CHAPTER III

CHINESE ALCHEMY

Studies in Chinese alchemy are rendered comparatively easier, as in the case of all other historical studies, by the Chinese written tradition, massive documentation and love for chronology. As printing was invented in China in the eighth/ninth century AD, i.e., some four to five centuries before it became known in the West, almost all the written documents are in a printed form. Abundant material is available on alchemy, chiefly written in the medieval period. It is to be found in the Taoist patrology - Daozang,[1] the pharmaceutical natural histories, dynastic records and encyclopaedias and compendia written a little later. It helps in tracing the origin of various alchemical ideas such as "the herb of immortality", gold-making or aurifaction, the powder of projection (i.e., the powder, a pinch of which transforms a large amount of base-metal into a noble one) or the use of mercury in synthesizing the elixirs.

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1 道藏

Since vast literature is available in the form of primary sources, Chinese alchemy has been extensively studied by a number of scholars, in its various aspects. In his monumental work Needham, with collaboration of Ho Peng-yoke, Lu Gwei-Djen, Sivin and others, deals with the problems of the origin of alchemy in China, its development through the centuries between the fifth century B.C. to the seventeenth century AD (i.e., until the introduction of modern chemical ideas in China from the West); the philosophy behind it; its metallurgical and physiological backgrounds and the chemical technology used in these experimentations. Needham gives translated excerpts from the ancient and medieval chemical and alchemical texts under consideration and uses them to draw inferences regarding these practices.

Sivin, in his "Chinese Alchemy - Preliminary Studies", gives an account of Chinese alchemy, the sources for its study, priorities in the study of Chinese alchemy and further discusses the text "Dan-jin Yao-jue"[2] written by Sun Si-miao,[3] a seventh century physician. Sivin has

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[2] 丹經要訣

[3] 孫思邈

supplied the future scholars with a model format for studying alchemical or, for that matter, any protoscientific text of the past.

A few translations of the Taoist alchemical texts, including some from Dao Zang have been published by authors like Wu, Ware, Tenney, Zhao Yun-zong, etc.

Among the books which are available for study we will be discussing a few at length here. These are the ones which depict the main trends in the growth of Chinese alchemy and also reflect upon the areas of the influence of Indian and Chinese alchemy upon each other. It should be noted that this is by no means an exhaustive study of Chinese alchemy. We do not study a number of aspects such as its basis in the synthesis of Taoist, Buddhist and Tantrik philosophy, nature of physiological alchemy, i.e., preservation of body by chemical means even after death, nei dan or internal alchemy, influence of Chinese alchemy on Arabian and Japanese alchemy and vice versa. We will limit our discussion to those aspects which reveal the parallel development of alchemy in India and China and the transmission of chemical and alchemical ideas between them.

Origins of Alchemy in China and Its Relation to Taoism

Transmutation of base metals into nobel metals and synthesizing elixirs of life are the two characteristic features of Chinese alchemy like that of Indian. It should be noted that Western[4] alchemy did not have a serious macrobiotic element but it chiefly dealt with gold-making processes.

Whether[5] this idea of "elixir of life" was an indigenous concept in China or a foreign influence is a question which has been studied by Chinese and Japanese

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[4]See paper on the Stockholm papyrus by Earle Radcliffe Caley in the Journal of Chemical Education, Vol. 4, 1927, July-Dec., p. 979. Also see the translation of Leyden papyrus in the Journal of Chemical Education, Vol. 3, 1926, pp. 1149-66.

Caley writes, "The two papyri are complementary and taken together they give an excellent cross-sectional view of the operations and aims of chemical technology in the beginning centuries of the Christian era. They are the only original laboratory documents that have come down to us from that period and hence their great value for the history of chemistry, especially on account of the light they throw upon the beginnings of alchemy.

Both of these earliest chemical manuscripts were brought to light in the early years of the last century. . . . The Leyden Papyrus chiefly deals with metals and alloys and makes little or no mention of the other phases of technical chemistry. . . . The Stockholm papyrus, on the other hand, emphasizes the arts of dyeing, imitating precious stones and other operations."

[5]Needham, Joseph (1), Vol. 5, Pt. II, pp. 114 onwards.

scholars for a long time. Their conclusions are diverse.

Chinese alchemy is intimately related to Taoism. From the very beginning Taoism laid more stress on "Study of Nature" than on social administration. Hence, in Needham's opinion, roots of all natural sciences could be traced to Taoist ideas directly or indirectly. The union of hands and brain, i.e., practical experimentation, was recommended by the Taoist priests, in contrast to Confucian scholars who used their hands only for reading and writing. Alchemy was studied by the Taoists in their "Investigation of Nature". The collection of Taoist writings Dao Zang, which is parallel to Da Zang, the Tripitaka of the Buddhists, contains over a hundred alchemical texts written in the medieval period.

References to mercury and cinnabar are found in China since the ancient times, the earliest being in the fifth century B.C. Mercury was a valuable substance. A number of ancient texts refer to the methods of prolonging life using mercury from which it is clear that these ideas existed in Chinese culture some five to six centuries earlier, before they appeared in the text "Can-tong-qi" (The kinship of the three) by Wei Bo-yang in the second century AD.

Yin, Yang, Qi and Five-element Theories

The ancient Chinese perception of five elements, which give rise to all forms of matter, included metal (jin),[6] wood (mu), water (shui), fire (huo) and earth (di). It was thought that these elements successively produce and destroy each other, thereby causing the physial and chemical transformations, e.g.,

earth generates metal

metal generates water

water generates wood

wood generates fire

and fire generates earth.

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[6] jin 金 - metal

mu 木 - wood

shui 水 - water

huo 火 - fire

di 土 - earth

Likewise,

earth destroys water

water destroys fire

fire destroys metal

metal destroys wood

and wood destroys earth.

Much is written about the theory of Yin and Yang as well as the five-elements in relation to the processes of alchemy. The theory of Yin and Yang is beautifully explained by Ho Peng-yoke[7] in the following way.

> The pneumatic concept of the Greeks had its parallel in China. The universe was filled up with qi, whose state of rest and motion give rise to the two cosmological forces Yin and Yang. From these two forces were derived four different "phases" - water, when the qi had already been at rest for a maximum period i.e. when Yin had reached the highest point, metal - when the qi of Yin just entered a state of rest; wood and fire - when the qi of Yang had reached its maximum state of motion. These four "phases" congealed in different proportions giving rise to the earth "phase" which gave the material forms of all matter. The qi above the earth changed cyclically, according to the seasons. This could alter the proportions of the different "phases" in the composition, say of a metal, resulting in transmutations. However, this natural transmutation would take time, at least a few hundred years, too long for mortals to wait. Chinese alchemists believed that ways and means could be found in their laboratories to hasten this process. The Chinese alchemists divide substances into Yin and Yang categories. Yin represents every thing that is cool, feminine and Yang, hot and masculine.

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[7]Ho Peng-yoke, "Final Curtain on Chinese Alchemy", unpublished manuscript.

Wei Bo-yang[8] and "Can-tong-qi"[9]

"Can-tong qi" is the earliest Chinese book on alchemy in which the author gives some consideration to the theoretical aspect of alchemy. It was written by Wei Bo-yang, a second century Chinese alchemist, who is known as the father of Chinese alchemy.

"Can-tong-qi" quotes the book of changes or Yi Jing[10] and also from the Taoist canon Dao-de-jing.[11] The language of this book is obscure and the descriptions of reactions are not clear. Much importance is given to the action between the dragon and the tiger; i.e., mercury and lead. Wei Bo-yang uses sixty-four hexagrams, and four cyclical signs to denote the time and period for

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8 魏伯陽

9 參同契

10 易經

11 道德經

the reactions. Alchemical passages are explained in terms of the theory of Yin and Yang and that of five elements. He mentions one fundamental concept of alchemy that changes happen or substances interact if they are from similar categories.

Ge Hong[12] and Bao-pu-zi[13]

After Wei Bo-yang, in the fourth century AD the adept-alchemist Ge Hong appeared on the scene of Chinese alchemy. He is the author of the text "Bao-pu-zi" (The book of the preservation-of-solidarity master). This famous alchemical text is the earliest on alchemical practice. The chapters are divided into two parts. Nei-pian[14] (esoteric or inner chapters) and Wai-pian[15] (exoteric or outer chapters). Ge Hong mostly discusses

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12 葛洪

13 抱朴子

14 內篇

15 外篇

God and principles governing life and other philosophical matters, but a portion is devoted to alchemical preparations, types of elixirs, natural substances which can bring about longevity and also transmutation of base metals into gold and silver.

Ge Hong admits that for the lack of funds he himself could not make the elixirs and test for their efficacy, but he was just putting together selected methods from the earlier texts. He stresses the point that gold-making should be pursued not for its own sake, i.e., for material gains, but for its application in elixir-syntheses, in order to achieve immortality and Xianship[16] (i.e., becoming a heavenly immortal according to Taoist teachings).

Artificial gold which was also called as processed or medicinal gold (Yao Jin),[17] was supposed to be superior to natural gold. At the end of the "Bao-pu-zi" text, a bibliography of earlier alchemical texts, no longer extant at Ge Hong's time, has been given.

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16 仙

17 藥 金

The ingredients used in the elixir-syntheses of Ge Hong included metallic-mineral substances such as gold, copper, iron, lead, cinnabar, sulphur, mercury, crpiment, realgar, iron and copper sulphates, magnetite, hematite, malachite, salt petre, common salt, mica and alum, etc. These are more or less the same as those occurring in Indian alchemical texts. The substances of plant and animal origin like lacquer, honey, vinegar, earthworm excreta and wine are also seen in Ge Hong's methods.

We find a number of parallels between the alchemical methods of Wei Bo-yang and Ge Hong and those given in Indian alchemical texts. We will discuss this in detail in a later chapter on transmission of alchemical and chemical ideas between India and China.

In his study of Chinese alchemy Needham divides the alchemical processes given in Chinese texts into five categories, viz. (1) Uniform substrate alloys, (2) Surface-layer enrichment by addition, (3) Surface-layer enrichment by withdrawal, (4) Surface-film formation, and (5) Special cases. It is interesting to note that almost all the above categories are seen in Indian alchemy. The parallels between Indian and Chinese alchemical processes are narrated in the next chapter where we consider the transmutation processes of the Sanskrit test Rasārṇavakalpa.

The Golden Period of Chinese Alchemy

The centuries between 400 to 800 AD were the golden period of Chinese alchemy. We find great alchemical activity during this period. Alchemy received support from the emperors of this age, i.e., of the Jin and Tang dynasties. It is important to note that this period includes a greater part of the Tang dynasty when the Sino-Indian contacts were at their peak. Travels by the Buddhists between India and China and translations of Buddhist texts into Chinese were maximum in the Tang dynasty. References to transmission of philosophic as well as scientific ideas are found in the texts written during these centuries.

The most celebrated alchemist of the fifth to sixth century AD was Tao[18] Hong-jing (456 AD to 536 AD). He was a great physician and a pharmaceutical naturalist. In his time Liang Wu-di,[19] a devout Buddhist, was the emperor. He took keen interest in Tao Hong-jing's preparations of elixirs. Being a pharmaceutical naturalist,

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[18] 陶弘景

[19] 梁武帝

his elixirs were simpler and safer for administration. In all probability he was subliming chlorides of mercury at the end of the fifth century AD and knew about its germicidal properties.

The alchemical tradition continued through the disciples of Tao Hong-jing, like Wang Yuan-ji[20] and his disciple Pan Shi-cheng.[21]

Sun Si-miao and His Alchemy

The next prominent figure was Sun Si-miao (between 531 to 682 AD). He wrote the text Tai-qing dan-jing yao-jue[22] (Essentials of the elixir manuals for oral transmission).

In ancient texts Sun Si-miao had read about "men taking elixirs and sprouting feathers whereby they rose weightlessly in flight." These accounts made Sun desirous of these elixirs and he made some himself. He calls the

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20 王遠知

21 潘師正

22 太清丹經要訣

art of alchemy a minor art, Shao Dao. He admits to having personally tried several alchemical formulae and assures of their efficacy. He also comments,

> That devotees of the refining art have had no prospect of success, is surely not because of the ancients have spoken deceiving words! It must be that students of the way themselves have been unable to reach the essential meanings.

In this text Sun Si-miao has given a list of some thirty-four elixirs. Some of these are: Grand purity elixir, Pale moon elixir, Nine cycle elixir, Divine dragon elixir, etc. He does not wish to let the public know about their methods of preparation, but only to the right persons. Hence he has only listed the names and not the methods.

A method of preparation of a Six-one lute, which is used in making the crucible airtight, is given in this text. It has the following ingredients:

1. Arsenolite.[23]
2. Red bole clay.[24]

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[23] 雄黄石

[24] 赤石脂

3. Shell of a left-oriented oyster - Kalinite[25] $KAl(SO4)_2\ 12\ H_2O$.

4. Talc[26] - $3\ MgO.\ 2\ SiO_2.\ 2\ H_2O$.

5. Turkestan Salt[27] - Impure NaCl.

6. Lake salt[28] - $Na_2CO_3.\ NaHCO_3.\ 2\ H_2O$.

This Six-one lute is applied over the crucible and which is rendered airtight by this method and the reactants are not allowed to escape by volatilisation.

Sun adds that there are some who foolishly employed earthworm excreta qui-yin-fen,[29] but he himself considers it unnecessary. Sun has dealt with a number

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25 左壳 牡虫粪

26 滑石

27 戎盐

28 滷 鹵戚

29 蚯 虫引 粪

of metallurgical processes such as purifying brass, paktong (Bai-tong),[30] and making jade, pearls and fixing mercury.

Sun has given a method for counterfeit Indigo as well. He describes the construction of apparatus to be used in these chemical processes with detailed measurements of the reaction vessel and the furnace.

Commenting on the development of alchemy in this period, Needham writes:[31]

> The time between Ge Hong and Sun Si-miao was an important period in alchemical development. Beginning from Ge Hong alchemical writings became less theoretical, developing finally into the lucid, practical style of the "Dia-jin shi-bi-ji" and the "Dan-jing Yao-jue." However after the time of Sun Si-miao, many of the alchemical writers gradually returned to the fashion of using obscure synonyms, perhaps because of the alarm caused by many cases of elixir-poisoning and the desire that those without proper guidance should be desuaded from trying out alchemical experiments by themselves. Increased attention to the use of vegetable material and plants in alchemical processes can be seen in the treatise "Shun yang zhen-fen[32]

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[30] 白鋌

[31] Needham, Joseph (1), Vol. 5, Pt. III, pp. 138-139.

[32] 孙思邈真人药石制

yao shr zhi' (The adept Shun-yang's book on preparations of drugs and minerals). During and after the ninth century AD, there seems to have been a general trend in alchemical writings from originality to compilation, from clarity in style to obscurity, and from proto-chemical techniques to psycho-physiological exercises (Nei Dan).

Alchemy in Tang, Song and Ming Dynasties

Tang dynasty emperors Gao Zong[33] (650-684 AD) and Xuan Zong[34] (713-756 AD) were interested in alchemy and especially patronised the elixir alchemy. From the beginning of the ninth century a number of Tang emperors, namely, Zian Zong[35] (806-820 AD), Mu Zong[36] (821-824 AD), Jing

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33 高宗

34 玄宗

35 憲宗

36 穆宗

Zong[37] (825-826 AD), Wu Zong[38] (841-846 AD) and Xuan Zong[39] (847-859 AD) died of elixir-poisoning. For this reason, elixir-alchemy received a setback in China. As a result, though Song emperors were devoted to Taoism and were interested in alchemy, elixir-alchemy more or less came to an end in Song times. Alchemy in its metallurgical aspect continued to be practised.

In the Song dynasty (960-1126 AD) there lived an alchemist Wang Jie[40] (980-1020 AD). He was a distinguished metallurgist and was successful in making a number of gold-like alloys. He learned his art from a Taoist whom he met in Mao Shan (the mountain Mao) which was a famous centre of Taoist Techniques. He used iron, mercury, certain plant and various chemicals in his

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37 苟崇

38 武崇

39 玄崇

40 王 揆

methods. The gold he made was brilliant and glittering. It is interesting to note that, though Wang Jie was an eminent metallurgist-alchemist, he had nothing to do with the Taoist's elixirs. One more name we come across, another Song alchemist, was Lin Chi-chang,[41] who made artificial gold using mercury.

The lure of elixir-alchemy had not been completely eradicated from the minds of people and once in a while we come across mention of it in the Song history, as in the case of Li Shao-yun[42] (1111 AD) whose elixir-formulae were like that of Wei Bo-yang, but with more details and precise statements of weights and measures.

On the whole we find that the Chinese were more interested in synthesizing elixirs of life than in gold-making. It is probably due to the deep-rooted Confucian morals that the Chinese refrained from practising the art of the "yellow and the white". Confucianism laid more stress on the just and harmonious social relationships. It encouraged the study of classics. Confucius (551-479 BC)

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41 劉知常

42 李少雲

was convinced that man's affairs can prosper only when they are in harmony with the moral nature of the world and that, for the well-being of the family and the society, human beings must adhere to the principles of an ethical conduct. In this way, though Confucian ideas are basically rationalistic and they opposed superstitions, they did not give thought to Nature and Natural Phenomena as the Taoists did. The Confucians[43] condemned the Taoist practice of leaving one's parents, wife and children to go alone in search of immortality. Confucians regarded the alchemical practice as a dangerous diversion from man's earthly duties. On the contrary, the Taoists were concerned with observations of nature.

The Taoist adepts practised this art for the relief of the poor.[44] The knowledge was only to be passed to the right persons, who will not use it towards selfish ends. Thus we observe that though Taoist ideas were pro-scientific they also had the Confucian morals embedded in them.

In the beginning of the ninth century two important chemical texts were written. They comprised of

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[43]Needham, Joseph (1), Vol. 5, Pt. II, p. 111.

[44]Note that the attitude of the Buddhist toward alchemical practice was identical. We will discuss the Buddhists' interests in alchemy in the chapter on Transmission of alchemical and chemical ideas between India and China.

the lists of chemical substances known until that time. Synonyms of various substances were also listed. One was Shi-yao er-ya[45] (Synonymic dictionary of minerals and drugs) written by Mei Biao[46] in AD 806 and the second was Qian-gong jia-geng zhi-bao ji-cheng[47] (Complete compendium on the perfected treasure of lead, mercury, wood and metal) compiled by Zhao Nai-an[48] in AD 808. In AD 870 the first scientific book was printed and it was on alchemy. It was written by a certain He Gan-ji.[49]

The Northern and the Southern schools of Taoism come up in the eleventh and twelfth centuries. The founder of the Southern school, Liu Cao,[50] was interested in

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45 石藥爾雅

46 梅彪

47 鉛汞甲庚至寶集成

48 趙耐菴

49 紇干泉

50 劉操

physiological alchemy. His disciple Zhang Bo-duan[51] wrote the book Wu-zhen-pian[52] (Essays on realizing the necessity of regenerating the primary vitalities). The Northern school, however, advocated the Nei pian or esoteric philosophy and self-cultivation.

On the whole, alchemy declined during Yuan, Ming and Quin dynasties. A revival, to a small extent, was brought about by some of the Ming emperors.

Zhu Quan, the son of Zhu Yuan Zhang,[53] (1328-1398 AD), founder of the Ming dynasty,[54] wrote several treatises on various subjects such as history, poetry, drama, music, astronomy, medicine and alchemy. Li Shi-zhen,[55] author of the well-known pharmacopoeia

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51 張伯端

52 悟眞篇

53 朱元璋

54 朱權

55 李時珍

Ben-cao gang-mu[56] mentions an alchemical work by Zhu Quan, viz. Geng-Xin Yu-ce[57] (Precious secrets of the realm of Geng and Xin, i.e., metals and minerals). It quotes from various other texts written in a century or two earlier. They are:

1. Wai-dan ben-cao[58] by Cui Fang[59] of eleventh century AD.

- Pharmacopoeia of operative alchemy.

2. Zao-hua zhi-nan[60] by Tu-xiu Zhen-jun[61] of fourth century AD.

- Guide to creation.

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56 本草綱目

57 庚辛玉册

58 外丹本草

59 崔昉

60 造化指南

61 土岩真启

3. Dan-fang jian-yuan[62] by Du-qu Tao[63] of tenth century AD.

- A mirror of alchemical processes, a source book.

4. Bao-Zang-Lun[64] by Xian-yuan Shu[65] of eleventh century AD.

- Precious treasure of the earth.

5. Dan-dai[66] lu by Qing Xia-Zi.[67]

-Discourse on the alchemical laboratory.

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62 丹方鑑源

63 獨孤滔

64 寶藏論

65 軒轅述

66 丹臺錄

67 青霞子

Li Shi-zhen tells us that Geng-Xin Yu-ce included a total of 541 items listed under seven sections, viz. (a) metals and inorganic substances, (b) "numinous" sprouts (ling-miao), (c) plants with active principles of remarkable properties, (d) feather and hair, (e) carapaces and hides, (f) edible and potable substances and liquids, and (g) iatrochemical and alchemical apparatus and that the material came from the above-mentioned texts, most of which are extinct now.

Fragments of Geng-Xin Yu-ce are found in Ben-cao gang-mu and some Japanese works of seventeenth to eighteenth century AD. Zhu Quan has classified minerals and plants in the Yin and Yang categories. He also gives a comprehensive list of plants which are metal-indicators.

This is the last of the alchemical texts of its kind in medieval China. During the Qing dynasty the alchemical texts only dealt with physiological alchemy, though aurifaction had not completely disappeared.