that, because the old eclipse technique used the mean sun, [the apparent sun] was ahead of it in the accelerated phase of its motion and behind it in the retarded phase." He therefore incorporated apparent solar motion into the eclipse theory (139). This had been done centuries earlier but abandoned.

A major obstacle in eclipse prediction, as well as in such workaday problems as the projection of observations in equatorial coordinates onto the ecliptic, was the absence of spherical geometry. Shen's evolution of arc-chord-sagitta relations out of some inferior approximations for segment areas given in the arithmetical classics was a first step toward trigonometry, making it possible in effect to apply sine relations and a fair approximation of cosine relations (301; III, 39, with diagram). The great remaining lack, as in planetary theory, was a mass of fresh observations on which to base new parameters. That this weakness could threaten the continuance of the system became clear the year after it was adopted (1076), when the failure of a predicted lunar eclipse to occur left Shen and his

associates open to attack. Shen parried with a successful request that astronomical students at the Han-lin Academy observatory be ordered to carry out his observational program "for three or five years" and to communicate the results to the original compilers. Whether this attempt to bypass the stalemate at the Astronomical Bureau's observatory was well-conceived remains unknown, for in the next year Shen's impeachment aborted it.

In sum, the immediate outcome of the Oblatory Epoch calendar reform was undistinguished, and within half a century the official documents embodying it had been lost. It is impossible to be sure, for instance, to what extent arc-sagitta relations had been incorporated after Shen invented them. But enough information survived in proposals, reports, Shen's writings, and compendiums of various sorts for his astronomical system to play a considerable part in the highest achievement of traditional Chinese mathematical astronomy, the Season-Granting (*Shou shih*⁴⁰) system of Kuo Shou-ching⁴¹ (1280). Kuo carried out a sustained program of observation using instruments that incorporated Shen's improvements. He took up Shen's arc-sagitta formula, greatly improving the cosine approximation, and applied it to the equator-ecliptic transform. Aware of Shen's emphasis on the continuous variation of quantities in nature, and of his criticism of linear interpolation in clepsydra design, Kuo used higher-order interpolation to an unprecedented extent in his calendar reform.

Shen recorded another scheme for reform of the civil calendar that was most remarkable for his time and place. It almost certainly occurred to him in the last decade of his life. The traditional lunisolar calendar was a series of compromises in reconciling two incommensurable quantities. The modern value for the tropical year is 365.2422 days, and that for the synodic month 29.53059 days, so that there are roughly 12.37 lunar months per solar year. The practical problem was to design a civil calendar with an integral number of days each month, and an integral number of months each year, in such a way that the long-term averages approach the astronomical constants. Hardly two of the roughly one hundred computational systems recorded in early China solved this problem in exactly the same way, just as there was endless tactical variety in order traditional societies, but strategy was generally the same. Months of twenty-nine and thirty days alternated, with occasional pairs of long months to raise the average slightly. Intercalary thirteenth months were inserted rough-

ly seven times every nineteen years, which comes to 0.37 additional months per year.

By a millennium before Shen's time the calendar was more than adequate in these respects for every civil need, although attempts to further refine the approximation led to endless retouching. The rhythms of administration, and to some extent of commerce, were of course paramount in the design of the lunisolar calendar, despite pieties about imperial concern for agriculture. It is most unlikely that Chinese peasants ever needed a printed almanac by which to regulate their activity; what they consulted, if anything, was its notations of lucky and unlucky days. Division of the year by lunar months is, in fact, useless for agriculture, since the seasons that pace the farmer's work vary with the sun alone. The Chinese calendar also incorporated twelve equal divisions of the tropical year (*ch'i*³⁰, like the Babylonian *tithis*), further subdivided into twenty-four periods with such names as Spring Begins, Grain Rains, and Insects Awaken. These provided a reliable notation for seasonal change in the part of northern China in which the series originated.

Shen's suggestion was a purely solar calendar, based on the twelve divisions of the tropical year (average 30.43697 days in his system) instead of on the lunation. The civil calendar would thus alternate months of thirty and thirty-one days, with pairs of short months as necessary to approach the average. This would provide truly seasonal months and at the same time do away with "that grotious excrescence" the intercalary month. "As for the waxing and waning of the moon, although some phenomena such as pregnancy and the tides are tied to them, they have nothing to do with seasons or changes of climate; let them simply be noted in the almanac" (545). Shen was aware that because the lunisolar calendar went back to hoary antiquity "it is by no means appropriate to criticize it." He predicted that his discussion "will call forth offense and derision, but in another time there will be those who use my arguments." This proposal was in fact considered by later scholars the greatest blemish on Shen's astronomical talent. His posterity appeared in the mid-nineteenth century, with the even more radical solar calendar enacted for a few years by the Tai-p'ing rebels.* His work was

*Kuo T'ing-i. ⁴² *Tai-p'ing t'ien kuo li-fa k'ao-ting* (⁴³ "Review of the Calendrical Methods of the Tai-p'ing Heavenly Kingdom." 1937; reprinted Taipei, 1963); Lo Erh-kang, ⁴⁴ *T'ien li k'ao chi t'ien li yu yin yang li jih tui-chao-piao* ⁴⁵ ("On the Tai-p'ing Calendar. With a Concordance Table for the Lunar and Gregorian Calendars": Peking, 1955).

cited to justify historically more respectable proposals between that time and the adoption of the Gregorian calendar in 1912.

Configuration and Change. Chinese natural philosophers, unlike the majority in the postclassical West, did not dismiss the possibility that terrestrial phenomena could conform to mathematical regularities. But given the strength of Chinese quantitative sciences in numerical rather than geometric approaches, the very late and partial development of mathematical generalization, and the complete absence of notions of rigor, it is only consistent that much of the effort to discover such regularities produced numerology. Thus the most obvious of Shen's contributions to understanding of the earth and its phenomena are qualitative.

Magnetism. For more than a millennium before Shen's time, south-pointing objects carved from magnetite had been used from time to time in ceremonial and magic, and in 1044 objects cut from sheet iron and magnetized by thermoremanence were recommended for pathfinding in a book on military arts. Shen took up the matter of needles rubbed against lodestone by contemporary magi, discussed floating and other mountings, recommended suspension, noted that some needles point north and some south, and asserted that "they are always displaced slightly east rather than pointing due south"-all in about a hundred characters (437; IV. 1, 249-250). This recognition of magnetic declination depended not only on consideration of a suspended needle but also on the improved meridian determined by Shen's measurement of the distance between the polestar and true north; declination in his part of China at the time has been estimated as between five and ten degrees (Needham and Peter J. Smith. "Magnetic Declination in Mediaeval China," in *Nature* [17 June 1967], 1213-1214. See the historical table in *Science and Civilisation in China*, IV. 1, 310).

Shen may have been anticipated by geomancers, who practiced a sophisticated protoscience of land configuration and siting, but the dates of texts on which such claims have been based are questionable. The use of compass needles in navigation is recorded shortly after Shen's death, and later descriptions provide enough detail to show that the twenty-four-point rose that Shen substituted for the old eight compass points (perhaps also under the stimulus of the better meridian, if not of geomantic practice) had become widely used. He apparently was unaware of the polarity of magnetite itself, since in another article he explained the difference between north-pointing and south-pointing

needles as "perhaps because the character of the stone also varies" (588; IV. 1, 250).

Cartography. It has been conjectured that Shen was the first to use a compass in mapmaking, although traditional methods would have sufficed. Neither his early maps of Khitan territory nor the atlas of China completed in 1087 have survived to answer this question. But in an enclosure to the latter he did separately record bearings between points using his twenty-four-point compass rose, as well as rectilinear distances rather than, as customary, distances along established routes (he calls the use of distances "as the bird flies" ancient, but we have no earlier record). "Thus although in later generations the maps may be lost, given my book the territorial divisions may be laid out according to the twenty-four directions, and the maps speedily reconstructed without the least discrepancy" (575; III, 576). His great atlas included twenty-three maps drawn to a uniform scale of 1:900,000; the general map was ten by twelve Chinese feet. There is no evidence that the handbook outlasted the maps.

Three-dimensional topographic maps go back at least to Hsieh Chuang ⁴⁶ (421-466), who had a demountable wooden model carved, apparently on the basis of an ancient map. In 1075, while inspecting the Khitan border, Shen embodied information gathered from the commander and the results of his own travels in a series of relief maps modeled, for the sake of portability, in plastic media-wheat paste and sawdust until the weather turned freezing, then beeswax-on wooden based. These were carried to the capital and duplicated in wood; similar models were thenceforth required from other frontier regions (472; III, 580).

Shen's regular use of both historical research and special on-the-ground surveys to solve such cartographic problems as tracing changes in water courses also is noteworthy (431). Typical of his ingenious topographic survey methods were those used in 1072 to measure the slope of the Pien Canal near the capital. There he built a series of dikes in temporary, narrow parallel channels to measure incremental changes in water level (457; III, 577*).

Formation of the Earth. In 1074, in the Tai hang mountain range (Hopei), Shen noticed strata of "bivalve shells and ovoid rocks running horizontally through a cliff like a belt. This was once a seashore, although the sea is now hundreds of miles east. What we call our continent is an inundation of silt. . . . This mud year by year flows eastward, forming continental land." A similar stratum

had been observed long before by Yen Chen-ch'ing ⁴⁷ (708-784), who vaguely suggested its origin in the sea; but Shen-whose duties has made him intimately familiar with the process of silting-opened a new line of investigation by proposing a mechanism (430; III, 604).

Probably on his southward drought survey earlier in the same year, Shen saw the Yen-tang range (Chekiang), a series of fantastic rock formations "invisible from beyond the ridgeline [opposite], but towering to the sky when seen from the valleys. If we trace the underlying pattern, it must be that great waters in the valleys have attacked and washed away all the sand and earth, leaving only the great rocks erect and looming up." His explanation proceeded to generalize the shaping role of erosion, and then to apply it to the hills that divide streams in the loess country of northwest China-"miniatures of the Yen-tang mountains, but in earth rather than stone" (433; III, 603-604).

Shen reported a variety of contemporary finds of petrified plants and animals (373-374; III, 614-618). He remarked particularly in a stony formation he identified as originally a grove of interconnected bamboo roots and shoots, found dozens of feet below ground level at Yen-an (Shensi). He knew from his military service there that the climate was too dry to from bamboo: "Can it be that in earliest times [literally, 'before antiquity'] the land was lower and the climate moister, suitable for bamboo?" (373). About a century later the great philosopher and polymath Chu Hsi ⁴⁸ (1130-1200), who knew Shen's jottings well and often extended ideas from them in his teaching, suggested that the stone of certain mountains was itself petrified silt deposits. But Shen's notion of prehistoric climatic change, like that of the reshaping of land by erosion, was not pushed further soon after his lifetime.

Atmospheric Phenomena. Although Shen did not report important original discoveries of his own, he preserved a number of interesting observations not recorded elsewhere. Perhaps the most important is a vivid description of a tornado (385; translated in Holzman, "Shen Kua," 286), the veracity of which was questioned by modern meteorologists until, in the first decade of the twentieth century, the Sikawei Observatory in Shantung reported phenomena of the same kind, previously thought restricted to the western hemisphere. Shen was also responsible for transmitting an explanation of the rainbow by Sun Ssu-kung, ⁴⁹ an elder contemporary in the court who was also considered one of the best mathematical astronomers of

his era. "The rainbow is the image [literally, 'shadow'] of the sun in rain, and occurs when the sun shines upon it." This sentence does not, as often claimed, adduce refraction (pinhole or mirror images were regularly called "shadows": see 44). Shen was prompted to determine by experiment that the rainbow is visible only opposite the sun (357). Later Chu Hsi, aware of Shen's account, added that by the time the rainbow appears "the rain *chi*." ³⁰ *Ch'i* must mean vapor here; the notion of reflections off individual drops is, as in Sun's explanation, implicit at best. Shen also recorded the fall of a fist-sized meteorite in more detail and with less mystification than previous reports. The particulars of its fall came from a careful account by another of Wang An-shih's associates. The object was recovered and exhibited, but Shen did not claim that he himself had observed that "its color is like that of iron, which it also resembles in weight" (340; III, 433-434).

Products of the Earth. Responsibilities with respect to fiscal policy gave Shen a detailed knowledge of important commodities, their varieties, and the circumstances of their production, as may be seen from his descriptions of tea (208) and salt (221). Inflammable seepages from rock had been known a millennium before Shen's time, and for centuries had been used locally as lamp fuel and lubricant. While civil and military commissioner near Yen-chou, he noted the blackness of soot from petroleum and began an industry to manufacture the solid cakes of carbon ink used for writing and painting throughout China. Good ink was then made by burning pine resin, but Shen knew that North China was being rapidly deforested. He remarked that, in contrast with the growing scarcity of trees, "petroleum is produced inexhaustibly within the earth." The name Shen coined for petroleum^{50a} is the one used today, and the source in Shensi province that he developed is still exploited. In the same article he quoted a poem of his that is among the earliest records of the economic importance of coal, then beginning to replace charcoal as a fuel (421; III, 609, partial).

Optical Phenomena. Shen's interest in image formation was not directly connected with his worldly concerns. His motivation is more plausibly traced to the play of his curiosity over old artifacts than to the improvement of naked-eye astronomical instruments.

In the canons of the Mohist school (ca. 300 B. C.) is a set of propositions explaining the formation of

shadows and of optical images (considered a kind of shadow) in plane, convex, and concave mirrors. One proposition is widely believed to concern pinhole images, although textual corruption and ambiguity make this uncertain. These propositions are in many respects correct, although very schematic, and rays of light are not presupposed. Shen concerned himself with the single question of why a concave mirror forms an inverted image. He posited an "obstruction" (ai⁵⁰), analogous to an oarlock, that constricts the "shadow" to a shape like that of a narrow-waisted drum-or, as we would put it, to form two cones apex to apex, the second constituting the inverted image. Like the Mohists, Shen clearly believed that inversion takes place before the image is reflected. He expressly likened the inverted image to that of a moving object formed on the wall of a room through a small opening in a paper window. Aware for the first time that there is a range of distances from a concave mirror within which no image is formed (that is, between the center of curvature and the focal point), he explained that this blank region, corresponding to the pinhole, is the locus of "obstruction" (44; translated in A. C. Graham and N. Sivin, "A Systematic Approach to the Mohist Optics," in S. Nakayama and N. Sivin, eds., *Chinese Science: Explorations of an Ancient Tradition* [Cambridge, Mass., 1973], 145-147). His pinhole observation was adventitious, but his approach to the burning-mirror was experimental in its details.

Two other observations of optical interest are found under the rubric "Artifacts and Implements." The first, in the "Sequel to Brush Talks," noted that when the ancients cast bronze mirrors, they made the faces just convex enough that, regardless of size, every mirror would reflect a whole face. By Shen's time this refinement had been abandoned and the reasoning behind the curvature forgotten, so that collectors were having the faces of old mirrors scraped flat (327; IV, 1, 93).

The second jotting is the oldest record of a Far Eastern curiosity still being investigated: "magic mirrors," or, as Shen called them, "transparent mirrors." Shen described a bronze mirror with a smooth face and an integrally cast inscription in relief on its back (both conventional features). When the mirror was used to reflect the sun onto a wall, the inscription was duplicated within the image. Shen cited with approval an anonymous explanation: "When the mirror is cast, the thinner parts cool first; the raised design on the back, being thicker, cools later and the shrinkage of the bronze is greater. Although the inscription is on

the obverse, there are imperceptible traces of it on the face, so that it becomes visible within the light." He then qualified this explanation as incomplete, because he had tried mirrors in his own and other collections that were physically indistinguishable from the "transparent" ones and found that they did not cast images (330; IV, 1, 94*). His doubt was justified, although the approach taken by his informant was at least as good as those of some modern metallurgists. Although cooling rate plays no discernible part, the variation in thickness is indeed responsible for the image in this sort of mirror, the most common among several types extant. Filing considerable bronze off the face of the mirror after casting is the key. This releases tensions in the metal and gives rise to slight deformations that produce the image.

Productive Technique and Materials. The technologies of Shen's time were not cumulative and linked to science, but independent artisanal traditions transmitted from master to pupil. Shen left so many unique and informative accounts of ancient and contemporary processes among his jottings that "Brush Talks" has become a major source for early technology. Shen's interests in contemporary techniques can in most cases be linked to broad concerns of his official career; but the exceptional richness of his record bespeaks a rare curiosity, and the trenchancy of his descriptions a seriousness about mechanical detail unusual among scholar-officials. His notes on techniques lost by his time reflect the application of this technical curiosity and seriousness to archaeology, which was just becoming a distinct branch of investigation in the eleventh century.

Most of Shen's cultured contemporaries had a keen appreciation for good workmanship but considered the artisans responsible for it beneath notice except for occasional condescension. Shen wrote about resourceful craftsmen and ingenious laborers with much the same admiration he gave to judicious statesmen. He did not lose sight of the social distance between himself and members of the lower orders, but in his writing there is no snobbishness about the concert of hand, eye, and mind.

Contemporary Techniques. The most famous example is Shen's account of the invention of movable-type printing by the artisan Pi Sheng ⁵¹(fl. 1041-1048). Shen described the carving and firing of ceramic type and the method of imbedding and leveling them in a layer of resin, wax, and paper ash in an iron form, one form being set as a second is printed. As in xylography, water-base ink was

used. Since the porous, thin paper took it up with little pressure, no press was needed. Shen also remarked, with his usual acumen, that the process could become faster than carving wood blocks only with very large editions ⁵² (the average then has been estimated at between fifty and a hundred copies). Unevenness of the surface and absorption of ink by the fired clay must have posed serious problems. Abandonment of the process after Pi died was probably due to the lack of economic incentive that Shen noted. The long series of royally subsidized Korean experiments in the fifteenth century that perfected cast-metal typesetting still began with Pi Sheng's imbedding technique as described by Shen. Whether he knew Pi is unclear, but Shen's cousins preserved Pi's original font (307; translated in full, but not entirely accurately, in T. F. Carter, *The Invention of Printing in China and Its Spread Westward*, L. C. Goodrich, ed., 2nd ed. [New York, 1955], 212).

Shen left a number of descriptions of metallurgical interest—for instance, an account of the recovery of copper from a mineral creek by replacement of iron, a process then being carried out on an industrial scale to provide metal for currency (455; II, 267); observations of two of the three steelmaking processes used in early China (56; translated in Needham, *The Development of Iron and Steel Technology In China* [London, 1958], 33-34; the book was reprinted at Cambridge, England, in 1964); and remarks on a little-known cold-working method used by smiths of the Ch'iang ⁵³ people of western China to make extremely tough steel armor (333). Water control techniques of which he records details include pound-locks with double slipways (213; IV, 3, 351-352), piles for strengthening embankments (210; IV, 3, 322-323), and sectional gables for closing gaps after embankment repairs (207; IV, 3, 342-343).

Ancient Techniques. The concern for understanding ancient techniques began with the commentators on the Confucian and other classics more than a millennium earlier. Exegesis remained an important activity in China, and the productive methods of golden antiquity were investigated with the same assiduity as anything else mentioned in its literary remains. For various reasons among them the recovery of ancient artifacts in large numbers for the first time, the growth of collecting, and the elaboration of a conscious aesthetics-archaeology began to emerge from the footnotes less than a century before Shen's time, especially in monographs on ancient implements and ritual institutions. He was familiar with this literature and

responded to it critically. Much of his writing in the "Artifacts and Implements" chapter falls squarely in this tradition, drawing on the testimony of both objects and books.

Shen's vision of the past as a repertory of lost processes introduced an influential new theme. A constant concert in his writing was not only that the workmanship of the past be esteemed for its excellence, but also that the present be enriched through understanding what the practical arts had been capable of. Although the belief was still current that the inventions that first made civilization possible were all due to semidivine monarchs of archaic times, in a letter Shen saw the technological past as successful for just the opposite reason: "How could all of this have come from the Sages? Every sort of workman and administrator, the people of the towns and those of the countryside—none failed to take part" (*Ch'ang-hsing chi* [1718 ed.], 19:53b).

Shen's remarks on magic mirrors are typical of his effort to understand lost processes. Another example is his reconstruction (and personal trial) of ancient crossbow marksmanship, interpreting a gnomonic aiming formula in an ancient footnote with the aid of a graduated sight and trigger assembly that he examined after it was unearthed (331; III, 574-575*). The most famous instance of Shen's use of literary sources for the study of techniques has to do with the remarkable modular system of architecture used in public buildings. The set of standard proportions is well-known from an official compilation printed about a decade after Shen's death. Shen, by describing the proportion system of the Timberwork Canon (*Mu ching*⁵⁴), attributed to a great builder of about 1000 and already falling out of use, demonstrates the antiquity of this art (299; IV, 3, 82-83).

Medicine. By Shen's time medicine, which from the start drew heavily upon natural philosophy for its conceptual underpinnings, had accumulated a classical tradition. Not only was each new treatise consciously built upon its predecessors, but a major goal of new work was restoring an understanding that medical scholars believed was deepest in the oldest writings. The revealed truth of the archaic canons was too concentrated for ordinary latter-day minds, who could hope to recapture it only as the culmination of a lifetime of study. Writers in the intervening centuries referred to the early classics as the ultimate source of significance even while aware that empirical and practical knowledge had considerably advanced since antiquity. The major contribution of the continuous

tradition of medical writing was to fit new experiences into the old framework and, when necessary to construct new frameworks in the spirit of the old. As woodblock printing became feasible, standard editions of the chief classics were compiled and disseminated by government committees. This increased the respectability of the curing arts as a field of study. Large numbers of men from the scholar-official class began to take up medicine, not in competition with those who made a living by it but as a means of self-cultivation allied to cosmology and occasionally useful. The initial motivations commonly were personal ill health and the desire to serve one's sick parents.

Shen, as noted earlier, began the study of medicine early, for the former reason. One of his two therapeutic compilations survives in somewhat altered form. Its preface is a long disquisition on the difficulty of adequate diagnosis and therapy, as well as on the proper selection, preparation, and administration of drugs. His criticisms of contemporary trends toward simplification remind us that the development of urban culture and education in Sung China had led to increased medical practice among ordinary people as well as study by the literati. As protoscientific medicine began to displace magico-ritual folk remedies (at least in the cities), there were more half-educated physicians to be criticized by learned amateurs such as Shen. Shen's most characteristic contribution was undoubtedly his emphasis on his own experience. Unusual in a tradition whose literature in the Sung still tended to depend heavily on copying wholesale from earlier treatises. Shen not only omitted any prescription of the efficacy of which he had not witnessed, but appended to most a description of the circumstances in which it had succeeded. He provided many precise descriptions of medicinal substances of animal, vegetable, and mineral origin. Although he had no more interest in general taxonomic schemes than other pharmacognostic scholars of his time, his concern for exact identification and for philological accuracy gave his critical remarks enduring value. Many were incorporated into later compilations on materia medica, and Shen's writing also served as a stimulus to the work a few decades later of the great pharmacognostic critic K'ou Tsung-shih⁵⁵ in his "Dilations Upon the Pharmacopoeias" (*Pen-ts'ao yen i*,⁵⁶ 1116).

A recent discovery of considerable interest is that certain medical preparations from human urine collectively called "autumn mineral" (*ch'iu shih*⁵⁷), which have a long history in China, contain

high concentrations of steroid hormones and some protein hormones as well. In "Good Prescriptions" Shen gives one of the earliest accounts, in the form of detailed instructions for two such preparations that he performed in 1061 (other accounts by contemporaries are harder to date).*

Perhaps Shen's most famous writing on general medical matters is one in which he refutes the common belief that there are three passages in the throat—as shown, for instance, in the first book of drawings of the internal organs based directly on dissection (1045). † His supporting argument is not from independent dissection but from sufficient reason: "When liquid and solid are imbibed together, how can it be that in one's mouth they sort themselves into two throat channels?" He thus saw the larynx as the beginning of a network for distributing throughout the body the vital energy carried in atmospheric air, and the esophagus as carrying nutriment directly to the stomach cavity, where its assimilation begins. This was a significant increase in clarity as well as accuracy (480).

A passage that has been praised for its simple but beautiful language takes issue with the ancient principle that medicinal plants should be gathered in the second and eighth lunar months (when they were thought easiest to identify). In a few hundred words it epitomizes the variation of ripening time with the identity and variety of the plant; the part used in therapy; the physiological effect needed for the application; altitude; climate; and, for domesticated medicinal plants, variation with planting time, fertilization, and other details of horticulture. The sophistication of this passage reflects not only increasing domestication (exceptional in earlier eras) but also the integration of drugs from every corner of China into the expanding commercial network.

Conclusion. The expansiveness of Northern Sung society and its, relative openness to talent, not to mention increasing government sponsorship

*See Lu Gwei-djen and Joseph Needham. "Medieval Preparations of Urinary Steroid Hormones," in *Medical History*, 8 (1964), 101-121; Miyashita Saburō, ⁵⁸ *Kanyaku shūseki no yakushigakuteki kenkyū*⁵⁹ ("A Historical Pharmaceutical Study of the Chinese Drug 'Autumn Mineral' the *Ch'iu-shih*"), Osaka, 1969), esp. 9-12.

†Persons untrained in medicine performed the dissection upon executed bandits in 1045 and recorded what was found under the direction of an enthusiastic amateur. Another episode of the same kind, undertaken explicitly to correct the earlier drawings, took place at the beginning of the twelfth century. There is no reliable account of either in any European language, but see Watanabe Kōzō, ⁶⁰ "Genson suru Chūgoku kinsei made no gozō rokufu au no gaisetsu" ⁶¹ ("A Survey of Extant Chinese Anatomical Drawings Before Modern Times"), in *Nihon ishigaku zasshi*, 7 (1956), 88.]

of learning, made this an important period in the history of every branch of science and technology. Shen was not the first polymath it produced. There was also Yen Su ⁶² (*fl.* 1016), who designed an odometer and south-pointing chariot (in which a differential gear assembly kept figures pointing in a constant direction as the chariot turned), improved the design of the water clock and other astronomical instruments, and wrote on mathematical harmonics and the tides. In Shen's lifetime there was Su Sung ⁶³ (1020-1101), who was first privy councillor during the last part of the reaction against the New Policies (1092-1093). Through the 1060's he played a major part in a large imperially sponsored compilation of materia medica, and in the editing and printing of ancient medical classics. In 1088 a group that he headed completed a great water-driven astronomical clock incorporating an escapement device. Their detailed description of the mechanism included the oldest star map extant in printed form, based on a new stellar survey. (The book has been studied and translated in Wang Ling, Joseph Needham, Derek J. de Solla Price, et al., *Heavenly Clockwork* [Cambridge, England, 1960].) That Yen, Su, and Shen were all in the central administration is not surprising. The projects on which they were trained and those in which they worked out many of their ideas were of a scale that only the imperial treasury could (or at least would) support.

Breadth of interest alone does not account for Shen's importance for the study of the Chinese scientific intellect. Another aspect is his profound technical curiosity. A number of the phenomena he recorded were mentioned by others; but even when others' descriptions happen to be fuller, they usually are of considerably less interest because their subject matter is treated as a mere curiosity or as an occasion for anecdote rather than as a challenge to comprehension. Above all, one is aware in Shen, as in other great scientific figures, of a special directness. A member of a society in which the weight of the past always lay heavily on work of the mind, he nevertheless often cut past deeply ingrained structures and assumptions. This was as true in his program of astronomical observations and his audacious solar calendar as in his work on government policies. People in the Sung were aware that man's world had greatly expanded since antiquity, and questioning of precedent (in the name of a return to classical principles) was inherent in the New Policies. Shen's commitment to this political point of view can only have reinforced the sense of cumulative improvement of

techniques and increasing accuracy over time that one finds in major Chinese astronomers. But given these predispositions and opportunities, Shen remains in many senses an atypical figure, even in his time and among his associates.

There certainly is much that a modern scientist of engineer finds familiar, not only in the way Shen went about making sense of the physical world but also in the temper of his discourse, despite the profoundly antique nature of the concepts he used. One comes away from his writings confident that he would see much of modern science as a culmination (not the only possible culmination) of his own investigations—more confident than after reading Plato, Aristotle, or St. Thomas Aquinas. But does Shen's special configuration of abilities and motivations suggest that a genetic accident produced, out of time, a scientific rationalist-empiricist of essentially modern type? To answer this question it is necessary to look at Shen's larger conception of reality, of which his scientific notions compose only a part but from which they are inseparable.

The Relation of Scientific Thought to Reality.

The sense of cumulative enterprise in mathematical astronomy did not imply the positivistic conviction, that eventually the whole pattern could be mastered. Instead, from the earliest discussions there was a prevalent attitude that scientific explanation—whether in terms of number or of abstract qualitative concepts, such as yin-yang—merely expresses, for human purposes, limited aspects of a pattern of constant relations too subtle to be understood directly. No one expressed this attitude more clearly than Shen. In instance after instance he emphasized the inability of secular knowledge to encompass phenomena: the reason for magnetic declination (437), why lightning striking a house can melt metal objects without burning the wooden structure (347), and so on.

Shen made this point most clearly in connection with astronomy. In one passage he discussed the fine variations that astronomers must, in the nature of their work, ignore. Every constant, every mean value obscures continuous variation of every parameter (123). In his official proposals on the armillary sphere,⁶⁴ he argued that measure is an artifact, that it allows particular phenomena to be "caught" (po⁶⁵) in observational instruments, where they are no longer part of the continuum of nature. That Shen saw as the condition of their comprehensibility. This and similar evidence amount not merely to an appreciation of the role of abstraction in science, but also to the steady con-

viction that abstraction is a limited process incapable of producing universal and fundamental knowledge of the concrete phenomenal world. Nature is too rich, too multivariant, too subtle (wei⁶⁶). This limitation did not detract from the interest or worth of theoretical inquiry, and did not lead intellectuals to question whether learning could contribute to the satisfaction of social needs; but the ambit of rationalism in traditional scientific thought was definitely circumscribed.

In this light Shen's explanatory metaphors become more comprehensible. In his remarkable suggestion that variations in planetary speed may be represented by a compounded figure, he chose to fasten to the periphery of his circle a willow leaf, whereas in Europe no figure but another circle was thinkable (148). When explaining optical image inversion in terms of converging and diverging rays, the images of the earlock and waisted drum occurred to him (44). The variation in polarity of different magnetized needles was likened to the shedding of antlers by two species of deer in opposite seasons (588; IV: 1, 250), and so on. Geometric figures, numbers, and quantities were useful for computation but had very limited value, not so great as cogent metaphors from the world of experience, in understanding the pattern inherent in physical reality.

Many Chinese thinkers, even in the Sung, did believe in number as a key to the pattern of physical reality; but their search was concentrated in numerology (especially as founded on the "Great Commentary" to the *Book of Changes*) rather than in mathematics. This is not to imply that numerology was a distraction from mathematics. The two were not considered alternate means to the same goal.

Other Kinds of Knowledge. Did Shen believe that other ways of knowing complemented and completed empirical and theoretical investigation? Aside from its scientific aspects, Shen's thought has been so little studied that only some tentative suggestions can be offered. Contemplation and disciplined self-examination were ancient themes in Confucianism, and by Shen's time illumination was widely considered among the learned as a source of knowledge complementary to that given by experience of the external world. The domestication and secularization of Buddhist and Taoist meditation were gradually leading to a more introspective and less ritualistic approach to self-realization. This tendency was later elaborated with great variety of emphasis and weight in the schools of neo-Confucianism.

To understand what part contemplation and meditation played in the thought of Shen Kua requires a clearer view than we now have of their currency and coloring in his time, of the considerable role of Wang An-shih's thought in his intellectual development, and of Shen's own attitudes as indirectly expressed in his literary remains. There is as yet no sound basis for evaluating his interest in Taoist arcana that seems to have peaked in his thirties, his public remarks that express sympathetic interest in illuminationist (Ch'an, Japanese "Zen") Buddhism, and his statement in an autobiographical fragment that Ch'an meditation was one of the things to which he turned his attention after retirement. In any case these involvements refract aspects of his epistemology that cannot be overlooked without badly distorting our recognition of the whole.

Teraji Jun has recently demonstrated this point in examining how strong a factor in Shen's motivation and individuality was his belief in destiny and prognostication. There are crucial passages, especially in his commentary on Mencius, where Shen spoke of the necessity for choosing what is true and holding to it, and called the rule of the heart and mind by sensory experience "the way of the small man." The basis of moral choice was an autonomous inner authority defined in an original way but largely in Mencius terms, a centeredness "filling the space between sky and earth," unquestionably linked with the self-reliance that marked his unhappy career.

It is not immediately obvious why someone who so valued individual responsibility should have been fascinated by fate and divination, which in fact are the themes of whole chapters of "Brush Talks." Shen does not seem to have viewed these enthusiasms as in conflict with his scientific knowledge. His delight in strange occurrences and his tendency to place matters of scientific interest under that rubric begin to make sense under the hypothesis that he accepted the odd, the exceptional, and the affront to common sense as a challenge for explanation at another time, or by someone else—without assuming that explanation was inevitable. In his hundreds of jottings on people, the person he chose to praise is most often the one who did not do the obvious thing, even when it seemed the sound thing to do.

At one point Shen provided a thoroughly rational explanation of the relations between fate and prognostication. The future can of course be foreknown by certain people, he said, but it is a mistake to conclude that all matters are preordained. The

vision of the future is always experienced in present time; the years in the interim also become simultaneous. One can do nothing to avoid an undesirable future so glimpsed. Authentic foreknowledge would have witnessed the evasive measures; a vision that failed to see them could not be authentic foreknowledge (350).

In addition to the visionary ability of certain minds, Shen pondered universally accessible methods of divination, which (he seems to have believed) do not describe the future or the spatially distant so much as provide counsel about them or aid thought about them. In one of his chapters, "Regularities Underlying the Phenomena," he explained why the same divinatory technique gives different outcomes when used by different people, and thus has no inherent verifiability. He quoted the "Great Commentary" to the *Book of Changes* to the effect that understanding is a matter of the clarity and divinity (in a very abstract sense) within one's mind. But because the mind is never without burdens that hinder access to its divinity. Shen reasoned, one's communion with it may take place through a passive mediating object or procedure (144, 145). This divinity is, for Shen's sources, the moral center of the individual. Prognostication, however ritualized (as we would put it), thus draws indirectly upon the power of self-examination. Access to the future, whether by vision or by divination, is a perfectly natural phenomenon that is imperfectly distinct, on the one hand, from the moral faculties, the choices of which condition the future, and on the other, from science, the rational comprehension of the natural order as reflected in all authentic experience.

Thus it appears that introspection supplemented by divinatory procedures was a legitimate means to knowledge in Shen Kua's eyes, just as painstaking observation and measurement of natural phenomena were another. He neither confused the two approaches nor attempted to draw a clear line between them. Nor was he inclined to assess the comparative importance of these ways of knowing.

The complementarity in Shen's attitudes toward knowledge is echoed by another in the external world of his work. Computational astronomy and divination of various kinds (including judicial astrology) were equally weighty functions carried out by the central government on the emperor's behalf, for both kinds of activity were established supports of his charisma. The need to combine science with ritual in this sphere is implied in an important memorial of Wang An-shih: because the monarch acts on behalf of the natural order, he can safe-

guard the empire and command the assent of the governed only through knowledge of nature. Ritually expressed awe of that order, without knowledge, is not enough (*Hsu tzu chih t'ung chien ch'ang pien* ⁶⁷ ["Materials for the Sequel to the Comprehensive Mirror for Aid in Government"], presented to the throne 1168 [1881 ed.], 236: 16b). Teraji has acutely pointed out that this is precisely the political justification for Shen's research, and the reason that traditional bureaucrat-scientists who were concerned mainly with maintaining ancient practices were not what Wang wanted.

Confucianism and Science. Recent attempts in both East and West to construct a historical sociology of Chinese science have in large part been built around a contrast between Confucianist and Taoist ideology. The values of the Confucian elite are often described as oriented toward stasis, hierarchy, bureaucracy, and bookishness. These characteristics are seen as perennially in tension with the appetite of socially marginal Taoists for novelty and change, their tendency to contemplate nature and the individual in it as a system, and their fascination with techniques, which kept them in touch with craftsmen and made them willing to engage in manual work themselves. It will no doubt be possible eventually to excavate a falsifiable, and thus historically testable, hypothesis from the mound of observations and speculations in this vein that have accumulated over the last half-century. For the moment, all one can do is to point out how relentlessly unsociological this discussion has been.

Sociology is about groups of people. Doctrines are germane to sociology to the extent that their effect on what groups of people do, or on how they form, can be demonstrated. Generalizations about people who accept a certain doctrine have no sociological significance unless such people can be shown to act as a group, or at least to identify themselves as a group. The term "Confucian" is commonly used indifferently even by specialists to refer to a master of ceremonial, a professional teacher of Confucian doctrines, a philosopher who contributes to their elaboration, someone who attempts to live by Confucius' teachings, any member of the civil service, any member of the gentry regardless of ambition toward officialdom, or any conventional person (since it was conventional to quote Confucian doctrines in support of conventional behavior). A "Taoist" can be anyone from a hereditary priest ordained by the Heavenly Master to a retired bureaucrat of mildly unconventional tastes living on a city estate. Either group, by crite-

ria in common use, includes people who would make opposite choices on practically any issue. This being so, the proposition "Taoists were more friendly toward science and technology than Confucians" reduces to "Educated individuals who hold unconventional sentiments are more inclined to value activities unconventional for the educated than are educated people who hold conventional sentiments." That is probably not quite a tautologous statement, but it is sociologically vacuous and historically uninteresting.

Unease of this sort is probably the most obvious outcome of reflection on Shen Kua's career. By sentimental criteria he can be assigned to Confucianism, Taoism, or Buddhism, to suit the historian's proclivities.* He was a member of the elite, a responsible official, a writer of commentaries on several of the Confucian classics, and a user of the concepts of Confucius' successor Mencius to explore the depths of his own identity. He spoke well and knowledgeably of Buddhism. He practiced arcane disciplines, such as breath control, that he called Taoist.

As for his allegiances, Shen was prominently associated with a powerful but shifting group of background very generally similar to his own. Social stasis and institutional fixity were impediments to their aims in reshaping government. At the same time, the new balance of power toward which they strove was more authoritarian than the old. Underlying their common effort was an enormous disparity of motivation, from the well-intentioned (Shen) to the simultaneously manipulative and corrupt (Ts'ai Ch'ueh).

Were these Confucians more or less Confucian than their Confucian opponents? Wang An-shih earned enduring stature for his commentaries on the classics and his thought on canonic themes. His followers seem to have found inspiration in the

* A new element was introduced in 1974 in a book issued as part of the "anti-Confucius anti-Lin Piao" campaign against current ideological trends. Two of its essays (pp. 118-140) portray Shen as a legalist and a relentless opponent of Confucianism. "Legalist" is a term applied to writers on government and administration concentrated in the last centuries before the Christian era, especially those who argued that polity must be built on law and regulation, in contrast with the traditionalist faith of Confucius in rites and moral example. Although the arguments in this book are too distorted and too selective in their use of source to be of interest as history, they become intelligible when "legalism" and "Confucianism" are understood as code words for the political convictions of two contending power groups in China today, as portrayed by spokesmen for one of the two. The book is *Ju-Fa tou-cheng yü wo kou ku-tai K'o-hsueh chi-shu ti fa-chan* ⁶⁸ ("The Struggle Between Confucianism and Legalism and the Development of Science and Technology in Our Country in Ancient Times"; Peking, 1974). The first printing was 31,000 copies.

classics as often as their enemies and as those who avoided taking a political position. This is not to say that everyone understood the Confucian teachings in the same way. The latter were not, from the viewpoint of intellectual history, a set of tightly linked ideas that set fixed limits on change; rather, they were a diverse and fragmentary collection of texts reinterpreted in every age. They were understood differently by every individual and group who looked to them for guidance when coping with problems of the moment.

The major commentaries, which attempted to define the meanings of Confucian teachings philologically, carried enormous authority; and governments (that of Wang An-shih, for instance) repeatedly attempted to make one interpretation orthodox. But the urge to pin down meanings was always in conflict with precisely what made these books classic. Their unlimited depth of significance depended more on what could be read into them than on precisely what their authors had meant them to say. That depth made them applicable to an infinity of human predicaments and social issues, unprecedented as well as perennial. Late neo-Confucian philosophers striking out in new directions demonstrated again and again how little the bounded intellectual horizons and social prejudices of the classics' authors objectively limited what may be drawn from them.

In other words, the Confucian canon had the influence it did because it provided a conceptual language that over the centuries educated people used and redefined in thinking out decisions and justifying action and inaction. The classics were often cited as a pattern for static social harmony and willing subordination in arguments against the New Policies. Shen, on the other hand, used them to argue for flexibility in social relations and for greater receptivity toward new possibilities than was usual in his time. Either as a social institution or as an ideology, Confucianism is too protean and thus too elusive a base for generalizations about the social foundations of science and techniques in China.

Institutions also changed constantly, but at least they were tangible entities. It is essential to consider them when tracing the social connections of science. Very little is known about how scientists were educated in the Northern Sung period; the obvious next step is a collective study of a great many biographies. In Shen's case we can see a pattern that certainly was not unique. He was, so far as we know, self-educated in astronomy, but with many learned associates to draw upon. In medicine

and breath control he probably received teaching in the traditional master-disciple relationship. Defined in the ages before printing made possible access to large collections of books, this relationship involved the student's memorizing the classics (more often one than several) that the teacher had mastered. This verbatim transmission of a text was supplemented by the teacher's oral explanations. The relation was deepened by ceremonial formality; the master took on the obligation to monitor the disciple's moral as well as intellectual growth, and the disciple accepted the responsibility of becoming a link in an endless chain of transmission. Schools were largely communities of masters and disciples. The scale of government-sponsored elementary schools in the provinces was small in Shen's youth, and began to compete with private academies only in the New Policies period. The two sorts together did not serve more than a small minority of youth.

By the eighth century there were small schools in the central government to train technical specialists. The masters, usually several in number, were functionaries, representing the departments of the bureau that the disciples were being trained to staff. The schools for medicine and astronomy could not lead to the top of government, but guaranteed steady advancement between minor sinecures. Very few of the great physicians or astronomers of traditional China began in these schools.

In the absence of evidence to the contrary, there is no reason to believe that Shen Kua ever attended a school of any sort, nor does that make him atypical. His early education by his mother, his training in medicine by an obscure physician and others who remain unknown, and his catch-as-catch-can studies of most other matters do not set him apart from his contemporaries. With no knowledge of particulars one cannot even guess how his personal style in technical work was formed. But to say that we are ignorant is not to say everything. The intimate relations of master and teacher and the isolation of the autodidact were themselves important institutions in the Northern Sung, institutions of a sort that did not discourage the emergence of unforeseen abilities in the small number of people who had the opportunity to be educated. Shen did not have to cope with a standard curriculum, for better or worse. If we are searching for the decisive curriculum of science and technology, it is necessary to look outside the realm of education.

The Civil Service and Science. One institution above all others influenced the mature ideas and

attitudes of the ruling stratum: the bureaucracy. What can be said about its influence on science and technology in the life of Shen Kua? First, like every bureaucracy, it depended upon science and technology. It supported both sorts of activity on a scale otherwise unattainable, and unheard of in Europe at the time. Shen's curiosity, experience, and skills were so largely shaped by the civil service that it is absurd to ask what he would have become had he lived as a country gentleman or a Taoist priest. On the other hand, as elsewhere, technicians were certainly less important to the priorities of the state than administrators. The responsibility of the former was to provide the emperor and his administrators with wealth and other tools for the realization of policy. Specialist positions in science and engineering did not often serve as the beginnings of great career.

By the New Policies period a career stream for economic experts had been established. It could assimilate people who combined technological acumen with fiscal skills, and carry them to the central councils of the empire. Shen's early technical feats were performed in general administrative posts, but his talents came to be valued and he rose quickly through formal and informal structures. It is not irrelevant that his directorship of the Astronomical Bureau was never more than a concurrent position. His attempt to combine an effective voice in the shaping of change with scientific contributions ended in personal disaster. He was ruined by men of his own faction, apparently for his political seriousness and naivete. His astronomical work was rendered futile by subordinates because of his professional demands upon them. The bureaucracy was not neutral; it was a two-edged sword.

The civil service provided a form for great projects in science and technology, and practically monopolized certain disciplines, such as mathematical astronomy and observational astrology. Printing gave it the wherewithal to determine much of the content of elementary technical education (as in medicine and mathematics). A man of Wei P'u's genius, who had not had the opportunity to enter the bureaucracy by a regular route, was looked down upon and deliberately frustrated. Had Shen himself chosen to be a mere technician, his standing in the civil service would have been sufficient to protect him from personal attack. He would have had more time but less power. It would be rash indeed to speculate that his calendar reform would not have failed. But there is a larger issue.

Shen's mind was shaped for the civil service, as were those of his ancestor and peers, by an early education centered in moral philosophy and letters. He was a generalist. The development of depth in thought and work was left to his own proclivities. Only a superficial knowledge of technical matters was expected of him as a youth—a situation not very different from that of the British civil service generalist of some decades ago. Shen's growing responsibilities in fiscal affairs were the one aspect of his career that we can be sure encouraged him to draw coherence out of his varied experiences and studies. For this reason and others of which we are still ignorant, the great breadth of his knowledge was accompanied by enough depth to let him write monographs of some importance and, even through his brief jottings, to reshape Chinese knowledge of certain phenomena. But distraction is a theme that runs through his writings: promising studies laid aside; endless skirmishes to defend administratively measures that spoke for themselves technically and strategically; proposals negated by political setbacks. Regardless of his capacity for scientific depth and his willingness to find his way to it, the sheer busyness of his career drastically limited him. The works of his final leisure, however valuable, were all superficial in form. Was this the result of habit, of distance necessitated by disillusion, or of an aesthetic choice of the style appropriate for conversing with one's brush and ink slab in a silent garden? That remains for deeper study to decide.

What, then, was responsible for Shen Kua's scientific personality? We do not know the answers to all sorts of prior questions. The greatest difficulty comes in learning what these questions should be—in isolating the important issues, in coming to terms with the paucity and partiality of the sources, and in doing justice to a rich mind that, despite its absorption in a quest that transcends people and eras, partook fully of its time and place. It is not a matter of mechanically juxtaposing the usual factors: intelligence, subjectivity, philosophical convictions, social background, career, and other experiences. We have already seen how problematic the last three are. The most conspicuous traits of Shen's consciousness were open curiosity, mental independence (without the intolerance for intellectual disagreement that was a major limitation of Wang An-shih), sympathy for the unconventional, ambition, loyalty, and lack of snobishness. The first four are considered marks of promise among technical people today, although one often meets great scientists who lack one or

more of them. Were these characteristics in Shen due to heredity, to early experiences and education, or to influences encountered in adult life? This is an example of the sort of question that bars understanding; surely Shen was the sum of all three. The secret of his uniqueness will not yield itself to historical method, however powerful, unless it is applied with imagination, artifice, and awareness of the springs of human complexity.

Attitudes Toward Nature. When examined closely, attitudes toward nature in the late eleventh century become as elusive as attitudes toward Confucian humanism. The richly articulated philosophical vision of man in harmony with his physical surroundings was proving quite incapable of preventing the deforestation of northern China, which was virtually complete a generation after Shen's death. One cannot even speak of the defeat of that vision in an encounter of ideas, for no intellectual confrontation is recorded. What happened? The most obvious part of the answer is that the people who were chopping down the trees for charcoal were not the people who were seeking union with the ineffable cosmic Tao. Since that social difference was of very long standing, however, it does not explain the crescendo of exploitation in the Northern Sung. The coincidence of that fateful shift with the rise of large-scale industry and market networks is again obvious enough.* What needs to be explained, in fact, is the survival of the naturalist ideal until modern times.

The dilemma emerges clearly in the attitudes of Shen Kua and Wang An-shih toward nature. The orientations that pervade "Brush Talks" are in most respects the same as those of literati thinking about nature a millennium earlier. Philosophical pigeonholes are largely beside the point. Some "Confucians" thought about nature a great deal, and some, convinced that human society is the sole proper object of reflection and action, as little as possible; but their perspectives were, on the whole, the ones common to all Chinese who could read and write. Nature was an organismic system, its rhythms cyclic and governed by the inherent and concordant pattern uniting all phenomena.

*It was made obvious in a brilliant series of papers by Robert M. Hartwell: "A Revolution in the Chinese Iron and Coal Industries During the Northern Sung, 960-1126 A. D.," in *Journal of Asian Studies*, 21 (1962), 153-162; "Markets, Technology, and the Structure of Enterprise in the Development of the Eleventh-Century Chinese Iron and Steel Industry," in *Journal of Economic History*, 26 (1966), 29-58; "A Cycle of Economic Change in Imperial China: Coal and Iron in Northeast China, 750-1350," in *Journal of the Economic and Social History of the Orient*, 10 (1967), 102-159.

It comes as a shock to see Shen's definition of salt in a memorial: "Salt is a means to wealth, profit without end emerging from the sea" (*Hsu tzu chih t'ung chien ch'ung pien*, 280: 17b-21b). This was not a slip, nor is it difficult to find philosophical precedents. Shen saw the fiscal function of the state (for which he briefly had supreme responsibility) as the provision of wealth from nature. His recommendations encouraged extractive industries and manufactures, and mobilization of the popular strength for land reclamation, in order to increase national wealth. In that respect he was faithful to the priorities of Wang An-shih. This is a far cry from the senior civil servant in China in the 1960's designing a campaign to convince farmers that nature is an enemy to be conquered, tamed, and remolded to social ends. But neither is it the pastoral ideal.

Why this discrepancy between nature as the ideal pattern to which man adjusts and nature as a (still beneficent) means of enrichment? Why does Shen seem not to be conscious of it as contradictory? These are questions on which the research has yet to be done. But Shen Kua's career, considered in the round, suggests a working hypothesis. Such notions as yin-yang, the Five Phases, and certain related ideas associated with the *Book of Changes* are often considered to have been hindrances to an autochthonous scientific revolution in traditional China. This is, of course, an elementary fallacy, comparable to considering the railroad, because it filled a need satisfactorily for so long, an impediment to the invention of the airplane. The old Chinese world view had much in common with cosmological ideas practically universal in Europe until the consummation of the Scientific Revolution—the four elements and so on—but that gave way soon enough. Historically speaking, Chinese organismic naturalism was not a rigid framework of ideas that barred change; rather, it was the only conceptual language available for thinking about nature and communicating one's thoughts, new or old, to others. Like any language, it imposed form and was itself malleable. Its historical possibilities were less a matter of original etymology or definition than of the ambiguity and extensibility that let people in later ages read new and often drastically changed import into old harmony of man and nature by Shen and others before and after him who favored the exploitation of nature in the interests of the state. Although such activist thinkers stretched the old pattern of understanding, its fabric remained seamless. Their defi-

nition of what they wanted could not transcend it. Only the more desperate urgencies or another time could finally stretch it until it tore.

BIBLIOGRAPHY

1. ORIGINAL WORKS. The best attempt at a complete list of Shen's writings is in an appendix to Hu Tao-ching's standard ed. of "Brush Talks." *Meng ch'i pi t'an chiao cheng*⁶⁹ ("Brush Talks From Dream Brook, a Variorum Edition"). rev. ed., 2 vols. (Peking, 1960 [1st ed., Shanghai, 1956]), 1151-1156. There are forty titles, including some only mentioned in early writings about Shen. A portion of the list belongs to parts or earlier version of larger writings. It has been suggested that the high rate of attrition was due to the campaign of Ts'ai Ching⁷⁰ (1046-1126), virtual dictator during the revival of the New Policies in the first quarter of the twelfth Century, to obliterate the literary remains of his predecessors as well as their enemies. (See Ch'en Teng-yuan.⁷¹ *Ku-chin tien-chi chü-san k'ao*⁷² ["A Study of the Collection and Dispersion of Classical Writings in Ancient and Modern Times"; Shanghai, 1936], 54.) Six works are extant, although only two appear to be substantially unaltered, and considerable fragments of four others exist. Those of scientific interest are described below:

1. *Meng ch'i pi t'an*²¹ ("Brush Talks From Dream Brook"), written over the greater part of Shen's retirement and possibly printed during his lifetime. It was first quoted in a book dated 1095. Originally it consisted of thirty *chüan* (a chapterlike division): but all extant versions, descended from a xylograph of 1166, follow an unknown prior editor's rearrangement into twenty-six *chüan*. The editor of the 1166 reprint noted a number of errors already in the text that he could not correct for want of variants. There are 587 jottings.

The practically definitive ed. of this book and its sequels (items 2 and 3 below), and in many other respects the foundation of future studies, is the Hu Tao-ching recession mentioned two paragraphs above. It includes a carefully collated and corrected text with variorum notes and modern (but occasionally faulty) punctuation, based on all important printed versions and on five previous sets of notes on variants. It also provides exegetic and explanatory notes and generous quotations from documents concerning Shen, from his other books, from the reflections of other early writers on his subject matter, and from modern Chinese (and to some extent Japanese and Western) scholarship. Appendixes include thirty-six additional jottings or fragments that have survived only in the writings or compilations of others; all known prefaces and colophons: notes on eds, by early bibliographers and collators: a chronological bibliography; a list of Shen's writings: and an index to names and variant

names of all persons mentioned in "Brush Talk" (a tool still very rare in Chinese publications). A 1-vol. version of the text with minimal apparatus was published by Hu as *Hsin chiao cheng Meng ch'i pi t'an*⁷³ ("Brush Talks From Dream Brook. Newly Edited"; Peking, 1957).

2. *Pu pi t'an*⁷⁴ ("Supplement to Brush Talks"), listed in most early bibliographies as two *chüan* but rearranged into three *chüan* with some alteration of order in the 1631 ed. Ninety-one jottings. Hu suggests that this and the next item were edited posthumously from Shen's notes. There is even stronger evidence for this hypothesis than he adduces, for some articles appear to be rejected drafts of jottings in "Brush Talks" (compare 588 with 437. 601 with 274).

3. *Hsu pi t'an*⁷⁵ ("Sequel to Brush Talks"). eleven jottings in one *chüan*, mostly on literature.

4. *Hsi-ning Feng-yuan li*⁷⁶ ("The Oblatory Epoch Astronomical System of the Splendid Peace Reign Period," 1075), lost, but listed in a Sung bibliography as seven *chüan*. This was the official report embodying Shen's calendar reform. It would have followed the usual arrangement, providing lists of constants and step-by-step instructions for computation, with tables as needed, so that the complete ephemerides could be calculated by someone with no knowledge of astronomy. Since a *Hsi-ning Feng-yuan li ching*⁷⁷ ("Canon of the Oblatory Epoch Astronomical System. . .") in three *chüan* is separately recorded, the remaining four *chüan* may have been, as in other instances, an official critique (*li i*⁷⁸) outlining the observational basis of the system and reporting on tests of its accuracy. The Sung standard history also records a ready reckoner (*li ch'eng*⁷⁹) in fourteen *chüan*, used to simplify calculations, and a detailed explanation of the mathematics with worked-out examples (*pei ts'ao*⁸⁰) in six *chüan*. Surviving fragments of the basic document have been gathered by the great student of ancient astronomy Li Jui⁸¹ (1756-1814) under the title *Pu hsiu Sung Feng-yuan shu*⁸² ("Restoration of the Sung Oblatory Epoch Techniques"), printed in his *Li shih i shu*⁸³ ("Posthumous works of Mr. Li," 1823).

5. *Liang fang*¹⁹ ("Good Prescriptions"), a work of ten or fifteen *chüan* compiled during Shen's retirement. In the Sung it was combined with a smaller medical miscellany by the greatest literary figure of Shen's time, Su Shih⁸⁴ (1036-1101), a moderate but influential opponent of the New Policies. The conflation is called *Su Shen nei-hun liang fang*⁸⁵ ("Good Prescriptions by the Han-lin Academicians Su and Shen"), often referred to as *Su Shen liang fang*. The most broadly based text is that in the *Chih pu-tsu chai ts'ung-shu*⁸⁶ collection and modern reprints descended from it. One copy of an illustrated Ming ed. still exists. Shen's original compilation was lost sometime after 1500. There is some overlap between *chüan* 1 of *Su Shen liang fang* and jottings in *chüan* 26 of *Meng ch'i pi t'an*: see the comparison in Hu's *Chiao cheng*. pp. 880-882. A lost collection of prescriptions in twenty *chüan*, *Ling yuan fang*⁸⁷ ("Prescriptions From

the Holy Garden"). is quoted in Sung treatises on materia medica. Hu has shown that it was written before *Liang fang* (*Meng ch'i pi t'an chiao cheng*, pp. 830-831).

6. *Wang huai lu*²⁰ ("Record of Longings Forgotten"). compiled during Shen's retirement. It incorporates a lost book of observations on mountain living written (or at least begun) in Shen's youth and entitled *Huai shan lu*⁸⁸ ("Record of Longings for the Mountains"). His retirement to Dream Brook satisfied his early longings, hence the title of the later collection. It was lost soon after his death. The only well-known excerpts in the *Shuo fu*⁸⁹ collection, are on implements useful to the well-born mountain dweller, but Hu Tao-ching in a recent study has shown that the book was correctly classified by early bibliographers as agricultural. See "Shen Kua ti nung-hsueh chu-tso *Meng ch'i Wang huai lu*"⁹⁰ ("Shen Kua's Agricultural Work . . ."), in *Wen shih*,⁹¹ 3 (1963), 221-225. Hu's collection of all known fragments has not yet appeared.

7. *Ch'ang-hsing chi*⁹² ("Collected Literary Works of [the Viscount of] Ch'ang-hsing"), originally forty-one *chüan*, almost certainly a posthumous compilation. Includes prose, poetry, and administrative documents prized for their language. By the time this work was reprinted in the Ming (ca. fifteenth century), only nineteen *chüan* of the Sang version remained. An additional three *chüan* were collected from other works and printed at the head of the recession in *Shen shih san hsien-sheng wen chi*⁹³ (1718). This is now the best ed. available. The collection includes important astronomical documents and a great deal of information on Shen's intellectual formation, in particular his commentary on Mencius (*Meng-tzu chieh*⁹⁴) in *chüan* 23.

The only book in any Western language that translates more than a few examples of Shen's writings is Joseph Needham et al., *Science and Civilisation in China*, 7 vols, projected (Cambridge, 1954-), particularly from vol. III on. The translations always occur in context, usually with fuller historical background than given in Chinese publications. Occasionally the English version is extremely free, as when "Meng chi" is translated "Dream Pool." Translations into modern Chinese are sprinkled through Chang Chia-chü,⁹⁵ *Shen Kua* (Shanghai, 1962). A complete Japanese trans. of "Brush Talks" and its sequels is an ongoing project of the History of Science Seminar, Research Institute for Humanistic Studies (Jimbu Kagaku Kenkyūsho⁹⁶), Kyoto University. A representative selection of English translations will be included in a sourcebook of Chinese science being compiled by N. Sivin.

II. SECONDARY LITERATURE. There is no bibliography devoted to studies of Shen's life or work, but most primary and secondary sources in Chinese have been cited in Hu's ed. or in the footnotes to the biography of Shen by Chang Chia-chü (see above). The latter is the

fullest and most accurate account of Shen's life, and pays attention to the whole range of his work. It is generally critical in method, but sometimes careless. Like

other recent Chinese accounts, it is extremely positivistic, patronizing toward "feudal" aspects of Shen's mentality, and inclined to exaggerate his sympathies toward the common people. A concise survey of Shen's life and positive contributions by a great historian of mathematics is Ch'ien Pao-tsune,⁹⁷ "Shen Kua," in Seminar in the History of the Natural Sciences, ed., *Chung-kuo ku-tai k'o-hsueh-chia*⁹⁸ ("Ancient Chinese Scientists": Peking, 1959), 111-121. Another work of interest by Hu Tao-ching, overlapping to some extent the preface to his ed. of "Brush Talks," is "Shen Kua ti ch'eng-chih ch'ing-hsiang ho t'a tsai k'o-hsueh ch'eng-chiu-shang ti li-shih t'iao-chien"⁹⁹ ("Shen Kua's Political Tendencies and the Historical Conditions Bearing on His Scientific Accomplishments"). in Li Kuang-pi and Ch'ien Chün-yeh,¹⁰⁰ eds., *Chung-kuo li-shih Jen-wu lun-chi*¹⁰¹ ("Essays on Chinese Historical Figures": Peking, 1957), 330-347. Its summary of scientific and technical accomplishments in the Northern Sung period from 960 to ca. 1100 is especially useful.

In addition to discursive biographical studies. Shen's life has been the subject of four chronologies (*nien-p'u*¹⁰²), an old form in which individual events are simply listed year by year along with related data. The fullest in print (although obsolete in a number of respects) is Chang Yin-lin,¹⁰³ "Shen Kua pien nien shih chi"¹⁰⁴ ("A Chronicle of Shen Kua"), in *Ch'ing-hua hsueh-pao*,¹⁰⁵ 11 (1936), 323-358. That appended to the 2-vol. Hu Tao-ching ed. of "Brush Talks," 1141-1156, is especially handy because of its references to jottings and to sources cited in the book's notes. The most up-to-date and accurate chronology is the one at the end of Chang Chia-chü, Shen Kua, 235-259. Hu Tao-ching, in his colophon to the 1960 ed. of "Brush Talks," remarked that his own book-length chronology was in the press, but it has not yet appeared.

Yabuuchi Kiyoshi,¹⁰⁶ Japan's leading historian of science, has provided a characteristically reflective discussion of the historic circumstances of Shen's career in "Shin Katsu to sono gyōseki,"¹⁰⁷ "Shen Kua and His Achievements", in *Kagakushi kenkyū*,¹⁰⁸ 48 (1958), 1-6. The most stimulating contribution to the study of Shen in the past decade is Teraji Jun,¹⁰⁹ "Shin Katsu no shizen kenkyū to sono haikai"¹¹⁰ ("The Natural Investigations of Shen Kua and Their Background"), in *Hiroshima daigaku bungakubu kiyō*,¹¹¹ 27, no. 1 (1967), 99-121. Rejecting the prevalent tendency to prove Shen's greatness by citing anticipations of European science and technology, the author has made a fruitful and original effort to grasp the inner coherence of his thought and work. This article provided a point of departure for the first two sections of the "Conclusion" of the present article.

The first, and so far the only, European introduction to Shen's life is Donald Holzman, "Shen Kua and his *Meng-ch'i pi-t'an*," in *T'oung Pao* (Leiden), 46 (1958), 260-292, occasioned by the first publication of Hu's ed. of "Brush Talks." In addition to providing a critical and

well-proportioned biographical sketch, Holzman has paid more attention to Shen's humanistic scholarship than has any other author discussed in this section. He also considers some of the evidence for Shen's position in the history of science, but reaches no conclusion. He tends to ask whether Shen's ideas are correct from today's point of view rather than what they contributed to better understanding of nature in the Sung. The most reliable and compendious introduction to the New Policies is James T. C. Liu, *Reform in Sung China. Wang An-shih (1021-1086) and His New Policies* (Cambridge, Mass., 1959). A full-length intellectual biography of Shen is under way by N. Sivin.

The first modern study of any aspect of Shen's interests, largely responsible for the attention paid him by Chinese educated in modern science, is Chu K'o-chen, ¹¹² "Pei Sung Shen Kua tui-yü li-hsueh chih kung-hsien yü chi-shu" ¹¹³ ("Contributions to and Records Concerning the Earth Sciences by Shen Kua of the Northern Sung Period"), in *K'o-hsueh*. ¹¹⁴ 11 (1926), 792-807. Chu's erudite and broadly conceived article has influenced much of the later writing on the subject. A great number of observations on Shen's scientific and technical ideas are distributed through Needham et al., *Science and Civilization in China*, as well as through the Yuan Periods"; Kyoto, 1967).

topical studies by leading Japanese specialists in Yabuuchi Kiyoshi, ed., *Sō Gen jidai no kapaku gijutsu shi* ¹¹⁵ ("History of Science and Technology in the Sung and

There is no recent investigation in depth of Shen's as astronomical activities, but a good technical description of what were traditionally considered his most important contributions is found in Juan Yuan, ¹¹⁶ Ch'ou jen *chuan* ¹¹⁷ ("Biographies of Mathematical Astronomers" [1799]; Shanghai, 1935), 20:238-243. Shen's most noteworthy mathematical problems have been studied in the various articles in Ch'ien Pao-tung, ed., *Sung Yuan shu-hsueh-shih lun-wen-shi* ¹¹⁸ ("Essays in the History of Mathematics in the Sung and Yuan Periods"; Peking, 1966). The considerable portion of "Brush Talks" devoted to music is evaluated and used in Rulan C. Pian. *Song [sic] Dynasty Musical Sources and Their Interpretation* (Cambridge, Mass., 1967), esp. 30-32. Shen's ideas concerning economic theory, the circulation of money, and similar topics have been related to traditions of thought on these subjects in an unpublished study by Robert M. Hartwell. A number of interesting ideas are found in Sakade Yoshinobu's ¹¹⁹ positivistic discussion of Shen's use of theory, "Shin Katsu no shizenkan ni tsuite" ¹²⁰ ("On Shen Kua's Conception of Nature"), in *Tōhōgaku*, ¹²¹ 39 (1970), 74-87. Shen's remarks on ancient techniques are elucidated in Hsia Nai, ¹²² "Shen Kua ho k'ao-ku-hsueh" ¹²³ ("Shen Kua and Archaeology"), in *K'ao-ku*, ¹²⁴ no. 5 (1974), 277-289, also in *K'ao-ku hsueh-pao*, ¹²⁵ no. 2 (1974), 1-14, with English summary, 15-17.

NOTES

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|-----------|-------------------------|----------------------|--------------------------|
| 1. 沈括 | 35. 一行 | 66. 徽 | 98. 中國古代科學家 |
| 2. 錢塘 | 36. 萬 | 67. 續資治通鑑長編 | 99. 沈括的政治傾向和他在科學成就上的歷史條件 |
| 3. 澗州京口 | 37. 樂律 | 68. 儒法鬥爭與我國古代科學技術的發展 | |
| 4. 沈周 | 38. 祖恒 | 69. 胡道靜、校證 | 100. 李光壁、錢君暉 |
| 5. 許 | 39. 奉元 | 70. 蔡京 | 101. 中國歷史人物論集 |
| 6. 新法 | 40. 授時 | 71. 陳登原 | 102. 年譜 |
| 7. 王安石 | 42. 郭守敬 | 72. 古今典籍聚散考 | 103. 張蔭麟 |
| 8. 寧國 | 43. 太平天國曆法考訂 | 73. 新校正夢溪筆談 | 104. 編年事輯 |
| 9. 蕪湖 | 44. 羅爾綱 | 74. 補筆談 | 105. 清華學報 |
| 10. 張藹 | 45. 天曆考及天曆與陰陽曆日對照表 | 75. 續筆談 | 106. 戴內清 |
| 11. 衛朴 | 46. 謝莊 | 76. 熙寧奉元曆 | 107. 沈括とその業績 |
| 12. 永安 | 47. 顏真卿 | 77. 曆經 | 108. 科學史研究 |
| 13. 平泉 | 48. 朱熹 | 78. 曆議 | 109. 寺帝遵 |
| 14. 蔡確 | 49. 孫思恭 | 79. 立成 | 110. 沈括の自然研究とその背景 |
| 15. 延州 | 50. 礙 | 80. 備草 | 111. 廣島大學文學部紀要 |
| 16. 經略安撫使 | 50a. 石油 | 81. 李銳 | 112. 竺可楨 |
| 17. 開國子 | 51. 畢升 | 82. 補修宋奉元術 | 113. 北宋沈括對於地學之貢獻與記述 |
| 18. 夢溪 | 52. 十百千 | 83. 李氏遺書 | 114. 科學 |
| 19. 良方 | 53. 羌 | 84. 蘇軾 | 115. 宋元時代の科學技術史 |
| 20. 忘懷錄 | 54. 木經 | 85. 蘇沈內翰良方 | 116. 阮元 |
| 21. 夢溪筆談 | 55. 寇宗奭 | 86. 知不足齋叢書 | 117. 疇人傳 |
| 22. 象數 | 56. 本草衍義 | 87. 靈苑方 | 118. 宋元數學史論文集 |
| 23. 技藝 | 57. 秋石 | 88. 懷山錄 | 119. 阪出祥伸 |
| 24. 辯證 | 58. 宮下三郎 | 89. 說郛 | 120. 沈括の自然觀について |
| 25. 異事 | 59. 漢藥秋石の藥史學的研究 | 90. 沈括的農學著作《夢溪筆談》 | 121. 東方學 |
| 26. 器用 | 60. 渡邊幸三 | 91. 文史 | 122. 夏鼎 |
| 27. 雜識 | 61. 現存する中國近世までの五藏六府國の概説 | 92. 長興集 | 123. 沈括和考古學 |
| 28. 藥識 | 62. 燕肅 | 93. 沈氏三先生文集 | 124. 考古 |
| 29. 五行 | 63. 蘇頌 | 94. 孟子解 | 125. 學報 |
| 30. 氣 | 64. 渾儀議 | 95. 張家駒 | |
| 31. 律呂 | 65. 搏 | 96. 人文科學研究所 | |
| 32. 隙續 | | 97. 錢寶琮 | |
| 33. 楊暉 | | | |
| 34. 朱世傑 | | | |

THE LATE CHIN DEBATES ON DYNASTIC LEGITIMACY*

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The history of Koryō up to the Mongol conquest was profoundly conditioned by the shifting fortunes of conflicting ideological orientations and correspondingly divergent concepts of Koryō's "true" identity. The Jurchen state of Chin was an essential component of the Gestalt within which these concepts found classic expression: historiographically in the "Historical Records of the Three Kingdom's" of Kim Pusik 金富軾 (1075-1151)¹ and poetically in the "Lay of King Tongmyōng" of Yi Kyubō 李奎報 (1168-1241).² For purposes of comparison I found it instructive to examine the corresponding phenomenon in Chin: the competition among various concepts of the Jurchen state's identity as there were articulated under imperial auspices in the late twelfth and early thirteenth centuries under the rubric "Cyclical Progression of the Elemental Virtues" (teyün 德運, hereafter simply "virtue-cycle"). The interest of such a comparison is heightened by the fact that Chin and Koryō were joined by a special bond, viz., the spirit of ancient Koguryō 高句麗, to which the founders of both states proclaimed themselves heir.³

Already when the Wan-yen 完顏 clan forged their "Golden" state, the "all-under-Heaven" imperium was a threadbare idea through whose rhetorical tatters the pragmatic contours of a multi-state system were readily discernible. The disintegration of the Chinese world order was dramatized by the collapse of the Northern Sung as a result of the Jurchen invasion in 1126. The effects of this "Catastrophe of Ching-k'ang 靖康" were traumatic: it was crucial to the crystallization of the neo-Confucianist ideology,⁴ and it had massive repercussions in the northeastern periphery of the battered ecumene. Prior to the reign of Chang-tsung 章宗 (r. 1189-1208) the legitimacy of the Chin state had been asserted frequently and in all the traditional ways, including some that had regional significance hallowed in Jurchen tradition;⁵ but the more specialized question of Chin's filiation within the Chinese "virtue cycle" had not been subjected to full-scale deliberation. The fact that a "History of Liao" had been commissioned under Hsi-tsung 熙宗 (r. 1135-1149)⁶ would indicate that the court had then acquiesced in the idea of Chin's descent from that state, the

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conquest of which had inaugurated their own. But a merely transmural descent from a regime that itself could boast of no exalted pedigree had little appeal in

Chang-tsung's sinified court. A series of officially sanctioned discussions which took place in the 1190s explored all the alternatives which the learned participants, Jurchen and Chinese, perceived as available to Chin as sources of dynastic legitimacy, thus laying the foundations for a definite reshaping of Chin's official self-image. These proceedings are almost entirely ignored in the Chin History; it would appear that the official historiographers who compiled the histories of Sung, Liao and Chin in the 1340s, in their determination not to get bogged down in a controversy that had already sidetracked the compilation of those histories for so long, made the whole subject of dynastic legitimacy more or less taboo. Fortunately we have, in the Ta-Chin Te-yün t'u-shou 大金德運圖說 ("Explanations, with Charts, of Great Chin's Virtue-cycle"), a dozen or so documents concerning the discussions as summarized and supplemented in 1214, on the eve of the removal of Chin's capital from Yen south to K'ai-feng.⁷ In addition to a series of position-papers each representing a particular legitimating ideology as espoused in 1214, these documents include an official memo which summarizes the various positions that had earlier been taken under Chang-tsung; about the latter, these summaries are all the information that we have. If the idea of descent from Liao was still being put forward in 1214, we have no record of the fact since the documentation for the proceedings of that year include no such position paper. From the summary of the earlier debates, however, we learn that that idea had still had proponents under Chang-tsung. That ruler had, in fact, opted for Sung-derived legitimacy in 1202,⁸ thereby aborting the Liao History project: such a compilation would have contravened the officially sanctioned view by implying Liao-derived legitimacy for Chin. Liao was explicitly rejected in 1214, on the grounds that Liao, unlike Sung, had occupied only one edge of the Central Plain, hence had no heritage to offer.⁹ Evidently the Chin court's keen interest in Liao precedents during the early years of the Jurchen state had been merely a matter of political and administrative expedience. For all that the two states had in common (as "rival states", ti-kuo 敵國, in Chinese historiographical parlance), they shared no transmural myth that might have bridged the gap between them to provide the Chin court with material for ritual or ideological purposes: the invocation of a Chinese criterion (possession of the Central Plain) easily sufficed to eliminate Liao from consideration.

One of the position-papers simply ignores the dynamic of the "virtue-cycle": it would dispense with interdynastic linkage altogether and base chin's legitimacy on the charisma of Aguda the founder, whose accession-decree of 1115 had alluded to the perdurability of gold and its correspondence with the color white,

the favored color of the Wan-yen clan.¹⁰ It would indeed appear that metal/white combination had been Chin's ritually sanctioned "phase" throughout the twelfth century. A statement of 1201 had alluded to this fact, linking it with the example of Yin 殷: just as that state had favored metal/white because it had been founded by dint of armed force, so also had Aguda conquered Liao and Sung to take possession of the Central Plain. His sagely instructions had thus been in spontaneous compliance with classical precedent and should continue to command the obedience of the Chin court, without reference to the sequence of the "Five Phases."¹¹ The invocation of Yin as model is noteworthy for its implication that neither Sung nor Liao was capable of validation Chin's legitimacy; so august a matter required nothing less than classical Chinese sanction, corroborating the charisma of the founder.

Three of the 1214 position-papers, those of Huang Shang 黃裳, T'ien T'ing-fang 田庭芳 and Chang Hsing-hsin 張行信, advocate a "virtue-cycle" that would link Chin with T'ang. Huang Shang accepts (without credit) Ou-yang Hsiu's definition of "orthodox hegemony" (cheng-t'ung 正統), a definition which, with its periods of "severance" (chüeh 絕) of the Mandate¹² lent itself to the idea of T'ang-linkage for Chin. Huang further points out that Liao, by its conquest of the Later Chin (936), got possession of the Central Plain before Sung did; why, he asks, if we are prepared to relegate Liao to intercalary status, should we hesitate to do likewise with Sung?¹³ T'ien T'ing-fang's essay is noteworthy for its adducing an item of regional "evidence," namely, gold production in the area of the "Long White Mountain" (Ch'ang-pai shan 長白山), the range in eastern Manchuria hallowed in Jurchen legend and cult (as also in the legends of their descendants the Manchus).¹⁴ He sees Sung's rejection of T'ang-linkage for itself as providential for Chin, which he felt should respond to that cue by claiming the heritage of T'ang, just as Han had crossed over Ch'in to associate itself with Chou.

The efforts of Huang and T'ien, whose central inspiration of nativist autonomy was enriched by their claim to succession from T'ang, are not to be scored. The fact that they seem at least as much concerned about Chin's retention of "metal/gold" as about dynastic transmission per se is readily justifiable in a

time of national crisis, when the regional "iconography" symbolized by "gold" had its distinctive role to play. There is no gainsaying the ideological relevance of the identity of that "virtue" with the state's name, an identity that had Aguda's state-founding utterance behind it; but their position had no monopoly on that argument, or on the charismatic and portentous elements which they also stressed: all these they shared with the purely nativistic autonomists. Moreover

Huang and T'ien made but a shallow case for T'ang-linkage, with their hackneyed precedent and their facile manipulation of the "virtue-cycle." They were no match for the Sung-linkers, who could point to both fact (the Ching-k'ang triumph of 1126) and theory (the Central Plain Mandate) in support of their thesis; moreover they could strike out at their T'ang-linking rivals by accusing them of being seditiously motivated, that is, of being crypto-Sung sympathizers, intent upon devising a tortuous linkage with T'ang only because they could not really accept the political implication of Sung-linkage, viz., the idea that Sung's Mandate had expired with the end of the Northern Sung.¹⁵

The third T'ang-oriented position paper, that of Chang Hsing-hsin,¹⁶ is by far the most interesting. Essential to his argument is a precedent ignored by all his colleagues, viz., that of the Toba Wei and the manner in which they had found their official identity within the "virtue-cycle." In a precis of that slippery subject that begins with Fu Hsi, Chang says:

... Coming down from Wei and Chin, the clans of Liu 劉 and Shih 石 and the states of Yen and Ch'in 燕秦 (i.e., the "Sixteen States" of the fourth century) one after another grasped the Middle Kingdom; but they cannot be counted in the sequence of phases because their careers were hasty and straitened. Yüan Wei 元魏, finding its origins in the somber boreal regions (yüan 元 = hsüan 玄 - shuo 朔), for its color esteemed black; this too is a spontaneous response, harmonizing with the "virtue" of water. Therefore, although Wei initially linked with /former/ Ch'in to become "earth," as a matter of principle there was something infelicitous about this. Hence, when Hsiao Wen 孝文 (r. 471-499) succeeded to the throne, he perused the counsels of his ministers in this matter and in the end decided on the "virtue" of water, thereby inheriting Chin's 晉 phase from afar. /Northern/ Chou and Sui linked themselves accordingly, and in the absence of any further arguments about it under the T'ang, /the latter/ simply accepted the sequence for itself. . . .

The change to which Chang refers took place in 491, two years before the

sinicizing emperor Hsiao Wen moved the capital of Wei from P'ing-ch'eng south to Lo-yang; the parallel situation of the Jurchen in 1214, a year before they moved their capital south from Yen to K'ai-feng, is obvious. As a result of the Toba discussions it was decided, and in 492 promulgated by decree, that the state's position in the sequence of phases (hsing-tz'u 行次) would henceforth be fixed as "water," proceeding from "metal."¹⁷ This decision signified Wei's derivation of its legitimacy from Chin 晉, rather than from the Former Ch'in as

previously professed.¹⁸ Wei Shou (compiler of the Wei-shu) did not share the reticence of the Chin-shih compilers where legitimacy-related discussions were concerned: in his "Monograph on Rites" he provides a rather detailed account of the discussions in question (Wei-shu 108.1, 14b). From this it is clear that the decision represented a victory for the concept of independent generation of legitimacy and a repudiation of the criterion of Central Plain Mandate chronology, the weight of which had previously sufficed to justify linkage with the Former Chin. The argument which now prevailed in the Toba court was that the Ssu-ma's possession of the Mandate had ended at Lo-yang in 316 (i.e., with the end of the Western Chin), whereupon the Toba had received it in their native region of northern Shansi. Neither the Former Ch'in nor any of the other non-Chinese regimes of fourth century North China (the "Sixteen States") play any rôle on this transmission. Such a view attests to a strong sense of ethno-geographical identity on the part of the Toba and a relative unconcern about participating in the actual process of Chinese history. What really counted were the putative magnetic fields of rival charismas, and in that metahistorical rivalry the Toba's claim in 491 was that their pre-state forebears had assumed the "orthodox hegemony" with the Chinese loss of North China in the first quarter of the fourth century, giving birth to a new, non-Chinese, sequence. The Eastern Chin's traditional claim to "main line" legitimacy was rejected.

The stress which Chang Hsing-hsin places on the Toba precedent is understandable, in view of its similarities with the model which he proposes for his own state of Chin. Having rejected the possibility of a "severance" in the "virtue-cycle" (pace Ou-yang Hsiu), he proclaims:

... If one examines the junctures and infers /therefrom the proper/ times, one can discern the intent of Heaven. From the time that T'ang's "Joyous" and "Resplendent" Emperors (Hsi-tsung 僖宗, r. 874-887 and Chao-tsung 昭宗, r. 888-903) failed in the west, Our Court's First Ancestor (Shih-

tsu 始祖 had already inaugurated his career in the east. His spirit reigned over the Long White /Mt./ (Ch'ang-pai /shan/) and his auspices overflowed the Golden Source (Chin-yüan 金源).¹⁹ The succeeding generations having received the benefit of his virtue, they brought together the Great Hegemony (ta-t'ung 大統)... If we look into the spontaneous responses of our state's initial phase, and if we follow the precedents of Han inheriting from Chou and Wei inheriting from Chin, we will certainly decide to become the virtue or metal, inheriting T'ang's cycle from above.

This contrasts with the conventional kind of T'ang-linkage proposed by Huang

Shang and T'ien T'ing-fang, wherein the heritage claimed was that of the T'ang whose shrunken Mandate had lapsed with the abdication of the "Lamented Emperor (Ai-ti 哀帝)" to Chu Wen 朱溫 (founder of the Later Liang) in 907. Thanks to Chang Hsing-hsin we know that even after waves of sinicization had swept over Chin for a century, the pre-state legend of the Jurchen was still a viable response to the question of Chin's identity. Making good use of his learning in Chinese historical materials, Chang found inspiration in the manner in which the Toba Wei had responded to their own identity crisis seven centuries earlier. On that basis he saw Sung as irrelevant a priori, and claimed for the Jurchen a T'ang Mandate that had not yet been dragged into the mire of ethnic and regional rivalries. For he postulated that the magnetism of Chin's "First Ancestor" had wrenched the Mandate from the faltering hands of the T'ang rulers whose fortune it had been to preside over the dissolution of the empire. We can safely infer that what Chang had in mind was the rebellion of Huang Ch'ao 黃巢, whose forces ravaged China for nearly a decade beginning in 875, and set the dynasty on its ignominious course to extinction. No tortuous reasoning here! Chang goes straight to the heart of the matter, dispensing with the tiresome verbiage which his more conventional colleagues, fixated as they were upon the Central Plain, lavished on the regimes which in that region had followed one another in rapid succession after the collapse of the T'ang. His fellow theorists of whatever persuasion had left the established chronological framework of Chinese dynastic history intact, either maneuvering within it or (in the case of the autonomists) turning their backs on it to begin anew with Aguda. Chang Hsing-hsin shows no such reticence: heedless of the dynastic disruption involved, he summarily appropriates the Chinese tradition's central sanction of "orthodox hegemony", bestowing it on a legendary ancestor of the Jurchen, who

in the late ninth century (by Chang's reckoning) had brought his people out of tribal obscurity to the threshold of political eminence in East Asia.

The ancestor in question was a culture-hero whom the "Raw" Jurchen in general and the Wan-yen clan in particular had claimed as their own. Versions of his story are preserved in the annals of both Koryō and Chin, in addition to works left by men of Sung who had sojourned in Chin; the First Ancestor's origin in "Kao-li" is one element that is common to all versions.²⁰ The reference to Kao-li in this context has been variously interpreted. Most convincing to me is the theory that the reference is to Koguryō (Kao-chū-li), conventionally abbreviated, since that ancient state's name and legend long outlived the state itself. Indeed, having been appropriated by Pohai,²¹ it played a part in the Wan-yen's mobilization of support for their new dynasty. The fact that Chang Hsing-hsin

does not refer explicitly to Koguryō is not surprising: even in nativistic perceptions the ideological needs and sense of identity characteristic of an empire that had long since consolidated its control over the Chinese-populated Central Plain had shifted markedly since the dynastic course had been set among the tribes of Eastern Manchuria. Nevertheless, in the person of the First Ancestor the spirit of Koguryō hovers in the background, linking Chin with that state, whose early establishment, vigor and longevity qualified it for acclaim as the ancestral state of the medieval kingdoms of northeastern Asia -- Pohai and Koryō, in addition to Chin. In Koryō, insulated as it was by Chin from the gravitational pull of the Chinese world order, this transmural tradition remained relatively robust. Thus in 1193 Yi Kyubo gave exuberant poetic expression to Koryō's national identity, celebrating the Koguryō ancestry that he felt should inspire his countrymen with pride in their past and hope for future greatness. Likewise in Chang Hsing-hsin's description the First Ancestor's achievements the mythic note is unmistakable, despite the conventional format and sober diction that otherwise set the tone of his essay. It is hardly likely that he was alone in his mythic conception of Chin's ancestry: the latter was in all likelihood the core of a still living tradition. But Chang appears to have been its last exponent, as it was swamped by the rising tide of sinicization, and was later ignored by the Yüan-sponsored historiography of the 1340's. The traditions associated with the Long White Mountain went into eclipse, to be revived four centuries later by the Manchu founders of the Ch'ing, who initially called themselves the "Later Chin 後金."

FOOTNOTES

1. Korea's oldest extant historical work, the Samguk Sagi 三國史記 was compiled by Kim Pusik on royal command and completed in 1147. See Korean Studies Guide (Berkeley and Los Angeles, 1954), p. 80, and Kim Tae-jin, ed., A Bibliographical Guide to Traditional Korean Sources (Seoul: Asiatic Research Center, 1976), pp. 11-17.
2. The Tongmyōng Wang P'yōn 東明王篇, composed by Yi Kyubo in 1193, is a poetic rendering of a portion of the Koguryō annals of a lost Three Kingdoms history that antedated the work of Kim Pusik; the latter's pro-Silla orientation is thought to have designedly replaced the pro-Koguryō orientation of the earlier work (see Yi Usōng 李佑成) "Samguk Sagi-ui kusong-gwa Koryō-wangjo-ŭi chōngt'ong ūisik 三國史記의構成과高麗王朝의正統儀式

- Chindan Hakpo 38 (Oct. 1974), pp. 203-207, and K.H.J. Gardiner, "The Samguk Sagi and Its Sources," Papers on Far Eastern History (Australian National University) 2 (Sept. 1970), pp. 11f. The poem is contained in ch. 3 of Yi Kyubo's collected works, Tongguk Yi Sangguk Chip 東國李相國集 (re which see Bibliographical Guide to Traditional Korean Sources, pp. 26-30). Translations into Korean and English (the latter very free) have been made, respectively, by Hwang Sun'gu 黃淳九 (Tongguk Ungi 東國韻記, Seoul, 1967, pp. 141-184) and R. Rutt (Korea Journal 13:7 /July, 1973/, pp. 48-54).
3. The claim to Koguryō's heritage (including its territorial domains in Liao-tung and beyond) is implicit in the name "Koryo;" see King Sanggi 金庠基, Koryō Sidae-sa 高麗時代史 (Seoul, 1961), pp. 1 ff. and Yi Pyongdo 李丙燾, Hanguk-sa, Chungse-p'yōn 韓國史, 中世篇, pp. 1 ff. Regarding Chin and the heritage of Koguryō, see below.
 4. Winston Lo, The Life and Thought of Yeh Shih (The Chinese University of Hong-kong, 1974), p. 8.
 5. For examples see Jingshen Tao, "Struggles for Legitimacy: a View from Liao Sung and Chin-Sung Relations," Conference on the Legitimation of Chinese Regimes. Sponsored by ACLS, Monterey, Calif., 1975. On this subject as a whole, I would like to call attention to a book-length study by Hok-lam Chan which is in press, Theories of Legitimacy in Imperial China: Discussions on 'Legitimate Discussion' under the Jurchen-Chin Dynasty (1115-1234). I have not myself had an opportunity to consult this study.
 6. Feng Chia-sheng, The Sources of Liao Dynasty History. Yenching Journal of Chinese Studies, Monograph Series No. 5 (in Chinese), Peiping, 1933, pp. 6f.
 7. Ta Chin te-yün t'u-shuo (hereafter TCTYTS): Ssu-k'u ch'uan-shu chen-pen 四庫全書珍本, Shih-pu 史部 11. Taipei, 1972. For another edition see Chang Chin-wu 張金吾, Chin wen-tsuì 金文最 (Suchou shu-chü, 1895), ch. 28- 29. Regarding the legitimation effort represented by the "virtue-cycle" discussions of 1214, one may safely assume that the irregular accession of Hsüan-tsung 宣宗 in 1213 under the auspices of the rebel Hu-sha-hu 胡沙虎 (Yao Tsung-wu 姚從吾, Tung-pei shih lun-ts'ung 東北史論叢 /Taipei, 1959/ pp. 63 f.; O. Franke, Geschichte des Chinesischen Reiches /Berlin: de Gruyter, 1948 and 1952/, IV, 261-263, V, 138 f.) provided further motivation.
 8. Such is the import of the terse notice in Chang-tsung's annals, dated Nov. 19, 1202 (T'ai-ho 2.11, chia-ch'en day): "/The Court/ has refixed the /dynastic/ virtue-cycle, making it 'earth'." (Chin-shih 金史 /Nan-chien pen, 1529 ed./, 11.12b.)
 9. TYTYTS 7a (memo of Department of State Affairs).
 10. TCTYTS 13 b; Aguda's accession-decree, Chin-shih 2.8a-b.

11. TCTYTS 2a-b (memo of Department of State Affairs).
12. TCYYTS 9b. Huang Shang begins his essay with the same quotation from the Kung-yang chuan that opens the first of Ou-yang Hsiu's "Three Essays on Legitimate Hegemony" (Cheng-t'ung lun san-shou 正統論三首 ; see p. 232 of Rolf Trauzettel, "Ou-yang Hsiu's Essays über die legitime Tronnachfolge," Sinologica 9 (1967), 226-249. Ou-yang Hsiu sets forth his "severance" theory in the second of his "Essays" (Trauzettel, pp. 240 ff.).
13. TCTYTS 11a.
14. On Ch'ang-pai shao see Gibert, Dictionnaire Historique et Geographique de la Mandchourie (Hongkong, 1934), pp. 860-862, and the observations of H. Franke in the Proceedings of the Conference on the Legitimation of Chinese Regimes (ACLS, 1975), p. 6/21 PM 4.
15. TCTYTS 3a-b.
16. TCTYTS 14a-16a. Chang Hsing-hsin has a biography in Chin-shih 107.
17. Wei-shu (I-wen ed.), 7B.9a (492.1, jen-hsu: Feb. 18).
18. Cf. the "virtue-cycle" shart in TCTYTS 8b.

19. Chin-yüan, "Source of Gold," designated the "River of Gold" (Al-chuhu, Ch. An-ch'u-hu 按出虎), original habitat of the Wan-yen clan. It was in memory of his place of origin that Aguda took Chin as dynastic name in 1115 (Gibert, Dictionnaire, p. 491; H. Franke, "Chinese Texts on the Jurchen. A Translation of the Jurchen Monograph in the San-ch'ao pei-meng hui-p'ien." Sprach-und Kulturwissenschaft Zentral Asiens der Universität Bonn 9 (1975), p. 123.
20. For quotation and discussion of six versions (Chin-shih 1 and 6, Koryō-sa 高麗史 13 and 14, Sung-mo chi-wen 松漠紀聞 and San-ch'ao pei-meng hui-p'ien 18) see Mikami Tsugio, Kinshi kenkyū vol. 3 金史研究三 (Tokyo, 1973), pp. 18 ff. The list might also include San ch'ao 3 (H. Franke, op. cit., p. 122) and the Lu-t'ing shih-shih 虜庭事實 in Shou-fu 8 (H. Franke, op. cit., pp. 178 ff. For discussions by Korean scholars see Yi Pyongdo, op. cit., p. 326, and Pak Hyōnsō in the National History Compilation Committee's Hanguk-sa IV, pp. 324 ff.
21. For citations of Pohai designated as "Kao-li," see Mikami, op. cit., p. 23.

The Historical Value of the Ch'üan-chen Sources
in the Tao-tsang

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Scholars have long been aware of the large number of Taoist and Buddhist writings which have accumulated in the past two millennia. But until recently relatively few historians of Chinese history have attempted to search for data of historical significance among these works. Several efforts have been made to examine the value of Buddhist works as historical sources, some of which have been shown to be of high value for the study of Chinese history.¹ However, very little effort has been made to examine the Taoist canon as a historical source. This paper is a preliminary report on the historical value of a small portion of the voluminous Tao-tsang 道藏, or Taoist canon.²

All the works examined here relate to the Ch'üan-chen 全真 sect and almost all of them are written by Ch'üan-chen adherents. These works can be roughly divided into three categories: collected works, biographies, and miscellany. I shall briefly discuss the contents of each category:

(1) Collected Works

The majority of the works fall into this category. A collected work is usually a compilation of the poems and essays of a Ch'üan-chen master edited by one of his disciples. Poetry dominates Ch'üan-chen writings probably because of the occasional nature of the genre. The poems may feature instructions to disciples, lyrical self-expression, or efforts at proselytizing the Ch'üan-chen sect.

(2) Biographies

While resembling the biographies of the dynastic histories in form, the individual biographies of each of the Ch'üan-chen masters must be used with discretion, for they contain many apocryphal accounts.

(3) Miscellany

These works do not fit into "collected works" or "biographies". They include

travel diaries, collections of inscriptions on tablets from Taoist temples, magical formulas and sect regulations. Not all of the books that I have examined contain valuable historical information. For example, those works dealing with sect regulations and magical formulas yield little useful data on contemporary events. Most of these sources in fact contain but a small proportion of useful information, encountered only sporadically or in fragments. Among the material I have examined, nothing approaches the Buddhist church history, Fo-tsu t'ung-chi 佛祖統記 by Chih-p'an 志磐 which, following the style of dynastic histories, includes annals, treatises, tables, and biographies. The historically valuable material from Ch'üan-chen sect writings is almost all in biographical form.

I would like now to discuss each category more specifically in terms of its historical value. Although most Ch'üan-chen writings fall into the category or collected works, this category contains very little historical data. The poems, which are the major components of the collected works, carry very little information that would attract historians' attention. Most of them were written to teach Ch'üan-chen followers self-cultivation or to persuade people to join the Ch'üan-chen sect. The titles of the poems may even be more valuable than the poems themselves, for they yield such information as to whom and on what occasion the poems were written. From the names or the recipients of the poems we are able to identify what class of people were associated with the Ch'üan-chen sect. The recipients represent classes ranging from emperors to female adherents, from Buddhist monks to regional commanders, and from Jürchen officials to Chinese literati. Many poems were written by the Ch'üan-chen masters to express their gratitude for imperial patronage.

Ch'iu Ch'u-chi 邱處機 wrote a preface to the elegy for Emperor Shih-tsung 世宗 of the Chin which provides us with a detailed account on his experiences at Emperor Shih-tsung's court.³ This account can also be found in several other Taoist works, but it is not found in the Chin History 金史. Professor Yao

Ts'ung-wu 姚從吾 considered this account as reliable,⁴ and it has been used to show Emperor Shih-tsung's interest in popular religions in his last years. It is recorded in Wang Ch'u-i's Wang Ch'u-i's 王處 Yün-kuang chi 雲光集 that he was summoned to Emperor Shih-tsung and Emperor Chang-tsung's 章宗 courts.⁵ These events are not found in the dynastic history. Probably the historians thought that they were too trivial to be included in official history. Another trivial matter which is not recorded in the dynastic history is that Prince Hsien-tsung 顯宗, second son of Shih-tsung, once painted a portrait of Chuang-tzu.⁶ In Yün-kuang chi, there is also a poem by Wang Ch'u-i entitled "Refusing to receive a foreign envoy who came to visit me".⁷ This small matter suggests that the popularity of the Ch'üan-chen sect spread even beyond the borders of China. It also implies that this Ch'üan-chen master, for some reason, was unwilling to deal with foreign envoys. Obviously, it would have been desirable had the source specified who the foreign envoy was or why Wang Ch'u-i refused to grant him an audience.

The biographies furnish us numerous accounts of Ch'üan-chen masters' visits to the Chin and the Yüan courts. According to the Yüan History 元史, Chinggis Khan sent Liu Chung-lu 劉仲祿 and Jabar 札巴兒 to summon Ch'iu Ch'u-chi to his court.⁸ But, throughout the Ch'üan-chen documents only Liu Chung-lu's name is mentioned; Jabar is not mentioned at all. Professor Yao Ts'ung-wu made a detailed examination of this incident, concluding that the Yüan History was wrong.⁹ This suggests how Ch'üan-chen works can be used to correct mistakes made in the official history. It is also recorded in the Yüan History that both the Chin and the Sung sent envoys to invite Ch'iu Chiu-chi to their courts, but Ch'iu refused to go. Unfortunately, it yields no further detail. However the Ch'üan-chen documents provide us with the dates of these two events, the names of the two Emperors and the names of the envoys, Clearly, Ch'üan-chen works can usefully supplement the official histories.

Numerous accounts of warfare, banditry, famine and drought are recorded in the Ch'üan-chen collections. The Ch'üan-chen followers believed that their sect provided relief for those people who suffered from disasters. The following account gives us a vivid scene of North China after the fall of the Chin.

Since the Great Dynasty (i.e. Yüan) prospered and the Chin lost its rule, warfare has never ceased. It has gone on for almost forty years now. Wherever the horseshoe touched, the toughest fortress would fall into pieces. Wherever swords appeared, people and things would turn into ashes. Valleys changed into mounds... Every household was slaughtered and nine out of ten families were exterminated. The orphaned were not exempted. Not one of ten-thousand survived. Those who escaped the slaughtering and those who were not yet dead were lonely and sad. Those who lost their fathers and sons were desolate and lonely.... At a critical time like that one must rely on Taoism for relief.¹⁰

Accounts as explicit as this are not often to be found in the standard histories, and they are certainly valuable in giving us first-hand pictures of what North China was like at that time.

Most of the disasters that we find recounted in the Ch'üan-ch'en writings can be verified through the official histories. But sometimes the Ch'üan-ch'en sources provide us with additional information. For example, it is recorded in Kan-shui hsien-yüan lu 甘水仙源錄, that in 1221 "The Heavenly Soldiers (i.e. Mongol soldiers) came down to Ho-tung 河東 (present day Shansi) and took half of the populace of the Che 澤 district (present day Chin-ch'eng 晉城) into captivity."¹¹ But in the official history we only find that "the Mongols attacked the T'ien-ching Pass 天井關 (near present day Chin-ch'eng)" without any mention of the captives.¹²

The last group of materials contains various interesting pieces of information. It is recorded in the Kung-kuan pei-chih 宮觀碑志 that in the second month of 1190 Empress T'u-tan 徒單 (Emperor chang-tsung's mother) became sick. All medicine failed to cure her. Consequently, the Emperor held a general Taoist sacrifice for seven days and seven nights and granted the Taoists five million pieces of cash. After that the Empress recovered and expressed her deep gratitude to the Taoists. In the same year the Emperor built a palace next to the Taoist T'ien-ch'ang temple 天長觀 for his mother. He also allotted a section of the palace to the temple so the Taoists could build a house to store the printing blocks of the Taoist Canon.¹³ The above account is not found in the Chin History, except for a line mentioning that in the sixth month of the year 1190 the Emperor served his mother in a temple, probably the one that he had built for her.¹⁴ The

above accounts give one the impression that Emperor Chang-tsung was really on good terms with the Ch'üan-ch'en sect. Yet it is recorded in the Chin History that in the eleventh month of the same year Emperor Chang-tsung banned the Ch'üan-ch'en for the reason that it "deluded the multitude and disordered the people".¹⁵ One cannot but wonder what caused Chang-tsung's radical change of attitude toward the sect in so short a period of time.

Another interesting account is found in the Hsüan-feng ch'ing-hui lu 玄風慶會錄 which is the only work among those I am dealing with here was written by a non-Taoist. This book is attributed to I-la Ch'u-ts'ai 移刺楚材¹⁶ and it is supposed to be a record of Chinggis Khan's audience with Ch'iu Ch'u-chi. According to Professor Yao Ts'ung-wu, this book is quite reliable.¹⁷ It contains an interesting item not found anywhere else:

Previously, after the Emperor Shih-tsung of the Chin ascended the throne for ten years, he over-indulged in sex and was overcome by exhaustion. Every morning he needed to be carried by two men to the court.¹⁸

Emperor Shih-tsung of the Chin has been hailed by traditional historians as a miniature of the ancient sage rulers Yao and Shun. He was the best ruler of the Chin dynasty. Could it be possible that this "minor Yao or Shun" indulged to the extent that he could not even walk? Did Ch'iu Ch'u-chi make this

up in order to persuade Chinggis Khan not to indulge in sex? I am afraid that these questions will have to remain unsolved. The Kung-kuan pei-chih also provides us with information that Chao Ping-wen's 趙秉文 calligraphy was found in a Taoist temple.¹⁹ Chao Ping-wen, a leading literati and a high official of the Chin dynasty, was known to be familiar with the Three Doctrines (i.e. Buddhism, Taoism, and Confucianism) and wrote on all three of them. However, for some reason, he disassociated himself from Buddhism and Taoism by destroying all of his writings on those two religions. His only extant work, Hsien hsien lao-jen fu-shui wen-chi 閑閑老人滏水文集, contains nothing on Buddhism and Taoism. The piece of evidence unearthed here confirms that at one time at least he was associated with the Ch'üan-ch'en sect.

One Ch'üan-chen document is of course very well known, the Ch'ang-ch'un chen-jen hsi-yu chi 長春真人西遊記, which is the travel account of Ch'iu Ch'u-chi's (H. Ch'ang-ch'un) enroute to the Mongol court in Central Asia recorded by Ch'iu's disciple Li Chih-ch'ang 李志常. It has been translated into English by Arthur Waley as The Travels of An Alchemist. It is very useful for the study of the customs and geography of Central Asia. This is also the only Ch'üan-chen work which is included in the Ssu-pu pei-yao 四部備要。

I would like now to say a few words about some of the work that has been done to make the Tao-tsang and Ch'üan-chen materials in particular more accessible. There is a book entitled Tao-tsang mu-lu hsiang-chu 道藏目錄詳注 by Pai Yün-chi 白雲霽 of Ming dynasty. Although the title indicates that it is a "detailed" annotated bibliography, it fails to provide any information at all on some books. For example, under the entry for Wu-chen chi 悟真集, it merely gives the number of chuan without even indicating the author. There is another volume, Tao-tsang yüan-liu k'ao 道藏源流考 written by Ch'en Kuo-fu 陳國符 (Shanghai, 1949), who was a professor of chemistry. Ch'en deals with several of the Ch'üan-chen works, but, unfortunately, he was more interested in dating them and identifying their authors than in examining their contents as such. More recently, Liu Ts'un-yan has written an article entitled "The Compilation and Historical Value of the Tao-tsang" which is included in Essays on the Sources for Chinese History edited by Donald D. Leslie, et al (Canberra, 1973). This article provides us with a detailed history of the compilation of the Tao-tsang together with a few remarks on its historical value. Some of the Ch'üan-chen works are included in the Ssu-k'u ch'üan-shu 四庫全書. The annotation on them in the Ssu-k'u ch'üan-shu tsung-mu t'i-yao 總目提要 provides us with helpful but usually insufficient information.

The most useful tool for locating historical sources in the Tao-tsang is the Tao-tsang tzu-mu yin-te 道藏子目引得. This index, compiled under the direction of Weng Tu-chien 翁獨健, is one of the Harvard-Yenching Institute Sinological Index series. In this work, Weng Tu-chien severely criticized Leon Wieger's index

to the Tao-tsang, which is incorporated in Wieger's book entitled Taoism, yet he included it in this index. In addition to title and author indexes, Weng also compiled a separate index to the names of the Taoists based on seventy-seven historical works in the Tao-tsang.

Now, a few words on the authors of our sources before I sum up. The collected works are almost exclusively done by the Ch'üan-chen Taoists. Only one of the authors is female and only one book is attributed to a non-Chinese Ch'üan-chen disciple. There are also cases where the editors are Ch'üan-chen disciples but the authors outsiders. Take the Kan-shui hsien-yüan lu for example. It is a compilation of biographical information on the Ch'üan-chen Taoists written either by Ch'üan-chen disciples or by contemporary literary figures and high officials who were not themselves Ch'üan-chen adherents. This book also includes some inscriptions from temple tablets recording the histories of the temples. For reasons of convenience, I have placed it under the category of biography.

I started this study with the hope that I would be able to find many valuable historical sources. The result, I must admit, is rather disappointing, for the bulk of the literature carries little historical value. Most discouraging is the fact that one could not even formulate a picture of Ch'üan-chen church organization. However, this research has not come up empty either, for I did at least find some sources of value. One may not conclude that the Tao-tsang as a whole is not useful for historical research simply because the Ch'üan-chen sources are not highly significant. The Ch'üan-chen materials comprise only a tiny portion of the entire body of the Tao-tsang and there are many works of historical interest that are not related to the Ch'üan-chen sect. The following are some examples.

(1) Li-tai ch'ung-tao chi 曆代崇道記 by Tu Kuang-t'ing 杜光庭. This book covers the era from King Mu of Chou (1001-947 B. C.) to the Sung dynasty. It tells us how Taoism developed and expanded under each of those rulers.

(2) Chiang-huai i-jen li 江淮異人錄 by Wen Tsao 溫造. This work can be used as

a source for unofficial biography.

(3) Hsüan-t'ien shang-ti ch'i sheng-lu 玄天上帝啓聖錄. This book is a collection of short essays and notes of historical value.

(4) Han-wu-ti nei-chuan 漢武帝內傳 and Han-wu-ti wai-chuan 外傳 by Tung-fang Shuo 東方朔. Two legendary accounts of the Emperor Wu of the Han dynasty including biographical information on other individuals.

The Tao-tsang, without doubt, contains much valuable data which can be used to verify and supplement other historical sources. The problem is that such information is scattered about in a wide variety of writings. A great contribution remains to be made by scholars who will systematically analyze the historically relevant content of the Tao-tsang and order it that it can be conveniently exploited by historians in general.

NOTES

1. Works such as Ch'en Yüan's 陳垣 Chung-kuo Fo-chiao shih-chi kai-lun 中國佛教史籍概論. (Peking: Chung-hua shu-chü, 1962), and Jan Yüan-hua's "The Fo-tsu-t'ung-chi: a biographical and bibliographical study," Oriens Extremus, 10 (1963), 61-82.
2. The Tao-tsang is a huge repository of works on a variety of subjects including self-cultivation, alchemy, medicine and pre-Ch'in philosophy. The works are divided into three main and four supplementary divisions. Each main division is further divided into twelve subdivisions including biographies, rituals, methods (for self-cultivation), alchemical techniques etc. The works in the three

main divisions largely fall into appropriate subdivisions although a few are misplaced. The four supplementary divisions are not subdivided at all although works of related interest are usually concentrated. In the absence of anything resembling a subject index, it is difficult to locate material on any specific topic.

3. P'an-ch'i chi 潘溪集, 3/6a-b.
4. "Yuan ch'iu Ch'u-chi nien p'u" 元邱處機年譜, in Tung-pei shih lun-ts'ung 東北史論叢 (Taipei: Cheng-chung shu-chü, 1959), pp. 230-231.
5. P'an-ch'i chi, 1/1a, 2/1a-2a, 3/3b.
6. Ibid., 3/10b.
7. Ibid., 2/35a.
8. Yüan Shih 202
9. Yao Ts'ung-wu, loc. cit., pp. 269-271.
10. Chi Chih-chen 姬志真, Yün-shan chi 雲山集, 7/19b.
11. Li Tao-ch'ien 李道謙 ed., 8/23a.
12. Chih Shih 16.
13. Wei Po-hsiao 魏博霄, "Shih-fang ta T'ien-ch'ang kuan p'u-t'ien ta-chiao jui-ying chi" 十方大天觀普天大醮瑞應記, 26aff. See also in the same book, Feng Chih-heng 馮志亨 "Ch'ih-chien p'u-t'ien huang-lu ta-chiao pei" 敕建普天黃祿大醮碑 8a, and Tang Huai-ying 黨懷英, "Chung-tu shih-fang ta t'ien-ch'ang kuan p'u-tien ta-chiao kan-ying pei," 中都十方大天長觀普天大醮感應碑, 28b.
14. Chin Shih 9.
15. Ibid.

16. Wang Shih-chen 王世貞 of the Ming dynasty suggested that I-la Ch'u-ts'ai was Yeh-lü Ch'u-ts'ai 耶律楚材 . See his Yen-chou shan-jen hsü-kao 兗州山人續稿 , ch. 158. However, Ch'en Yu-shan 陳友珊 considered that I-la Ch'u-ts'ai was a mistake for I-la A-hai 阿海 . See his "Ch'ang-ch'un Tao-chiao Yuan-liu," 長春道教源流 in Yen I-p'ing 嚴一萍 ed. Tao-chiao yen-chiu tzu-liao 道教研究資料 Vol. 2, (Taipei: I-wen yin-shu kuan, 1974), pp. 391-392.
17. Yao Ts'ung-wu, loc. cit., pp. 256-259.
18. 9a.
19. "Ch'ung-yang ch'eng-tao-kung chi," 重陽成道宮記 3b.

Book Review

The Jurchen in Twelfth-Century China. A Study of Sinicization.
Jing-shen Tao, Seattle and London: University of Washington Press, 1976. 217 pp. \$11.00.

Professor Tao's pioneering work provides the first English-language monograph treatment of the Jurchen dynasty. The author proposes primarily to discuss the social, cultural and to a lesser extent political and economic changes undergone by the Jurchen in their establishment of a Chinese-style dynasty in North China. Ostensibly these changes are a response to and result of sinicization. The book follows a chronological format, beginning with a discussion of the pre-dynastic Jurchen and ending with a consideration of sinicization on the eve of the dynasty's demise.

In his introduction the author states his purpose to be "to explain the fusion of Chinese and Jurchen cultures, and the consequent assimilation of the Jurchen by the Chinese." There follow some general remarks on the history of alien states in China or on its frontiers, and on the traditional and modern scholarship treating this subject. Tao points out the significance of the Chin as a model for the Mongols and Manchus, and as a member of the 12th century interstate order, or as he puts it: "... as part of the barbarian encroachment on the Sung Empire (p. xi)." The utility of the book as a reference tool and general introduction to the Jurchen is enhanced by the inclusion of an index, extensive bibliography and notes, Chinese glossary, a map, and a chart of the Chin emperors with their Jurchen and Chinese names, reign periods and posthumous titles. Unquestionably, this study will make its subject far more accessible to the Western reader than it has been till now.

The overall value of the book, however, is diminished in two important respects: first, by some degree of oversimplification and even superficiality, perhaps unavoidable considering its length (117 pages); second, by Professor Tao's failure to break out of the bonds of traditional attitudes toward barbarians and sinicization, and advance some fresh and long overdue new perspectives on this issue. His occasional use of the phrase "Sino-Jurchen synthesis" (p. 78) seems to promise this, but ultimately his endeavor assumes the disappointingly familiar air of an apology for alien rule in China.

One of the major problems with the work regards definitions and methods. An entire chapter could easily be devoted to a discussion of these, but instead they receive cursory mention in a singly paragraph (p. xiii). For his working definition of sinicization Tao adopts F. C. Anthony Wallace's statement on assimilation: "...in assimilation, the subordinate group attempts to abandon its existing inadequate culture by entering into the society of the dominant group

and accepting its culture, almost in toto... (p. xiii)." Without knowing the context of Mr. Wallace's statement, this reader wonders if he had conquest dynasties in mind as possible subordinate groups; his concept of assimilation hardly seems appropriate to the subject at hand. Nor does Tao clearly establish beforehand any fixed or variable criteria by which one can measure the extent and quality, not to mention significance, of sinicization as it does occur among the Jurchen. It is assumed that such things as dress, names, writing (of which the Jurchen had none to begin with), intermarriage, etc. are the vehicles of sinicization. Some of these things are very superficial, while most tend to occur among the upper classes of society, the ruling aristocracy and educated elite. What about the bulk of the population, the commoners, Jurchen and non-Jurchen? Influences were mutually received, so what precisely constituted sinicization? Can we not equally speak of a Chinese becoming sinicized?

Indeed the Jurchen experienced a profound crisis in adapting to their new environment and task, but Tao's only explanation for this complex phenomenon seems to be that "the Jurchen were prisoners of Chinese tradition (p. 93)", or that "they could not avoid becoming Chinese (p. 86)." Doesn't this merely beg the question of sinicization? Alternatively, can we not view sinicization as one of many processes occurring along a cultural-political continuum to which all the societies of East Asia contributed over several millennia (Prof. Willard Peterson's idea). How the Jurchen participated, borrowing from and contributing to this continuum, can be measured in terms of their specific goals and needs, and how they set about to meet them. In such a context sinicization can never be a static concept: before I can set up meaningful criteria for sinicization among the Jurchen we must first establish what it meant to be Chinese in the twelfth century North China, what properties are exclusive (language) and what are shared (dress), which borrowings result from geographical proximity (agricultural methods) and which from deliberate policy (bureaucratic modes); and finally what socio-cultural exchanges occur almost automatically when a small conquest

group settles amidst a larger conquered population (names, intermarriage, marriage and burial customs). After setting up appropriate categories (e.g. exclusive: writing: Confucian textual criticism) we must determine which segments of the population engaged in sinicizing practices, and to what extent. The more exclusive the activity, the more sinicized the product. But sinicization, no matter how defined, still deals with the adoption of things Chinese, and by itself cannot explain the complex and frequently rapid processes whereby non-Chinese kingdoms arose on or within the borders of China. Hence Tao's undeveloped proposal of a Sino-Jurchen synthesis would serve far better in exploring the Jurchen's struggle to redefine their identity and reshape their destiny in the twelfth century.

Partly related to Tao's unsatisfactory definition of sinicization is the occurrence of contradictory statements, inconsistencies and vague generalizations. For instance, although Chinese influence at the Chin court apparently expanded in the later years of the dynasty (p. 89, 96), paradoxically Chinese become increasingly alienated from government in the same period (p.89, 94). Similar ambiguities appear in the discussion of bureaucracy and recruitment. Tao tries to show how on the one hand the Chin maintained a balance between Jurchen and non-Jurchen (mainly Chinese) elements and political influence in government (p. 54, 61). On the other hand, he asserts that Chinese political influence declined, that the Jurchen never disabused themselves of the notion that they were a "privileged minority" (p. 60) - which they has no reason not to think and so resorted to packing the inner court with Jurchen officials to preserve and strengthen their political power (p. 59). In discussing frequent transfers from the military to the civil service, Tao points out the cases of two men who left the military to become directors of the Imperial Library; this he deems "lack of professionalism in Chin administration (p. 63)." What he means by professionalism or why it is lacking here is never explained.

Professor Tao does not provide the conceptual tools with which to analyze and explore the various contradictory trends subsumed by the convenient catchall term of sinicization.

Finally, and perhaps most importantly, Professor Tao's study would have been immeasurably strengthened by drawing comparisons with the Kitan Liao and later Mongol experiences (leaving aside Hsi Hsia for the present). Parallels with the Mongol situation literally leap from the pages; for example, the attempt of Shih-tsung (r. 1161-1189) to balance ethnic elements in the Chin bureaucracy immediately suggests Qubilai's attempt to do almost exactly the same thing one hundred years later. Both men succeeded, and were in fact considered the best monarchs of their respective dynasties, their successors gradually losing the control that they themselves had been able to wield. A comparison of the careers of these two men would certainly shed much light on the processes and patterns of sinicization. It would also reveal that sinicization is a very selective process, the primary items of selection being those that enhance the political control of the conquest group. This might explain Shih-tsung's seemingly contradictory behavior in both promoting ancient Chinese ideals and norms, and sponsoring the Nativistic movement.

It should be observed that Professor Tao's book is replete with material, which will be of signal assistance to us in elucidating the Sino-Jurchen synthesis in greater detail. This synthesis perhaps found its intellectual expressing in the words of Wang Jo-hsü, a late Chin literatus:

The universe does not belong to any individual. The occupation of various areas and the demarcation of state lines should be tolerated. The small serves the big; the big protects the small. Every country does its best. . . There is no reason why every country should be destroyed and unification achieved. (p. 105)

In conclusion I beg to indulge in a special interest gripe concerning the genealogical chart of the prominent Shih family on page 97. While the male offspring are listed by their given names, the females are merely denoted as

"Daughter 1", "Daughter 2", etc. Someone (myself, for one) might wish to know the names of the daughters, especially since Daughter 1 was married to Muqali, Cinggis Qan's famous general. If the names do not occur in the sources, an explanatory note to that effect could be appended.

Ruth Dunnell

Princeton University

REPORT ON RESEARCH CONFERENCE, "The Impact of Mongol Domination on Chinese Civilization"

This conference, sponsored by the Committee on Studies of Chinese Civilization, ACLS, and coordinated by John D. Langlois, Jr., was held at York, Maine, in July of 1976. Brief summaries of the papers are given below. They are now being edited by the writer for publication.

1. Marilyn W. Fu, Yale University, "The Impact of Re-unification: Northern Elements in the Life and Art of Hsien-yü Shu (1257?-1302) and Their Relation to Early Yüan Literary Culture." The paper demonstrates that the reunification of China by the Mongols had significant consequences in the realm of the fine arts. Professor Fu examines briefly the differing Northern and Southern artistic traditions as they existed on the eve of the conquests of the north and the south by the Mongols, and then shows that the opening of contacts between those two realms was a stimulating event for the artists of the era. Such is the context for her study of Hsien-yü's art under the influence of the southern tradition through a close study of the artist's scroll "Admonitions to the Imperial Censors" (御史箴) and other works.

2. Morris Rossabi, Case Western Reserve University, "The Muslims in the Early Yüan Dynasty." This is a study primarily of the Muslim se-mu-jen 色目人. The

author first discusses the nature of the relationship between the early Mongol rulers and the Central Asian and Middle Eastern Muslims were employed in administrative positions to help the Mongols rule their territories. Qubilai's relationship with the Muslims is dealt with in some detail. The author points out that the relationship changed over time, from one of a trusting reliance upon the Muslims as a buffer between the rulers and the ruled in China to one of suspicion of the people and repression of their religion. Professor Rossabi outlines Muslim contributions to Chinese economy and culture, focusing on the career of the finance minister Ahmad to illustrate Muslim economic contributions, and on Muslim craftsmen, physicians, architects, musicians, astronomers, and military advisors to elucidate their cultural contributions. Muslim colonization of Yunnan, which the author views as a major force behind the sinicization of Yunnan during the Yüan period, is discussed in some detail. Interestingly, Muslim activities in Yunnan did not lead to Islamicization of the people there.

3. David M. Farquhar, University of California-Los Angeles, "The Government of the Yüan Dynasty as a Structure." In this paper the author adopts a highly skeptical attitude toward the notion that Mongol rule in China was centralized and bureaucratic. He argues that a "feudal" model is far better as a frame of reference in analyzing Yüan government than the centralized-bureaucratic model that is currently seen in much of the literature. In his view the Yüan "central" government was subject to severe geographical limitations in that it had direct control over only a small area, primarily in North China. Furthermore, the essence of Yüan control was feudal or, in the author's words, "fief-like." It was a government only of the emperor's domains and of his enfeoffed nobles. The Yüan rulers, interested in exploitation, made few efforts to integrate, systematize, and unify their administration of China. Even the censorial system was far from centralized and integrated. Professor Farquhar's paper also contains a guide to the chief imperial governmental agencies.

4. Li Chu-tsing, University of Kansas, "Wu-hsing in the Art of Early Yüan." Professor Li in this paper studies the flowering of fine arts that occurred in Wu-hsing 吳興 under the Mongols. He begins with a brief survey of the long cultural heritage of Wu-hsing, showing how the area became a magnet for literary and artistic persons during the Southern Sung and Yüan periods. He discusses the effects of the Mongol conquest on Wu-hsing and explains how Wu-hsing recovered quickly from the effects of the conquest and held its position of cultural eminence. Mongol rule in some ways had a liberating effect on artists. The

Sung-painting academy had exercised a dominating influence on the painting world, and its demise left painters with an opportunity to explore new ideas with newfound independence. Professor Li discusses the creations of Ch'ien Hsüan 錢選 and Chao Meng-fu 趙孟頫 both of whom spent many years of their lives in Wu-hsing. After the deaths of these two figures, however, Wu-hsing began to decline in artistic importance and was eventually overshadowed by other cities. Although it continued to produce important painters and writers, its golden age had been the first fifty years of the Mongol era.

5. Sun K'o-k'uan, Tunghai University (Emeritus), submitted his paper in absentia, "Yü Chi (1272-1348) and Southern Taoism in the Yüan Period." (The essay in its original form has been published in Ta-lu tsa-chih 大陸雜誌, fall 1976.) Professor Sun sets Yü Chi's 虞集 career in the context of the convergence of the Taoist and Confucian traditions. Yü Chi, one of the greatest belletrists of the era, and an important scholar at Ta-tu under several emperors is described as a "lay Taoist." He was the master of certain formal Taoist writing forms and the close friend of leaders of the Southern Taoist school centered in his birthplace Kiangsi. Professor Sun contends that Yü Chi, through his outstanding abilities as a scholar and as a literary stylist, and through his close associations with the Taoist clerical establishment, exerted a profound influence on the Southern Taoist movement. In the author's view, it was under that influence that the Taoists gained recognition as the literary peers of the Confucian wen-jen. As a consequence, the Southern School became more prestigious than that of the North, such that on the eve of the establishment of the Ming Dynasty, the Taoist and Confucian schools in the South had become closely intertwined.

6. Paul H. Ch'en, School of Oriental and African Studies, University of London, "The Chinese Legal Tradition in the Yüan Period." This paper will be published soon along with the author's translation of the Chih-yüan hsin-ko 至元新格 of 1291. Dr. Ch'en traces the history of Yüan codification efforts and highlights some of the unique features of Yüan law. Important areas of Mongol influence on the Chinese legal traditions are discussed. He contends that three stages in their history are discernible. In stage one (from roughly 1229 to 1271), Mongol law was predominant. In stage two, from 1271 to 1320, Chinese notions and institutions began to flourish under Mongol rule, and in stage three, from 1320 to the end of the dynasty, Chinese and Mongolian cultural traditions had come to a mutual accommodation. The flourishing of legal codification efforts during this period reflects that accommodation. The author then turns to considerations of the Yüan penal system, the administration of justice, and legal professionalism. He concludes from his study that the legal system in China under the Mongols

was more humane and, in the author's words, more "mature" than earlier legal systems in China.

7. Stanislas Kuczera, Institute of Oriental Studies, Academy of Sciences of the U.S.S.R., "The Influence of the Mongol Conquest on the Chinese System of Education and Selection of Officials" (trans. by Thomas T. Allsen). Dr. Kuczera's paper was submitted in absentia as circumstances prevented him from attending in person. In the paper the author first outlines the traditional interlocking of state-administered examinations, official careers, and educational institutions in pre-Mongol China. He then notes that the Mongol conquest completely shattered that traditional interlocking, but that in time the domestic Chinese pressures for its restoration forced the Mongols to tolerate and even to some extent to exploit a limited revival of the civil service examination system. Thus, in the author's view, Mongol rule in China passed through four stages. The first was primarily destructive, as it coincided with the wars first against the Chin and then against the Southern Sung. Qubilai's reign constituted the major part of the second stage, when Mongols began to recognize the need to employ Chinese methods to administer Chinese territory. The reign of Jen-tsung (1312-1320), which initiated the flowering of the Chinese-style examination system as well as the establishment of numerous Chinese educational institutions, is viewed as the third stage. The final stage began in the 1330s and continued until the end of the dynasty. It was characterized by the devolution of Chinese educational systems and the examination system due primarily to Mongol inability to maintain order in the realm.

8. David A. Sensabaugh, Princeton University Ph.D. candidate, "Notes on Ku Te-hui 顧德輝: A Late Yüan Literatus." Mr. Sensabaugh's paper deals essentially with two related matters. First, he seeks to explore the realities of the life of Ku in order to test the hypothesis that a new type of wen-jen 文人 (literatus) emerged under Mongol rule. Second, he attempts to identify a new development in the history of Chinese portraiture. These two themes are tied together at numerous points in the essay. Paintings and inscriptions are employed to supplement the literary evidence that the author adduces to support the hypothesis stated above, and literary evidence is used to supplement extant paintings as evidence in support of the second theme. The description of the wen-jen that emerges is characterized by two kinds of convergence. The one is a convergence of painter and poet, such that Ku Te-hui represents the culmination of a long historical process dating back many centuries. The other is a convergence of Buddhism, Taoism, and Confucianism. Ku was at home in all three spiritual realms.

9. Lao Yan-shuan, Ohio State University, "Southern Chinese Scholars and

Educational Institutions in Early Yüan: Some Preliminary Remarks." This is a study of the activities of Southern scholars during the first three decades of Mongol rule. Scholars' responses to the new dynasty varied a great deal, but a number of gifted scholars agreed to serve the Mongols. These included Wu Ch'eng and Chao Meng-fu, among others. Professor Lao finds that many such individuals became quite despairing over their plights as time passed. Their poetry reveals conflicting emotions with respect to their careers under the Mongol overlords,

as well as lingering attachments to the defeated Sung house. The author also cites literary materials to show that a chasm separated Northern and Southern Chinese scholars. This chasm was the legacy of several centuries of division, for China had not been unified since the T'ang period. Resentment and suspicion characterized the attitudes of the one for the other, and discrimination against Southerners by more highly placed Northerners was a common occurrence. Under these circumstances the Southern scholars often found outlets for their energies in the establishment of educational institutions. Thus in Yüan times the number of private academies that were founded was extraordinarily high, exceeding four hundred.

10. Stephen H. Went, University of Arizona, "Mongol Influence on the Development of Northern Drama." The author begins by outlining the explanations for the rise of Yüan drama that have been advanced since Ming times. He finds that the Mongols are usually accorded a causal, albeit negative, responsibility for the rise of drama. That is, Mongol rule, oppressive in general, frustrated the normal career patterns of the literati in particular. The literati therefore sought creative outlets in humble, popular dramatic forms. Their participation in those forms thus made possible the emergence of the mature, sophisticated tsa-chü 雜劇. Professor West argues that this explanation is inadequate, even in its most eloquent presentation by Yoshikawa K jir . This is because the underlying assumption that it was the literati who brought the form to its most advanced stage of development is probably incorrect. The author offers his view that the dramatic form known as tsa-chü was the latest link in a chain of literary developments which have been illuminated by the archaeological discoveries made in China over the past 15 years. Yüan tsa-chü was part of a discreet literary tradition that found a flourishing setting under the Jurchen and that continued into the Yüan period. Continuity and development are the key points, and not Mongol influence, that one should keep in mind when considering the reasons for the flourishing of drama under the Mongols. This is not to deny Mongol influence completely, however, as the author identifies three areas where

such influence can be seen: 1) direct and indirect Mongol patronage helped promote tsa-chü; 2) the abolition of the examination system tended to increase literati interest in drama as participants and as consumers (but this effect of Mongol rule was not causal); and 3) Mongol words and terms found their way into dramatic works as part of the ordinary patois of the era.

11. Chan Hok-lam, University of Washington, "Development of Official Historiography at the Yüan Court: The Composition of the Liao, Chin and Sung Histories." The author studies the official Three-History Project that unfolded, after many false starts, between 1343 and 1345. He considers not only the historiographical aspects of the project, but the nature of Mongol sponsorship of the project as well. Special attention is paid to the question that plagued the historians for many years, namely the cheng-t'ung 正統 or "legitimate succession" issue. It was a question that had to be resolved before the form of the histories could be decided upon. Professor Chan analyzes the various proposals that were made and shows how the final solution imposed by Toghto opened the way for the completion of three separate histories. (A different solution might have led to histories compiled along the model of the Pei shih and Nan shih.) In a discussion of the strengths and weaknesses of the histories, the author provides details on Ming and Ch'ing efforts to write a new Sung history. He notes that the T'u-mu Incident of 1449 led to an important shift in Chinese attitudes towards alien rulers of China. The new anti-foreignism sparked attempts to rewrite the Sung history in order to delegitimize the foreign rulers of Liao, Chin and Yuan, which had all been implicitly recognized as legitimate by Toghto's imposed solution to the cheng-t'ung dispute.

12. David Gedalecia, College of Wooster, "Inquiry, Insight and Innovation in the Thought of Wu Ch'eng," The paper first deals with Neo-Confucianism as an intellectual response in developing inner and outer-directed approaches to the realization of tao, in examining Chu Hsi's grounding of a patch toward social action in the moral awakening of the individual, and in showing how Wu Ch'eng 吳澄 (1249-1333) approached this problem under the impact of Mongol conquest and rule.

Wu half-heartedly served in educational posts in the North for only a few of his eighty-five years, yet came into conflict with policy-makers. This was in part a result of his ideas about harmonizing Chu and Lu Hsiang-shan but was heightened by his feeling that scholarship during the Yüan, and from the late Sung generally, was in disrepair. Through imaginative classical exegesis and the injection of Lu's emphasis on inner-cultivation into the Chu framework of knowledge seeking, Confucian values could be revitalized.

For Wu Ch'eng, study was no handicap to moral enlightenment. Especially

notable were his searching commentaries on the Book of History and the Spring and Autumn Annals, the former doubting the authenticity of the "old text" portions and the latter incorporating parallel use of the three traditional

commentaries so as to transcend mere historical detail. His commentary on the Record of Ritual was highly praised by Wang Yang-ming in 1520 for its imaginative treatment of the ritual texts.

Wu was concerned with the Confucian line of succession, tao-t'ung 道統, and believed that it had become sidetracked after Chu Hsi, which parallels his views on thirteenth-century scholarship. It was his task to pick up the pieces, yet his philosophical endeavors, derived as they were from personal insight and refined within the context of a disoriented milieu, drew him away from alignment with the intellectual and political establishments.

13. John D. Langlois, Jr., Bowdoin College, "The Mongol Impact on Chinese Political Thought: The Case of P'u-chiang Literati." (P'u-chiang is a hsien in Chin-hua prefecture; in the Yüan period the political unit was known as Wu-chou lu, but the area tends to be called by its later Ming name.) In this paper the author tries to outline how some Chin-hua literati in Yüan times dealt with foreign rule—a problem in political thought. To do this, he begins by showing that Chin-hua and particularly P'u-chiang thinkers in the Sung period had been relatively outspoken in urging the state to adopt aggressive policies towards the Jurchen. Furthermore, the area was a center of kung-li 功利 (practical statecraft) thought during the early Southern Sung. As the region fell to the Mongols, Chu Hsi's tao-hsüeh (the School of the True Way) was firmly embraced in Chin-hua and was merged with its earlier rival school. Thus Yüan Chin-hua literati inherited a rich intellectual tradition. Their response to Mongol rule was to recognize its legitimate existence and to formulate ways to improve upon it. Their answer was to emphasize the importance of law as a tool to make the state function rationally and beneficently. Given the fact that "the rule of virtue" was a dead issue as long as Mongols were on the throne, law became a means of ensuring that government would be less capricious and unpredictable than it would be otherwise. Wu Lai 吳萊 and Liu Kuan 柳貫, two P'u-chiang literati, took the lead in formulating the idea that Confucian scholars should become masters of the laws and that compilations of the laws should be viewed with the same seriousness that the classics are viewed.

14. Ho Wai-kam, Cleveland Museum of Art, presented an oral report on "Government Administration and Supervision of Crafts in the Yuan Dynasty," summarized here by Nancy Shatzman, one of the rapporteurs at the conference.

In his report, Dr. Ho discussed four types of crafts: sculpture, textiles, wood block printing, and architecture. With regard to sculpture, Dr. Ho pointed out that the Yüan

government exerted control over sculpture, with the result that style and iconography show similarities throughout North and South China. This can be shown by comparing Yüan sculptures from Hangchow with those at the Chü-yung Kuan. The Hsüan-cheng yüan supervised activities in both places. The Yüan is different from all earlier periods in its uniform distribution of Buddhist iconography. In textiles, the government has monopolistic control in certain areas. There were three major textile centers in North China in the early Yüan: Yen-ching, Hung-chou (near Tatung), and Hsing-chou (near modern Chung-ting). Yen-ching produced for the court and for the capital city. Hung-chou manufactured nacisi, a textile made with gold thread. Hsing-chou was the fief of Khubilai's mother and was also a laboratory for Khubilai's experiments with Chinese ways of rule. In regard to wood-block printing, Dr. Ho focussed on P'ing-yang (southern Shansi), which had been the center of Chin culture during the previous era. This is true for sculpture and tsa-chü and probably for painting as well. The Chin painting academy was centered there, and it was even more elaborate than that of the Sung. The Mongols established a printing office there after their takeover, but it was soon abolished. The Mongols sought eventually to reduce the remnants of the Chin tradition in P'ing-yang, and to counter the prestige and influence of the Ch'üan-chen Taoist sect which had been centered there. The blocks for the Chao-ch'eng edition of the Buddhist Tripitaka, which had been cut in P'ing-yang, were also moved to Peking. Then in 1256 the Mongols issued the Hung-fa tsang. Though not extant, it is known to have been used as a basis for the Chi-sha tsang. The latter had been begun in the Sung, in Hangchow; several hundred chüan are in the Gest Library in Princeton. Illustrations for the Chi-sha tsang show strong Tibetan influence. (In 1958 some 50-60 chüan of an edition of the Tripitaka were found in a Tibetan temple. It is thought that they are part of the Hung-fa tsang. The illustrations are in the Hsi-Hsia style.) With respect to Yüan architectural projects, Dr. Ho pointed out that the Mongols introduced two important forms. These were the hipped roof, called lu-ting, shaped like a sutra container, and the Tibetan pagoda.

15. Herbert Franke, University of Munich, who attended the conference as a discussant, has submitted an essay for inclusion with the others if publication should occur. The essay is entitled "Tibetans in Yüan China." Professor Franke discusses the role of Tibetans in Yüan government, Mongol policies towards Tibetans, and Tibetan abuses of their power. Influential Tibetans in Yüan China

were Lamas, and their activities were exclusively religion-based. A major effect of Tibetan Lamaist influence on Mongol rule was the "sacralization" of the state, or, in other words, the Mongol adoption of a Buddhist theocratic notion of rule. The Lama Page-pa was the chief luminary in this process, through his close relationship with Qubilai. The Mongols established the Hsüan-cheng yüan 宣政院 for dealing with Tibetan and Buddhist affairs, and the author discusses the available materials that shed light on its operation. To illuminate Tibetan power and its abuses, the author discusses the career of Yang Lien-chen-chia, the infamous monk who despoiled the Sung tombs. Here, as with respect to the alleged debaucheries of Tibetans in Yüan China, Professor Franke is careful to distinguish the Chinese and Tibetan perspectives in an attempt to clarify the thinking behind Tibetan activities in Yüan China.

John D. Langlois, Jr.

BOOK NEWS

1. Western Language Publications

A Sung Bibliography. Edited by Yves Hervouet. Hong Kong: The Chinese University Press, expected in August 1978. Ca. 850 pp. Announced list price \$37. (HK \$170.); pre-publication price for orders up to June 30, 1978 \$26. (HK \$120.). (Shatin, N.T., Hong Kong)

It is an enormous pleasure to be able to announce in back-to-back issues the SSN publication or the two major products of work initiated under the aegis of the late Etienne Balazs' Sung Project. Having called attention in our last issue to publication of the four-volume Sung Biographies, we are authorized to announce completion of the bibliographical part of the Project and its publication in 1977. Containing 660 items contributed by eighty scholars, A Sung Bibliography is arranged according to the traditional classification of Classics, History, Philosophers, Belles-Lettres and Ts'ung-shu. Within these categories the system used by the Catalogue of the Kyoto University Jinbun Kagaku Kenkyūjo is used. Most entries are in English, either initially so written or having seen translated, but about one-fifth are in French. Indices of three sorts are provided, to book titles, to names of persons, and to subjects.

In view of the lack of any systematic and thoroughgoing handbook on Sung source materials (comparable to Wolfgang Franke's An Introduction to the Sources of Ming History), the need for this work need hardly be stressed. Indeed it promises to be one of the most significant contributions to the study of Chinese society and culture in the Five Dynasties, Sung and Yüan periods of recent decades.

Other recent publications (reviews of several of the following are planned for our next issue):

James Cahill, Hills Beyond a River: Chinese Paintings of the Yüan Dynasty. New York: Weatherhill, 1976. xv and 198 pp. 102 illus. \$25.00.

Li-li Ch'en, trans., Master tung's Western Chamber Romance: a Chinese Chantefable. Cambridge and New York: Cambridge University Press, 1976. \$25.00.

Michael S. Duke, Lu You. Boston: Twayne, 1977. 160 pp. (Twayne World Authors Series).

George A. Hayden, trans., Crime and Punishment in Medieval Chinese

Drama: Three Judge Pao Plays of the Yüan and Ming Dynasties. Cambridge: Harvard University Press, 1977.

Lam Lay Yong, A Critical Study of the Yang Hui Suan Fa: A Thirteenth Century Chinese Mathematical Treatise. Singapore: Singapore University Press, 1977. xvii and 360 pp.

Almut Netolitzky, Das Ling-wai tai-ta von Chou Ch'ü-fei: eine Landeskunde Südchinas aus dem 12. Jahrhundert. Wiesbaden: Steiner, 1977. (Münchener Ostasiat. Studien, Bd. 21) xxxiv and 320 pp. DM18

J. D. Schmidt, Yang Wan-li. Boston: Twayne, 1976. (Twayne World Author Series)

Stephen H. West, Vaudeville and Narrative: Aspects of Chin Theater.

Wiesbaden: Steiner, 1977 (Münchener Ostasiat. Studien, Bd. 20) xiv and 190 pp. DM18

Editor's note: Word has been received that E. A. Kracke, Jr.'s A Translation of Sung Civil Service Titles will be reprinted soon by CMC in Taiwan. Having been issued by the Sung Project in Paris in 1957 and soon becoming unavailable, this handy research aid will be eagerly awaited.

2. Chinese Books

The Chung-hua edition of the dynastic histories. As most readers perhaps will have noticed, publication of this extremely well edited and punctuated edition of the dynastic histories by Chung-hua of Peking is now complete through the Ming-shih, excluding only the Sung-shih. Presumably the latter will appear soon. Meanwhile, readers concentrating on the periods covered by the SSN may enjoy the convenience of this new edition of at least the Liao, Chin and Yüan histories.

Sung Shee 宋晞, "A Classified List of Chinese Articles and Books on Sung History (III) 宋史研究論文與書籍目錄 (三編)," Chinese Culture 17:3 (Sept. 1976), 113-155.

Professor Sung has now carried his bibliography of works written in Chinese on Sung forward to include the years 1971-75. He also includes here items missing in his previous bibliographies which cover the period 1920-70 (cf. SSN 5, p. 18). There is an index to authors and the same classification is employed, with the

addition of a Classics section, as previously. No doubt, this supplement will be issued together with its predecessors in a single volume.

Brian E. McKnight, comp., Ts'ung-shu so-yin Dung-wen tzu-mu 叢書索引宋文子目: An Index to Sung Dynasty Titles Extant in Ts'ung-shu. San Francisco: Chinese Materials Center, Inc., 1977. XII, 373 pp. \$17.50.

Long in preparation, this helpful volume has now appeared and promises greatly to facilitate the location and use of Sung works contained in their principal repository, the numerous ts'ung-shu. Drawing on the comprehensive Chung-kuo ts'ung-shu tsung-lu (Shanghai, 1959-62) and its later Taiwan reprints (Ts'ung-shu tzu-mu lei-pien and Ts'ung-shu ta-tz'u-tien), it features an index in romanization to 1,644 Sung authors under whom some 4,500 works are listed. A romanized index to these individual titles is provided together with a key to the romanization used (Wade-Giles). The compiler stresses that convenience in utilizing the sources buried in the ts'ung-shu was his aim. Users of this index will feel no hesitation in concurring that he has wholly achieved this aim.

Yang Shu-fan 楊樹藩, Sung-tai chung-yang cheng-chih chih-tu 宋代中央政治制度. Taipei: Commercial Press, 1977. 262 pp. NT\$36.

Yang shu-fan, Chung-kuo wen-kuan chih-tu shih 中國文官制度史 Taipei: San-min shu-chü, 1976. 788 pp. NT250.

The former is effectively a handbook on Sung central government. Written in a succinct style and quoting copiously from the sources. As its focus is restricted to the central government and largely to organizational aspects, it is a rather more limited study than the same author's volume on T'ang political institutions.* Yet, it is a handy work to consult and offers a wide range of valuable quotations. The latter is a monolithic survey of the Chinese civil service period by period, in its Sung section complementing well the above volume. For each dynasty the discussion takes up miscellaneous matters (ranks, honorary designations, the paraphernalia of office), recruitment (especially the examinations), the utilization of personnel (including evaluation, promotion, discipline), and the retirement of officials. Chapter 4 (pp. 294-408) is devoted to Sung, Chapter 5 (409-488) to Liao and Chin, and Chapter 6 (489-588) to Yuan. Readers will find the Sung and Liao material a useful supplement to Kracke's Civil Service and the treatment of officialdom in Wittfogel and Feng's Liao volume.

*(T'ang-tai cheng-chih shih)

Wang Chu 王洙 Sung-shih chih 宋史質 Taipei: Ta-hua shu-chü, reprint ed. 1977. 471 pp. \$10.00

Though the scholarship of this Ming scholar was in bad odor throughout the Ch'ing, it has been viewed with a sympathetic eye by scholars of our own century.

Students of Sung history cannot help but be pleased by having this reprint available. It comes with a 23-page introductory essay by Professor Wang Te-yi on "Ming Views of the Sung Official History as reflected in the Sung-shih chih."

National Central Library microfilms

As readers of CMC's Special List # 116 will have noticed, the National Central Library in Taipei is making rapid progress in its project to microfilm its rare books collection. To date 163 Sung works, six Chin and 171 Yüan have been filmed and are available on an individual basis. The CMC list gives the complete list together with prices. These works do not duplicate Library of Congress' microfilms of rare books in the Peking Library.

Chang Fu-jui 張馥蕊 comp., I-chien-chih t'ung chien 黃聖志通檢 Taipei: Taiwan hsueh-sheng shu-chu, 1976. NT 450 600

Four indices to Hung Mai's unique collection of curiosities and anecdotes are provided in this volume: to the names of persons (whose professions are often indicated), to places, to literary works, and to the titles of the individual anecdotes and reports. Needless to say, a research aid such as this can only be welcomed. Yet, as the indices are arranged according to the old style French romanization, which is falling into disuse even in France, only a limited number of scholars will readily be able to use them. Moreover, useful as the last index is likely to be, a genuine subject index would surely have proven of more value.

Other recent publications

沈括熙寧使虜圖抄箋證	王民信	臺北學海出版社	22/
宋代金石學著述考	陳俊成	臺北 著者刊	248
王小波李順起義資料選注 (農民戰爭史資料選注)	嚴龍才	北京 中華書局	31
方臘起義 (曆史知識讀物)	北京汽車製造	北京 中華書局	39
		廠工人理論組	
元曲六大家 (滄海叢刊)	王忠林	台北 東大圖書出版	275
	應裕康		
範仲淹的修養與作風	湯承業	1 st ed. 1977 341p.	\$1.25
關漢卿考述	盧元駿	1 st ed. 1977 168p.	\$1.00
千古風流蘇東坡	陳桂芬	1 st ed. 1977 235p.	\$1.50
邵康節學述	陳鬱夫	1 st ed. 1977 188p.	\$1.80
早期蒙古遊牧社會的結構-- 成吉思汗時期的蒙古	王明蓀	1 st ed. 1976 155p.	\$3.20

3. Japanese Books

Murakami Masatsuga 村上正二, Yūboku minzoku kokka: Gen
遊牧民族国家・元・ Tokyo: Kodansha, 1977. 206 pp., 66 color prints, 230
black and white illustrations, maps, chronological chart, index. ¥2400.

This popularly priced, popularly written book is beautifully illustrated. It is volume six of Kodansha's new series entitled (Zusetsu) Chūgoku no rekishi (圖説) 中國の歴史. Professor Murakami is a well-known authority on Mongol history, having translated the Yüan-ch'ao pi-shih into Japanese and written many articles on Yüan institutions. This book covers the following topics: 1) the Khitan state and Liao Dynasty culture; 2) the Jurchen state and Chin Dynasty culture; 3) the Tangut state and Hsi-Hsia culture; 4) the emergence of the Mongol empire; 5) the accession of Qubilai and the establishment of a political system; 6) Yüan Dynasty prosperity and the "Tartar Peace"; 7) society and culture under Yüan rule; 8) internal discord and the fall of the Yüan; 9) relations between Japan and the Yüan. (J.D.L.)

Otagi Matsuo 愛宕松男 and Terada Takanobu 寺田隆信, Gen-Min
元・明. Tokyo: Kodansha, 1974, xii + 455 + 11 pp., maps, illus., index,
¥1180.

Professor Otagi wrote the Yüan sections of this book. He and his co-author present an argument for joining the Yüan with the Ming, rather than with the Sung, in discussions of Chinese historical development. Their point is that while the Ming sought in many ways to make a strong break with the Yüan and to reverse Mongolian influences on Chinese society, they were unable completely to do so. A kind of dislectical relationship between continuities and discontinuities existed in Ming times with respect to the immediate past, and only a work which addresses this directly can explain them. The Yüan sections of the work deal with the following topics: 1) pre-history or the Yüan; 2) Mongol control over their dependencies; 3) Qubilai Qaghan; 4) Yüen political control of China; 5) economic policies and realities; 6) Yüan society and culture; 7) the last days of the Yüan. (J.D.L.)

Okamoto Keiji, trans. and ed., Tsūsei jōkō no kenkyū yakuchū
通制條格の研究譯注, vol. 3. Tokyo: Kokusho Kank kai 国書刊行會, 1976.
274 pp. + 128 pp. (index). ¥8,300

Vol. 1 (by Kobayashi Takashirō 小林高四郎 and Okamoto, 1964, reprinted in 1975), and Vol. 2 (by Okamoto, 1972) are still available for ¥8,500 and ¥10,000 respectively. Vol. 3 completes the annotated translation of the extant portions of the Ta Yüan t'ung-chih 大元通制 (promulgated in 1323). The detailed index and notes make the work a valuable source for Yüan social and legal history.

Sogabe Dhizuo 曾我部靜雄, Chūgoku shakai keizai shi no kenkyū
中国社会經濟史の研究 Tokyo: Yoshikawa kobundo, 1976.

Professor Sogabe, whose collected papers on Sung history we noted in the last issue, has included in this new volume five studies primarily concerned with Five Synasties, Sung, and Yüan history. They are:

宋の宗室
宋元時代の村落
宋代の結闢--械闘の前身
南宋の都市
五代宋の牛皮税

Other recent publications:

篇 名	編著者	出版處	頁數	價值
朱子學大系, 第三卷, 朱子の先驅	鈴木喜一	東京 明德出版社	498	¥6500
朱子學大系, 第十二卷, 朝鮮の朱子學	諸橋轍次	東京 明德出版社	451	¥6500
日本の朱子學(上)	安岡正篤			
征服王朝の時代(新書東洋史3)	笠沙雅章	東京 講談社	241	¥390
蒙古襲來研究史論(中世史選書1)	川添昭二	東京 雄山閣出版	307	¥2500
朱熹と王陽明	高橋進	東京 國書刊行會	307	
宋史刑法志索引	佐伯富	京都		
朱子集(朝日中國文明選三)	吉川幸次郎	東京 朝日新聞社	528	¥1500
	三浦國雄			

DISSERTATIONS

Completed

1. "Political Power and Social Prestige of Palace Women in the Northern Sung (960-1126)," by Priscilla Ka Tak Ching-chung, University of Pennsylvania, Ph.D. diss., 1977. 224 pp. Order no. 77-19,837.

The question this dissertation attempts to answer is, "Did palace women in

general possess, to a certain extent, social prestige and political power?"

The concept of social prestige, termed "deferment-entitlement" by Edward A. Shils, is used as a means of determination in this study. The properties identified by Shils are power, occupational role, wealth, style-of-life, kinship connections, and the like. To prove the contention of this dissertation, the study first explores the context of power then proceeds to examine social prestige. Power is defined here as the capacity for achieving goals in the social and political systems--the capacity for obtaining honors and advancements for oneself one's family, and one's allies, as well as the capacity for removing one's enemies from power or the ability to thwart their wishes by maintaining one's position in the face of their opposition.

Biographies of ninety-two imperial women in the Northern Sung were first compiled for information on family background, methods of entry into the palace, conditions of advancement to high positions, etc. The study then examined bureaucracy's recognition of the power of palace women, power of wet nurses, power of securing positions, and the extension of power to imperial relatives. The five regencies in the Northern Sung were also studied in detail and it was found that female rule was recognized by the Chinese bureaucracy and that women were able to exercise direct political power through the institution of the regency. The Chinese bureaucracy was apparently forced to accept the regency without sanction of written law, for purposes of practicality and by reason of "mother right," the by-product of observation of filial piety through Confucianism.

Having established that palace women possessed power through their functional offices, the direct rule of regents, ability to uplift their families socially and politically, advancing themselves within the civil service hierarchy, influencing the politics of their times, etc., the study proceeds to examine the occupational role of palace women, their ranking in civil service hierarchy as compared with male officials, etc. The property of wealth is then looked at, ascertaining that service in the palaces did increase the wealth of families of palace women through access to remuneration and gifts given the latter. This

bettered economic position led to improved life-styles commanding respect in the local community. A result of this enhanced social standing was the possibility of intermarriage with local gentry thus giving families kinship connections that were not previously possible but essential to social mobility as endorsement of local gentry was needed before men were permitted to sit for civil service examinations. Economic gain further gave families access to educational opportunities, which were formerly not within their means.

For the families, the accouterments of their increased wealth, the acquisition of official posts through either direct command of the emperor or through success in the examination system, etc., all led to entry into and

advancement within the bureaucracy. Entrance into the bureaucracy also ensured the position of a family for several generations since subsequent generations were entitled to enter into civil service through yin privilege.

Having demonstrated that palace women possessed power or more specifically, political power, this study has also shown that these women possessed the properties of deferment-entitlement as identified by Shils. It is thus the conclusion of this dissertation that the question posed--did palace women in general possess, to a certain extent, social prestige and political power--should indeed be answered in the affirmative.

2. "Urbanism in Sung China: Selected Topics on the Society and Economy of Chinese Cities in a Premodern Period," by Michael Harold Finegan, The University of Chicago, Ph.D. diss., 1976.

This dissertation is an analysis of data on selected topics collected from a variety of sources concerning many areas in China throughout the Sung period, with generalizations being drawn referring to the basic characteristics of cities at the time. Those topics considered are physical features, society and institutions, government, taxation, population, economic institutions, and the pattern of cities in the area surrounding Hangchow.

The city layouts, urban buildings, and public works such as walls, canals, streets, and wells were important physical features of the cities. Land use patterns were mostly unplanned and determined by such factors as the value of land, one common exception being the existence of a north-south axial street leading from the south gate of the city to the south gate of the main government compound, which was often located on the north side of the main east-west street. In contrast to large scale public works which were carried out by the government,

small scale ones were undertaken by local residents, generally under a Buddhist motivation to do good works and frequently organized as associations under local elite sponsorship. Of the many groups that made up city populations, the educated elite and the merchants stand out for their contributions to city organization and development. Despite some conflicts between their value orientations and life patterns, both groups prospered and pursued their goals without great restriction. Urban institutions considered include schools, religious organizations, the army, popular entertainment, and relief. City administration was under the regular units of local government, the county and prefecture, but to cope with city needs specific urban institutions and practices developed such as police and fire fighting organizations in large cities and special administrative

units with limited jurisdiction in cities that were not originally government seats. Taxation was one of the activities of local government, and in terms of regular taxation the cities were not heavily taxed. Although the existence of irregular levies and of indirect taxes such as those on commerce makes difficult a precise assessment of the urban tax burden in its entirety, the prosperity of the cities and the sparsity of complaints about urban taxation suggest that the burden was not great.

There is a wide variety of evidence concerning Sung city populations including census statistics and estimates by officials, and from comparison of different figures it is possible to determine the approximate populations of many cities. Most interesting were the existences of large commercial cities with populations from 200,000 to 400,000 people and the appearance in highly developed areas of dense networks of smaller cities. This high level of urbanism in some areas can be explained by the importance of the economic functions of the cities, as centers for trade, industry, and investment. Available information on trade mostly concerns the provision of food to city consumers, but there is also information that large cities were regional wholesale centers and that many goods were not available outside of them. Large market centers were industrial as well as commercial centers, commercial book publishing, for example, being highly concentrated in Hangchow as well as in two small towns in Fukien. Wealth also was concentrated in large cities, and this wealth was invested in business as well as in agriculture. Individual cities were not isolated but existed in an interrelated pattern of exchange of functions with other cities and the countryside, as is revealed in a study of the area around Hangchow. Among a dense distribution of small market towns larger cities occupied central locations on

waterways, particularly at important crossroads. A major factor behind such a flourishing of cities in the Sung was the existence of long periods of peace.

3. "Formal Themes in Medieval Chinese and Modern Western Literary Theory: Mimesis, Intertextuality, Figurativeness, and Foregrounding." by William Craig Fisk, The University of Wisconsin-Madison, Ph.D. diss., 1976. 247 pp. Order no. 77-8089.

The thesis deals with medieval Chinese poetics in four areas-mimesis, intertextuality, figurativeness, and foregrounding-discussing the nature of each, its implications for interpretation, and its ramifications with respect to contemporary literary theory.

The sources include Liu Hsieh's (ca. 465-ca.521) Elaborate Carvings of the Literary Mind and works in the shih-hua ("poetry criticism") form written between

the eleventh and thirteenth centuries. Discussion of passages from Fan Hsi-wen's Night Dialogues (pref. 1262) concludes each chapter. Most of the poems used to apply theory to interpretation are from the T'ang dynasty (618-907), and a large proportion are by Tu Fu (712-770).

The chapter on mimesis concerns the theory of reciprocal affectivity between "feeling" (ch'ing) and "scene" (ching). Although these terms only become established in the twelfth and thirteenth centuries, the opposition itself is shown to already have been well developed before this. Mimesis selects elements of scene to express a feeling that partakes of a momentary "presence" in synchronous flux. Mimetic theory is shown to have been the leading element in orthodox evaluative criticism; literary artifice, especially intertextuality, breaks the poem's "presence."

The chapter on intertextuality begins with the ideas of "wind" (feng) and "bones" (ku), and of "continuity" (t'ung) and "change" (p'ien) in Liu Hsieh's Literary Mind. Here intertextuality is considered the coincident projection of similar poems from similar types of feeling. Reincarnating a poem's "wind" in new "bones" or revivifying its "bones" with a new "wind" is viewed by criticism of the twelfth century as a conscious and imitative means of creating new poetry. Other uses of these relationships in twelfth and thirteenth century criticism, however, discuss intertextual affinities for the appreciation of the reader, rather than as imitations.

The chapter on figurativeness starts with the poems considered exemplary by eleventh and twelfth century criticism concerned with the concepts of "ineffability" (yen-wai-chih-i) and "blandness" (p'ing-tan). Abstract meaning is, paradoxically, projected by (or embedded in) concrete language. The idea is shown to be related to theory or "figurative evocation" (hsing) in early exegetical practice. Figurativeness there, as in later criticism, has to do with juxtaposed, duplicative patterns whose interrelationships are established by contention.

The chapter on foregrounding examines the development of a concept of foregrounding as the result of general interest in the qualities of outstanding lines and as the conversion of ideas implicit in metaphors for strikingness. Two of these metaphors, the "eye word" and the "resonant word," become terms. Examples from Lü Pen-chung's Poetry Primer for Innocents (fl.ca. 1085-1119) and Fan Hsi-wen's Night Dialogues are used to discuss the characteristics of words which are foregrounded by breaking syntactic, semantic, idiomatic, or metric expectations, and which also foreground the intentionality of a poem

The conclusion contrasts medieval Chinese and modern Western literary theory by regarding key functions as paradoxes, which reduce contradictions in how a text means. The criticism of Sklovskij, Tynjanov, Mukatovsky, Riffaterre,

Fish, and Bloom displays the idea that the independence of one text depends upon another and that one part of a system is equivalent to the whole which contains it. A metacritical comparison then reveals differences in medieval Chinese literary theory which force us to consider it in many ways better suited to the interpretation of Chinese poetry than is the modern Western criticism now more and more frequently used for that purpose, and also to see some of the implications of these differences for the further development of literary theory.

4. "A Study of the Western Chamber: A Thirteenth Century Chinese Play," by Shang-hsien Ho, the University of Texas at Austin, Ph.D. diss., 1976. 193 pp. Order no. 77-11,528.

Since Chinese does not have a tradition of linguistic or literary analysis comparable to that of the West, descriptive terminology, no matter how ill-fitting, has been borrowed from descriptions of Western languages and literature. Previous studies made on the Chinese language and literature have provided many useful insights into the intricate complex of problems, which the work under study represents. It is the purpose of the present study to provide concrete information about specific facets of the problem, which may contribute to a future more definitive description of the use of language in Chinese literary works.

There are four chapters in this study, with an appendix, which gives a summary of this 20-act play. Chapter one describes the linguistic elements of the temporal and geographical dialect in which the message was transmitted, some register markers of the traditional Chinese drama, and patterns in spoken lines which give the play under study its general stylistic features. Chapter two begins with a discussion of various major traditional verseforms, which is followed by an account of the significant differences between songs in Yüan drama and verses in other major forms, and ends in an analysis of poems found in the play that belong to the major verse forms. Chapter three takes up an analysis of the functions of the songs. The songs are analyzed on the basis of their dramatic effects, or the extent of the area of experience the playwright is able to master poetically. And the last chapter is to explore the relationship between form and meaning, and attempts to describe how the work as a whole offers for our contemplation a world of its own, with its own characteristic relations and principles of coherence.

5. "Dogen's Formative Years In China: Historical Study and Annotated Translation of the Hōkyō-ki," by Takashi James Kodera, Columbia University, Ph.D. diss., 1976. 355 pp. Order no. 76-29, 103.

This is a historical and textual study of the formative years in the life of Dogen, a Japanese Zen Buddhist monk of the thirteenth century, A.D. It attempts to demonstrate the process leading toward his enlightenment experience of the "dropping the body and mind" under the instruction of his Chinese master, Ju-ching, which occurred in the fifth and final year of Dogen's study in Southern Sung China. The Hōkyō-ki, Dogen's posthumously discovered journal from this year, discloses the extent and the content of Ju-ching's influence upon Dogen. The annotated translation of the journal constitutes the second half of this study.

Contrary to the line of continuity between Dogen and his Chinese predecessor that is shown in this study, many Japanese scholars in the last five decades have emphasized Dogen's unprecedented originality. Their claim seems to derive either from their sectarian orientation, where Dogen is principally portrayed as the founder of the Japanese Sōtō School of Zen, or from their treatment of the later years of Dogen's life without sufficient analysis of his formative years.

While Dogen's study under Ju-ching receives the central attention, the first half of this study includes a biographical study of Dogen's life before

this trip to China and an examination of his search for the "authentic teacher" in China prior to his encounter with Ju-ching. This study also supplies a brief discussion of the major schools and figures of Southern Sung Zen as the background for Dogen's experience in China.

6. "The Fisherman in Yüan Painting and Literature as Reflected in Wu Chen's Yü-fu t'u in the Shanghai Museum," by William W. Lew, Ohio University, Ph.D. diss., 1976. 254 pp. Order no. 77-10463.

While themes and topics associated with the anchoritic tradition have prevailed throughout the ages in China's long history, they seemed to have gained greater significance and new meaning during periods of instability, turmoil, and chaos. One such theme is that of the fisherman which proved to be popular among the literati or scholar class during the Yüan period (1179-1368). Generally speaking, the fisherman in China came to symbolize freedom and solitude among the literati class; in this context, it provided a contrast to the harried world of affairs of the scholar-official. However, in light of the political situation during the Yüan period, one can detect certain subtle overtones of protest. Although the theme of the fisherman has had a lone history in painting and an even longer

history in literature, and although it was developed to a unique degree by Chinese painters and poets, nevertheless, for Western scholars it has been a relatively unexplored area of study. This dissertation represents an examination of the fisherman theme in Chinese literature and painting. Its purpose is twofold: (1) to show, through the vehicle of the fisherman, the interrelationship between the artistic and literary endeavors and the intellectual and emotional attitudes of the literati class in China; and (2) to reveal its significance as a symbol of eremitism and a subtle vehicle of protest in the Yüan period.

Since the Yüan master, Wu Chen, provided a summation of the fisherman theme in the art of the Yüan period, attention was directed to his Yü-fu t'u handscroll in the Shanghai Museum collection. Using the poems and painted scenes on this handscroll as a point of departure, the fisherman was: (1) examined within the context of China's eremitic traditions; (2) discussed in relation to Wu Chen's personal life and art; and (3) viewed in light of some of the intellectual and emotional attitudes of the Chinese literati in the Yüan. The study was brought to a conclusion with a discussion of the nature of eremitism in Chinese culture.

While the fisherman theme traditionally symbolized freedom and solitude among the literati, it can be said to have gained new significance as a vehicle of protest in the Yüan period. The subtle echoes of protestation in the fisherman paintings of this period, and especially in the works of Wu Chen, manifested themselves by way of veiled references: references to motifs which symbolized moral superiority references to a southern landscape characteristic of the area of China that was the last to give way to Mongol domination; and reference to past artistic and literary styles associated with individuals who were originally from the above-mentioned area of China. These disparate references in the fisherman paintings, when viewed as a unified statement, can be interpreted as a subtle assertion of traditional Chinese cultural values in light of foreign domination and the prevailing political situation.

7. "The Phenomenological Analysis of Sung Painting," by John William Linn, University of Georgia, Ph.D. diss., 1975. 263 pp. Order no. 76-6419.

The purpose of this study was to demonstrate the efficacy of the phenomenological method of criticism in dealing with any art object. Chinese Sung painting was chosen since it allowed the critical analysis to be conducted from the standpoint of a virtual tabula rasa thus proving the above contention.

The demonstration consisted of the following steps: a) a case for the appropriateness of Sung painting was made; b) the historical foundations of

phenomenology as a mode of philosophic analysis were provided; c) a comparison was made between phenomenology, now seen as a method of aesthetic analysis, and other common modes of art criticism (e.g., impressionism, expressivism, formalism, and contextualism); d) the difficulty of understanding non-Western art was examined; e) the phenomenological method of criticism was applied to three Chinese Sung landscapes: Autumn in the River Valley by Kuo Hsi, Spring Mountains and Pine Trees by Mi Fei, and A Corner of West Lake by Hsia Kuei; and f) correspondences in results between other systems of analysis and the phenomenological method were provided.

The study reached the following conclusions: a) that the phenomenological method is capable of dealing with previously little understood art objects: b) that the phenomenological method is capable of yielding results similar to that of other critical methods: c) that these results have the advantage of being both demonstrable and verifiable thus reducing critical error; d) that the phenomenological method is capable of making findings that other systems do not; and e) that the phenomenological method is capable of yielding interpretations that connect with the issues of existence and that conform to the perceptual evidence of the works.

The advantage of the phenomenological system as a method of art criticism was thus made clear.

8. "Chang Sheng-wen's Long Roll of Buddhist Images: A Reconstruction and Iconology," by Moritaka Matsumoto, Princeton University, Ph.D. diss., 1976. 470 pp. Order no. 76-23,865.

The Long Roll of Buddhist Images, executed by the Ta Li painter Chang Sheng-wen and other collaborators just before 1180, is the subject of this dissertation.

The painting, at present, is mounted as a scroll in the Palace Museum in Taipei and measures approximately 19 meters including the attached colophons. However, the condition and arrangement of the work is not in accordance with the original format. The wording, chüan (卷) and chih (帙), referring to the accordion-type format, has been scrutinized here in the light of existing sutra frontispieces surviving from Sung times, and a large body of physical internal evidence.

In determining the authenticity the provenance of the painting there are four major considerations: Firstly, documentation that established the identity of the colophon writers, particularly Miao-kuang who was responsible for the first colophon and a majority of the cartouches. Secondly, verifiable historical information within the colophons and cartouches. Thirdly, the identification of the

period and regional styles; two primary painting and two primary calligraphic styles in the work. And, finally, the interpretation of the iconological properties manifested in the Buddhist images.

An attempt has been made to restore the original sequence of the accordion-type format based not only on physical internal evidence, but also on the iconographical identification and programming principle of the deities, as well as their iconological, contextual implications. Classification of the painting into four sections (Type A, B, C and D), in accordance with the margin design motif combinations, has produced an unexpected but uniquely coherent exposition of iconographical programming of the deities assembled in each section. This has been substantiated by the identification of crucial images such as: Taigensui Myōō, Chang Wei-chung, Ts'an-t'o-chueh-to, Hsieh-tao and Maishun in the Type A

section; Rūpasari and other episodes from the Life of Shaka, Tenkuraion Nyorai, Hōtō Nyorai, Nichigetsutōkō Nyorai and the Seven Kannon in the Type B section; Sabari Butsumo, Byakususei Kannon, Kozekkaigan Kannon, Hachinan Kannon, Jinseiguku Kannon, Basudara Butsumo, Shieki Kongozo, Jōguri Kannon, Roku Jizō and Tenrinō in the Type C section; Karura, Yakushini, Kendatsuba, Kinbachi Karashin, Daian Yakushashin, Fujō Kongō and Usushima Myōō in the Type D section. Each image, which may be treated independently, is also an integral part of several larger and more encompassing iconological frameworks, some of which are tinged with the conflation of Chinese and Nan Chao and/or Ta Li iconological properties, and others of which are clearly oriented toward the formulation of such mandalas as, Taigensui Myōō, Taizōkai and the Thousand-armed Kannon.

The fact that canonical bases for many of the iconographies here are found only in Sung liturgical materials, and the fact that stylistic properties manifested in the painting correspond basically to those of Sung works, corroborate the assumption that the Ta Li artistic and Buddhist outlook was heavily influenced by Chinese Sung culture on many levels.

9. "Judgment Deferred: An Intra-genre Criticism of Yüan Drama," by Ching-Hsi Perng, The University of Michigan, Ph. D. diss., 1977. 246 pp. Order no. 77-18,094.

Traditionally, criticism of Yüan drama has been dominated by the "poetic" and "socialistic" schools. The present paper attempts to see Yüan drama (tša-chū 雜劇) as drama and to evaluate individual plays by aesthetic criteria generated from within the genre itself. Seven p'ing-fan kung-an chū 平反公案劇 or

judgment reversal plays form the main corpus of study. The two major areas of investigation are language and the manipulation of characters.

Three levels of language commonly employed in tša-chū are identified: lyric (aria), verse, and prose, each having its function in the dramatic presentation. Briefly, lyric expresses well the inner feelings of its user; verse serves special purposes on special occasions; prose both carries the dramatic action forward and provides the desired comic relief.

Language in The Mo-ho-lo Doll and Injustice to Tou Ngo is exploited most effectively. The Chalk Circle, The Gold Phoenix Hairpins, and Rescue of a Filial Son come second in rank as far as the dramatic use of language is concerned. The other two plays, Judgement on the Kerchief and Child Shennu-erh, are relatively inferior in this respect.

Dramatic characters in Yüan tša-chū are delineated in Theophrastian, rather than naturalistic, terms. The most familiar stock figures in judgement reversal plays are the villain, the victim, and the judge. Their portraits are marked by distinct conventional features.

A study of Tou Ngo as a dramatic character reveals that the custom of a single singing role tends to make the star of the play more finely drawn than the rest of the cast—primarily through the exploitation of lyrics. On the other hand, memorable "minor" characters do exist. Mrs. Ma in Circle, the Innkeeper in Hairpins, and Kao Shan in Mo-ho-lo stand out in our select group of plays. In criticizing a highly conventional and stylized type of drama like Yüan tša-chū, it is important to pay close attention to well-wrought minor characters: they may be considered inventions that testify to the playwright's art and creativity.

10. "Kuan Yü in Drama: Translations and Critical Discussion of Two Yüan Plays," by Gordon Victor Ross, The University of Texas at Austin, Ph.D. diss., 1976. 222 pp. Order no. 77-3975.

The great Chinese General of the Three Kingdoms Period (A.D. 220-265), Kuan Yü, has remained a popular hero in Chinese thinking down to the present time. In addition to the legends and myths that have grown up about him, successive Chinese rulers awarded him posthumous degrees and titles, so that by the middle of the nineteenth century he was not only deified as the God of War but was regarded as a sage equal to Confucius. He remains a major deity in folk religion on Taiwan today.

The deeds of Kuan Yü, as might be expected, have been popular subject matter for Chinese literature, not only in stories and dramas about his life, but in repeated references made to his military ability and his great virtue in poetry and prose down to and including contemporary works on the Chinese mainland. Of

the many dramas of the Yüan dynasty which were based on Three Kingdoms stories, several were written about Kuan Yü. The two translated as part of this dissertation, "Kuan Yü Travels A Thousand Li Alone" and "Kuan Yü Goes To A Lone Sword Meeting", each employs dialogue and songs to provide a realistic portrayal of these events from Kuan Yü's career.

Compared with these events as recorded in the historical record, or San kuo chih, and story tellers' versions contained in the San-kuo-chih p'ing-hua both of which emphasize the course of action and pay attention only to external details, the plays add an emotional element effectively expressed by the songs. This expression of the emotions which were necessarily part of each adventure distinguishes the manner in which the stories are related in Yüan drama from other historical and fictional accounts.

Each playwright approaches an historical incident with a different purpose in mind. The anonymous author of "Kuan Yü Travels A Thousand Li Alone" depicts the most famous incident in Kuan Yü's life in a straightforward fashion without altering the basic historical framework. Kuan Han-ch'ing, in his play, "Kuan Yü Goes To A Lone Sword Meeting", uses a relatively insignificant incident as the basis for a play which is not designed to retell an event from history, but to vividly portray the character of Kuan Yü as the epitome of bravery and loyalty to his lord.

Using Northrop Frye's classification of Western fiction according to different levels of the hero's power action, the presentation of Kuan Yü's ability in fiction and drama can be shown to correspond to that of a romantic hero in Frye's definition. Not only is Kuan Yü clearly superior to other men and his environment in degree, but many secondary characteristics of romantic literature exist in these two plays. In spite of the many similarities to Western romance, important differences exist, the most significant being that Kuan Yü's adventure, unlike those of heroes of Western romance who often sought personal glory in their quest as an end in itself are all undertaken with a definite purpose in mind to establish Liu Pei's legitimate rule. The significance of this comparison is to show that Chinese playwrights successfully employed drama to depict the adventures of romantic heroes when Western authors of romance have, for the most part, not done so.

11. "The Poetry of Yang Wan-li," by Jerry Dean Schmidt, The University of British Columbia, Ph. D. diss., 1975.

Yang wan-li (1127-1206) is regarded by Chinese literary historians and critics as of the three most outstanding shih poets of the twelfth century. The present study attempts to explore Yang Wan-li's unique contribution to Chinese literary criticism, rather than emphasizing European, methodology as is the case

with most studies on non-European literature done by Westerners.

I begin with an extensive account of Yang Wan-li's life, paying particular attention to the influence that his political career had upon his literary works. However, the biography is not merely limited to a study of Yang's official life, or the very personal nature of his poetry allows us to explore the inner workings of his mind, and, in particular, the important role played by Ch'an (Zen) Buddhism in determining his outlook on life and his attitudes toward literature.

The next major section focuses on Yang's theory of literature and how his Ch'an background led him to view the writing of poetry as an intuitional process which results from sudden enlightenment. Such a theory caused him to reject thoughtless imitation of earlier poets and to advance the idea of natural, un-adorned verse. The most concrete expression of Yang's theory of poetry is his "live method" (huo-fa), a poetic method which includes such elements as iconoclasm, illusion and paradoxical language, surprise and sudden enlightenment, humor, and extensive use of colloquial language.

After this general discussion of Yang's literary theory and practice, I proceed to explore some of the major themes of Yang Wan-li's poetry, finding that a considerable body of his poetry is concerned with the Buddhist theme of illusion and reality. However, Yang's career as a Confucian bureaucrat also was of the utmost importance for his poetry, and he frequently describes his family and his general relationship with society. He is particularly original in his verse of social criticism and the life of the lower classes.

However, the most common subject of Yang's literary creations is nature, a tendency which is consistent with the esthetic interests of both painters and poets of his period. Yang's nature poetry has great similarities to the visual art of his contemporaries, and the striking innovations in Yang's nature poetry are easily compared to contemporary changes in Chinese painting. Yang's landscape poetry, in particular, is found to be intimately connected with Ch'an Buddhist mysticism. His poetry on plants and animals, like the painting of the period, is in harmony with the scientific, analytical tendencies of the culture as a whole.

I conclude with a study of Yang Wan-li's position in Chinese literature. The influences of earlier poets on his verse are analyzed and the traditional opinions concerning the evolution of his style are found to be erroneous. Yang's poetry is compared and contrasted with the work of the two most prominent shih poets of his period, Fan Ch'eng-ta and Lu Yu. Finally, I give a brief account of Yang Wan-li's influence on later poets and critics.

12. "The Collapse of the T'ang Order," by Robert Milton Somers, Yale University, Ph. D. diss., 1975. 390 pp. Order no. 76-14, 561.

This dissertation examines the last half-century of the T'ang rule, a period universally regarded by scholars as a great watershed in Chinese history. Part One discussed the background of late T'ang financial policy, and the clear pattern of social unrest and resistance already established by the 830's and 840's. The militarization of South China, and the effects of outbreaks in that region are described, as are the effects of foreign invasions of southwestern China, which seriously affected the delicate military balance in the provinces and led indirectly to the P'ang hsün rebellion (869 A.D.). This part stresses the interlocking nature of the problems facing the dynasty, and the ominous development of garrison revolts tied to popular rebellion.

Part Two examines political developments during the reign of I-tsung (860-873 A.D.) and assesses their effect on regional administration and ultimately on Dynastic survival itself. The consequences of the succession dispute, which was finally settled, with the aid of force, in favor of I-tsung are measured. It is argued that the circumstances of the succession had a profound effect on politics, which in turn had grave implications for the survival of the dynasty. Though it is normally thought that the hold of powerful aristocratic families only tightened during the last decades of the dynasty, it is shown that I-tsung's reign marked a sharp political break with the past. This part also describes the personality and political role of I-tsung, and shows how he exacerbated the deteriorating political climate at court.

Part Three examines the great popular rebellion of Wang Hsien-chih and Huang Ch'ao, which all but destroyed the T'ang dynasty. It begins with a discussion of the composition and organization of the bandit gangs, which led the rebellion. The pattern of roaming banditry, which took the bandit gangs from Shantung in the north to Canton in the far south, is described, as is the long march towards the capital, which the rebels occupied in 880. The attempts of Huang Ch'ao to organize his own followers, and his efforts to gain regional support are assessed. Juxtaposed with this is an account of the flight of the Emperor Hsi-tsung to Szechwan, and the revolt there of Ch'ie Neng, a local military officer. The establishment of orthodox forces to suppress the Huang Ch'ao rebellion is described, and placed in context with the fragmentation of the rebel leadership.

Part Four describes the desperate efforts of the Emperor Hsi-tsung (r. 873-888) and his supporters to recover dynastic power after the rebellion and

gives an account of the political recovery of the older elite families. Equal attention is given to the massive militarization of the provinces, with particular attention on the widespread establishment of local militia and the formation of a regionally based military elite.

The final breakup of the imperial coalition—the Emperor and his personal supporter, remaining Outer Court officials, provincial and foreign allies—is discussed in Part Five. The foreign occupation of important areas of North China in part the result of the dynasty's efforts to postpone its collapse, is stressed. The new regional power centers in North China are described, and an account is given of the accumulation of power and territory by Chu Wen, who overthrew the T'ang dynasty in 907 A. D. and set up his own Liang regime. The appearance of a series of regional states in South China is also described.

The dissertation concludes with some revised interpretations of the break-up of the T'ang order which, in turn, will require re-examination of the current theses regarding the founding and history of the Sung dynasty (960-1279 A.D.).

13. "The Literary Criticism of Yüan Hao-wen (1190-1257)," by John Timothy Wixted, University of Oxford, D. Phil. diss., 1977. 703 pp.

Those aspects of Yüan Hao-wen's life and work that have bearing on literary theory, criticism, or history of criticism are dealt with in this dissertation. The focus of attention is on Yüan's thirty-poem series of poems on poetry. (A copy of this dissertation is on deposit in the Harvard-Yenching Library.)

14. "Chinese Impressionistic Criticism: A Study of the Poetry-Talk (Shih-Hua Tz'u-Hua) Tradition," by Wai-leung Wong, The Ohio State University, Ph. D. diss., 1976. 246 pp. Order no. 77-2537.

This study focuses on the language and methodology of practical (or applied) criticism in Chinese poetry-talk. From the eleventh-century Liu-yi shih-hua to the twentieth-century Jen-chien tz'u-hua, twenty-one works were carefully selected for investigation. There are two major kinds or critical statement, namely, expressions of primary impressions, and those of secondary impressions. The former are immediate and evaluative remarks; the latter are descriptive. Two types of description are discerned—the abstract and the concrete (or metaphoric). The four-character phrase is a standard pattern for both types of description. There are a great number of "binary compounds" such as ch'i-hsiang and shen-yün in Chinese poetry-talk, many of which have troubled the average reader. Proper attitudes toward such terms are suggested. It is the habit of

Chinese poetry-talk writers to select verse lines, particularly antithetical couplets, in their criticism. Often, lines are chosen for separate appreciation, unaccompanied by

any critical statement. Basically, Chinese poetry-talk criticism is a kind of impressionistic criticism, which is characteristically brief, non-analytical, and spontaneous, the essence of Chinese impressionistic criticism is the summarized description. For centuries, many Chinese poetry-talk writers have enjoyed the simplicity and spontaneity sanctioned by this impressionistic tradition, which developed from native aesthetic concepts as well as unique linguistic features. In the later part of this study, several comparisons are made: China impressionistic criticism vs. the so-called English impressionistic criticism; summarized description in this Chinese tradition vs. elaborate analysis exemplified by the New Criticism. Also, a chapter is devoted to pointing out the non-impressionistic elements in Chinese poetry-talk as well as other types of critical writing in traditional China, which have quite often been pejoratively, but mistakenly, characterized as impressionistic criticism.

In Progress

1. "The Development of the Tz'u as a Literary Genre from Late T'ang to Northern Sung," by Kang-i Sun Chang, Princeton University."

The dissertation attempts to trace the early development of the Chinese tz'u in terms of its distinct linguistic characteristics, conventional requirements, aesthetic values, and structural principles. Its main purpose is to try to bring to light the underlying principles governing generic changes in Chinese poetry by taking the evolution of the tz'u as a specific case.

2. "The Sung Dynasty Ch'an Monk, Ta Hui (1089-1163), and Lay Ch'an," by Miriam Lindsey Levering, Harvard University.

Ta Hui is an important figure in the development of Lin Chi school teaching within Ch'an Buddhism; his teaching methods, doctrines and characteristic emphasis are shown to be related to his interest in enlightenment (wu-tao) for laymen.

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