

JAINA ALCHEMY*

J. C. SIKDAR

L. D. Institute of Indology
Ahmedabad 9

(Received 21 February 1978)

The Jaina alchemical thoughts and practices from the time of the *Jainācāryas*—Nāgārjuna and Pādaliptasūri up to the eighteenth century A.D. reflect an aspect of the material culture of the Jainas with scientific ideas on *Rasāyanaśāstra* and *Dhātuvidyā* (chemistry and metallurgy).

A study of the extant Jaina manuscripts—*Suvarṇaraupyasiddhishāstra* of Jina-dattasūri (VS. 1210) with some additional alchemical informations of the iatro-chemical period, *Rasaratnasamuccaya* of Mānikyadevasūri (sixteenth century A.D.), *Yogaratanākara* Copai of Nayanaśekhara (VS. 1736 = 1679 A.D.) *Vaidya-vallabha* of Hastirūci (seventeenth century A.D.), *Nāgārjunividyā* (16th-18th A.D.), etc. reveals two distinct trends in Jaina Alchemy—(1) chemistry and metallurgy and (2) medical science, together with some informations on occultism.

During the period of the authors of these MSS. with its system of philosophy of mercury a vast mass of chemical informations accumulated in them was pressed into signal service in the iatro-chemical period of India (1300-1550 A.D.).

Western India, by virtue of its geographical position as a centre of Jainism, was a receptacle for many alchemical ideas from other Indian culture-areas.

In the Jaina MSS. some metals and plants are identified with some code names, e.g. mercury with *dhamma* (virtue), gold with *mangalam* (auspiciousness), etc. The research to make gold was continued by the Jaina and other Indian alchemists throughout the Middle Ages together with the studies dealing with industrial process, especially, metallurgy and the manufacture of drugs.

The prominent feature of Jaina Alchemy lay in the search after the elixir vitae. In short it has dealt with the mineral kingdom *rasas* (minerals), *uparasas* (inferior minerals), *ratnas* (gems) and *lohas* (metals), mercury, the construction of apparatus, the mystical formulae for purification of metals, extraction of essence, liquefaction and incineration of metals, etc. The virtues of mercury are commended as a remedy to make men free from a multitude of diseases.

*Paper presented in National Seminar on "Technology and Science in India during 1400-1800 A.D." held at Indian National Science Academy, New Delhi, April 20-21, 1978.

INTRODUCTION

The Jaina alchemical thoughts and practices fostered from the time of the *Jainācāryas*—Nāgārjuna¹ and Pādaliptasūri² up to the eighteenth century A.D. throws an welcome light upon an aspect of the material culture of the Jainas with scientific ideas combined with their interpretation in the light of other Indian literary evidences on *Rasāyanavidyā* (chemistry) and *Dhātuvāda* (metallurgy) and *Ayurveda* (medical science) of the Middle Ages. Jaina Alchemy has not yet been evaluated in relation to the Indian history of Alchemy. It seems that Western India (Rajasthan and Gujarat)³, by virtue of its geographical position as a strong centre of Jainism from the beginning, was a receptacle for many alchemical ideas, specially from other culture-areas of India.

It may be, as pointed out by Subbarayappa, that India, by virtue of its geographical position, was a receptacle for many alchemical ideas from the Chinese and the Arabic Culture-areas⁴ in later period.

A study of the extant Jaina manuscripts—*Suvarṇarāupyasiddhīśāstra*⁵ of Jinadattasūri (VS. 1210) written in Sanskrit, Prakrit, Apabhraṃśa and Old Gujarati, copied with additional materials in the eighteenth century A.D., *Nāgārjunī Yogamāllāvṛtti* of Guṇākara⁶ (VS. 1296) in Sanskrit, *Rasaratnasamuccaya*⁷ of Māṇikyadevasūri (sixteenth century A.D.) in Sanskrit, *Yogarātnākara Copai*⁸ of Nayanāśekhara, a pupil of Jñānaśekhara (VS. 1736 — 1679) in old Gujarati, *Nāgārjunīvidyā* (16th-18th A.D.)⁹, *Vaidyakasāra Saṃgraha*¹⁰ of Harṣakīrti (VS. 1660-1603) in Sanskrit, *Pāradavidhī*¹¹ of an unknown Jaina author (circa VS. 1700) in old Gujarati, an unnamed MS¹² of the eighteenth century A.D. on venereal diseases in old Gujarati, *Vaidyavallabha*¹³ of Hastirūci (VS. 1710 — 1763 A.D.) in Sanskrit and Gujarati *Ṭikā; Anupānamañjarī*¹⁴ of Pītāmbara (VS. 1873) in Sanskrit and old Gujarati, and now all kept in the library of L. D. Institute of Indology at Ahmedabad reveals the scientific ideas and practices of the Jainas with two distinct trends in Jaina Alchemy, viz. (1) chemistry (*rasāyanavidyā*) and metallurgy (*dhātuvidyā* or *dhātuvāda*) and medical science (*vaidyakaśāstra*), together with some informations on occultism.

ALCHEMY

It appears that during the period of the authors of the above mentioned Jaina MSS. with its system of philosophy of mercury a vast mass of chemical informations was accumulated in these treatises on *Rasāyanavidyā* and *Dhātuvidyā*, which was pressed into signal service in the iatro-chemical period of India (1300-1550 A.D.)

A comparative study of the Jaina MSS with other Indian works on *Rasāyanavidyā* and *Dhātuvidyā* shows that since the second century A.D. Indian alchemists were endeavouring to make gold¹⁵. The research to make gold was continued by them throughout the Middle Ages together with studies dealing with industrial processes, especially metallurgical processes¹⁶, and with the manufacture of drugs¹⁷,

In the course of researches of the Indian alchemists many important chemical discoveries were made by them¹⁸.

During the Middle Ages an extensive system, in part secret, of code names¹⁹ or symbolic letters²⁰ or names, for chemical substances was developed by the *Jainācāryas*. Toward the end of the eighteenth century A.D. the Jaina alchemists began to make use of initial letters of the names of elements and compounds instead of older symbolic names, e.g. *hā* = *hāṭakaṃ* (gold),²¹ '*ra*' *iti* = *pāro* = *rasa* (mercury), '*kha*' *iti* = *kharpara* (mineral calamine), '*ma*' *iti* = *manahśala* = *manahśila* (realgar), *ṣeti* = *ṣamkaṇa* (borax), *heti* = *haratāla* (orpiment).²² A parallel development of alchemy was going on in the western world (Greek-Arab countries) during the Middle Ages. It is stated that "In a manuscript written in Greek in the tenth or eleventh century and now kept in St. Mark's library in Venice, the work of an Egyptian alchemist (the early chemists were called alchemists) perhaps of the second century A.D. is described. In this manuscript seven metals are identified with seven celestial bodies—gold with the Sun, silver with Moon, lead with Saturn, iron with Mars, copper with Venus, tin with Mercury, and electron (an alloy of gold and silver) with Jupiter. These signs conventionally used for the bodies were used for the corresponding metals. Other symbols were also used, thus the symbol for iron was a complex symbol containing the symbol for iron.

The second century-alchemist whose work is described in St. Mark's manuscript was endeavouring to make gold. The endeavour to make gold was continued by alchemists throughout the Middle Ages together with studies dealing with industrial processes, especially metallurgical processes and with the manufacture of drugs. In the course of the early works of alchemists many chemical discoveries were made.

During the Middle Ages an extensive system, in part secret, of symbols for chemical substances was developed. Toward the end of the eighteenth century A.D. the chemists began to make use of initial letters of the names of elements and compounds, instead of the older symbols. Berzelius then systematized this procedure and his scheme was soon adopted by all chemists²³.

In the aforesaid Jaina MSS. Jaina Alchemy is described in detail and some metals and plants are identified with some code names²⁴, e.g. mercury with '*dhamma*'²⁵ (virtue), gold with *maṅgalaṃ*²⁶ (auspiciousness), the Nepalese copper with *ukkiṭṭham*²⁷ (best), *Kantheri* (a piece of opuntia) with '*ahiṃsā*'²⁸, red *Agastia glandiflora* (or *Sesbania glandiflora*) with '*saṃjamo*'²⁹ (self-control), black *kanaka* (*dhatūra* = thorny apple) with '*tavo*'³⁰, yellow *Andropogon serratus* '*pīli devadāli*' with '*devā*'³¹ (gods). Besides there are found other symbolic names for metals, e.g. *pitam*³² (gold), *tāram*³³ (silver), *śvetaṃ*³⁴ (silver), etc. on the basis of their colour.

The prominent feature of the Jaina works on alchemy lay in the search after the elixir vitae and the powder of projection as their contents testify³⁵, whereas fantastic and extravagant ideas in them, such as capacity, of becoming invisible,³⁶ impossible of realization, had subsided into something more practical and tangible.

The numerous preparations of mercury³⁷, iron,³⁸ copper,³⁹ gold,⁴⁰ silver,⁴¹ and other things⁴², although they could not secure immortality or revive the dead, were to be helpful accessories in medicines. At first they came to be used cautiously and tentatively, mixed up with the medical recipes which were drawn chiefly from the vegetable kingdom but they soon began to assert a supremacy of their own even to supplant the old Indian Āyurvedic treatment by herbs and simples.⁴³ Nay, even absurd pretensions were set up on behalf of these metallic preparations.⁴⁴ Thus here we come across some remarkable passages in the Jaina MSS. "*Amara Kāyā Kare*"⁴⁵, etc.

The one characteristic feature of the period of the extant Jaina MSS. is that opium (*aphīna*)⁴⁶ is recognised as an official drug in their materia medica portion. This usefulness of opium may be found from the middle of the eighteenth century A.D., as it is also mentioned as such in other Indian works⁴⁷ on *Rasāyanavidyā*. But the Jaina authors are inevitably quite in the darkness as to the origin of opium, for nothing is said about its origin.

Whatever has been revealed by an analysis of the materials in the Jaina MSS. under the preparations of mercury all that has been said by Nāgārjuna,⁴⁸ Pādalip-tasūri,⁴⁹ Carpaṭa⁵⁰, Nātha⁵¹ and other alchemists⁵² for the benefit of the people afflicted with diseases. A similar account of the preparations of mercury for the benefit of the people afflicted with diseases is given in other Indian works⁵³ on *Rasāyanavidyā* with reference to Nāgārjuna and Siddha Carpaṭa. There is a problem for the scholars to identify the Buddhist and Jaina Nāgārjunas with the great legendary Indian Alchemist Nāgārjuna and to determine his date in the history of Indian Alchemy.

The extant Jaina works on alchemy as mentioned in the beginning are important treatises of the iatro-chemical period of India like other Indian works⁵⁴ on the same problem. They are comprehensive and purely chemical works dealing with many operations on mercury⁵⁵ and various chemical processes⁵⁶ are incidentally described, a good deal of which, however, overlap each other, as they are found in other Indian works⁵⁷ on alchemy in the Middle Ages.

The authors of the extant Jaina MSS as devout Jaina monks, begin their works with an adoration of Gautama,⁵⁸ Gaṇeśa,⁵⁹ and the Tirthāṅkara Mahāvīra⁶⁰ and even symbolize Mahāvīra with mercury, as Śiva is symbolized with mercury⁶¹ in the Hindu Alchemy.

It appears that the entire series of the Jaina treatises on alchemy is a composition and epitome based upon some standard works on the subjects—chemistry, metallurgy, medicine and occultism and the contribution of the adepts.⁶² It is interesting to note that some Jaina alchemists declare their indebtedness to the previous *Ācāryas* like Nāgārjuna,⁶³ Pādaliptasurī,⁶⁴ Carpaṭa,⁶⁵ Nātha,⁶⁶ Sekham Ali⁶⁷ and others⁶⁸ for a knowledge of certain processes of alchemy as is found in the case of other Indian works⁶⁹ on alchemy. This seems to indicate that the cultivation of alchemy and chemical knowledge among the *Jainācāryas* became neglected at certain period of Indian history of alchemy and almost forgotten and the earnest research into the lore of alchemy had to be made during the time of the Jain alchemists of the iatro-chemical period as was the case with the authors of other Indian works on *Rasāyanavidyā* on this problem.

The peculiarity of the Jaina works⁷⁰ of the iatro-chemical period on alchemy is this that they are based upon the Indian *Āyurvedas*⁷¹ on the one hand and the Indian Tāntric chemical treaties⁷² on the other. It appears from the study of the contents of the Jaina works on alchemy in comparison with those of other Indian works on alchemy that the Jaina works are more or less a compilation based on many other Indian works⁷³ of the Tāntric period on the same problem or there might have been a common Indian source of alchemy from which all the Indian schools of alchemy might have drawn their respective alchemical informations.

Jaina alchemy as found in the extant Jaina MSS. has dealt with the mineral kingdom—*rasas*⁷⁴ (minerals), *uparasas*⁷⁵ (inferior minerals), *ratnas*⁷⁶ (gems) and *lohas*⁷⁷ (metals).

Rasas (minerals) are *abhraka* (mica), *vaikrānta*, *mākṣika* (pyrites), *vimala*, *śilājatu*, *adrija* (bitumen), *sasyaka*, *capala* and *rasaka*; while *uparasas* (inferior minerals) are *gandhaka* (sulphur), *gairika* (red ochre), *kāsisa* (sulphate of iron), *tuvarī* (alum), *tālā* (orpiment), *manaḥśilā* (realgar), and *añjanas* (collyrium). Besides there are mentioned some other common *rasas*, such as, *navasāra* (sal-ammoniac), *hiṅgula* (cinnabar, *Syñ darada*), etc.⁷⁸

The gems are *vajra* (diamond), *mauktika* (pearl), etc.⁷⁹

Six metals⁸⁰ are recognized at the outset, viz. gold (*kāñcana*, *suvāṇṇa*, *pīta* or *hema*), silver (*tāra* or *raupya*), copper (*tāmra*), lead (*sīsa* or *nāga*), tin (*vaṃga*) and iron (*loha*). It is interesting to note that there is mention of zinc (*jasta*).⁸¹

Later on eight metals⁸² are named including two alloys—brass (*pīṭal*) and bell-metal (*kāṃṣa*). The Jaina works on alchemy deal with mineral preparations in detail⁸³. They are also devoted to the short processes of killing metals⁸⁴ and minerals⁸⁵ as they are treated in other Indian works⁸⁶ on *Rasāyanavidyā*.

They give an account of the processes for the preparation of mineral acid by distillation of which the Jaina alchemists name *śamkhadhava*,⁸⁷ ash of bone of the neck of camel⁸⁸ and bone-ash of a boar.⁸⁹ They are described as substances endowed with the property of dissolving metals.⁹⁰

Besides some distilling apparatus have been mentioned in the Jaina alchemical works as they are found in other Indian alchemical works, e.g. *Dolikāyantra*⁹⁰, *Vālukāyantra*⁹¹, etc. In short they have treated mercury, minerals and metals, the construction of apparatus, the mystic formulae for the purification of metals, the extraction of essence, liquefaction and incineration of metals, etc. The virtues of mercury are commended in the Jaina works on alchemy that men are freed from a multitudes of diseases by partaking of medicines prepared with mercury. There is an important reference to harmless birth control⁹², if old ghee (clarified butter) is taken by the woman during her menstrual period. The final phase of Jaina alchemy as found in the Jaina MSS, on alchemy is characterized by the fact that over and above opium, some other foreign drugs were incorporated into its pharmacology as is evidenced in other Indian alchemical works. It is a well known historical fact that the Portuguese had fairly established themselves at Goa and some other parts of India by the beginning of the sixteenth century A.D.⁹³ "As a result of intercourse of India with them that dreadful scourge—the venereal disease—syphilis made its appearance"⁹⁴ in India.

Syphilis (*phiringī-* or *phiraṅgiroga*)⁹⁵ as mentioned in Indian alchemical works⁹⁶ of the period "had now to be reckoned with and a *new name* had to be coined for it".⁹⁷

The Jaina MSS. *Suvarṇarāyppya-siddhiśāstra* and *Vaidyakasaṅgraha* prescribe calomel (*rasakarpura*)⁹⁸ (or *revamcini*)⁹⁹ and *Marahaṭṭi* (*Chobchini*=*Cababchim*=china root, *smilax china ciniakapūra*)⁹⁹ for what is termed for the first time as *phiraṅgiroga* or the disease of the Portuguese. "The use of this drug as a remedy for syphilis, it is believed, was made known to the Portuguese at Goa by the Chinese traders about A.D. 1535"¹⁰⁰.

Both opium¹⁰¹ and mineral acids¹⁰² are prescribed for many diseases. The Āyurvedic method of treatment has been described in the Jaina works in detail as is evidenced in ample citations¹⁰³ as given from the Indian Āyurvedic works¹⁰⁴. Some portions of the Jaina alchemical works have particularly been devoted to mineral preparations¹⁰⁵ but it seems that they have been borrowed chiefly from some Indian works. The Jaina alchemical treatises have dealt with the preparations of medicinal tinctures¹⁰⁶ and prescribed mercury treated with some other minerals as the remedy for many diseases¹⁰⁷ as is found in *Arkaprakāśa*¹⁰⁸.

As regards occultism it has been claimed by the Jaina alchemists that a flowing river with full flood-current can be crossed by walking on it with the power of some *guṭikās* specially prepared by them¹⁰⁹.

One can alone win over 1000 soldiers¹¹⁰ by keeping with him a *guṭika* prepared with mercury and the head of a dead brave soldier in the battle field, etc. One can overpower a woman or man by *Vaśikaraṇavidyā*¹¹¹, etc. The main objective of Jaina Alchemy was to show the way for the destruction of all sins, poverty, disease and old age.¹¹²

Some examples of chemico-metallic processes, diseases and medical recipes, and processes of occultism are given below to throw some light on Jaina alchemy.

The processes of making gold, silver, iron, copper, mercury and pearl

- (1) Mercury is killed with the juice of thorny apple (*dhaturā*), gold with that of red *Sesbania glandiflora* and the Nepalese Copper with that of *Capparis sepiaria*. Having rubbed these three elements—mercury, gold and copper with the juice of yellow *Andropogon serratus*, the essence of these, weighing one *guñja*, should be mixed with copper (melted) weighing one *tolā*. There will be an accomplishment of the process of making gold.¹¹³
- (2) Mix up alum (*hāṭephuli*) and oyster shell (*vāṭephuli*) and give 12 parts of *Tanak-Toḍī* (a kind of solid earth) into *rāṅg* (a kind of tin) and heat them up. *Carpata* makes the magic performance of the process of making silver.¹¹⁴
- (3) Melt *somala* (oxide of arsenic) *māsā*-1 zinc-*māsa* 1, borax *māsā* 2, copper-*māsā* 4, in an open crucible. Their lump (*dalaṃ*) is made. Quench the leaf of good iron in the stool of cock-*vāla* 14 in an open crucible, in molasses (*gola*)—(*vāla* 14) and sal-ammoniac (*vāla*-14). Iron is produced by putting the leaf inside.¹¹⁵
- (4) Wash the earth of earth-worm and take out the stone out of it, later on, make powder of the wing of a peacock by cutting it, put this powder into cowdung and get it dried up in the shade, next put it into an earthen jar and seal it up with *chāli* (bark) and put it on fire; give fire to it. When it is burnt, take out the whole thing, take out the stones by washing the ash. Mix up the stone of the previous earth with it, next melt them. Copper will come up.¹¹⁶
- (5) Take out the juice of grapes, again take out its spirit (*tejāb*). Smear the leaves of mica with that *tejāb*. After their drying up, tap the leaves of mica, 5 or 7 times by smearing and smearing the leaves of mica. Thus mercury comes out of mica. This is called marvellous mercury.¹¹⁷
- (6) Take silver with equal portion of *Śvetakāca* (white glass) and gold-1/100th part of *Śvetakāca*. There becomes pearl by the chemical process of mixing them together.¹¹⁸

THE PROCESS OF KILLING METALS

Metal is killed by orpiment oil. Take 1/4th of orpiment and ½ pai of sal-ammoniac, crush them together, put the whole thing into a bottle and put it into a *Tikalīyantra*. Oil comes out of it. All metals get killed by orpiment and realgar (SRSS. Ch. V. 1.)

The Killing of Mercury

- (1) Rub mercury with the juice of *Euphorbia pilulifera* (*Nagārjūni*) for a day, put it on fire and reduce it to paste for 7 *praharas*, go on putting juice, mercury is killed.
- (2) Give *Samkhadhava* into mercury by making powder of it. It also kills mercury (SRSS. Ch. 4. 21, 10.6)

EXAMPLES OF SOME MEDICAL RECIPES

(1) If *añjana* (collyrium) is made with *lavaṅga* (*Caryophyllus aromaticus*) and lemon, all the diseases of the eye go away, give *parati* (*anupāna*) with honey, (SRSS. 7-2) *Mūtra kṣchatā* (scanty urination) stops also with this medicine. If *lavaṅga* with ghee *rati* 2 is given to a patient in the case of *Jholo* (a kind of disease), it goes away (ibid).

(2) *Leucoderma*—its remedy. Drench *amlā-pai*. 1½, and Sulphur, umtin and *Janāvādī-pai* in the juice of lemon for 3 days. Eczema, leucoderma (*karolia*) and other skin diseases will disappear (SRSS 8-16).

(3) All *Chāndās* (blisters) and their remedies: Fry onion and leaves of neem, melt them in ghee, put into it *rāla* (*resin*) 9, wax 9. Wash the ointment with water 7 times. All *Chāndās* go away by its application (SRSS. 9-63) (*sarvacam dā-mātra jāi*).

(4) Grind *Sābarasing* and powder it, put honey into it. Heat the ointment combined with neem and onion with honey, put the medicine into the sceptic ulcer by gently rubbing it. Sceptic ulcers will be cured within 7 or 21 days (SRSS. 9-64)

(5) Rub pure mercury ¼ *tolā* in a mortar in oil—8 *tolās*, produced from the seed of black *dhatūrā* for seven days till there becomes the best form of mercury like leech.

First mix it up with the powder of *Phaseolus radiatus* (*māṣa*), then wrap it up with a strong thread. Dry it up with the sunrays to make the plaster of it thick like the small finger, dry it up again in the sunrays. When it gets dried up well, then cook it in mustard oil measuring 8 kgs.; all oil gets burnt up till *guṭikā* is formed, place it in a cool shade, then slowly take the accomplished *guṭikā*.

Next put the *guṭikā* into a strong jar filled with milk, when milk gets dried up, take out the *guṭikā*, put it into the mouth of a he-goat. As soon as that *guṭikā* enters into its mouth, it is seen as burning. It really excites sexual desire but it does not affect the balance of health of its body when it enters into its stomach. It gives a sense of love. An intelligent man must test the *guṭikā* and that a healthy man should put into his month. With the power of it a *sādhaka* (practiser) goes to one hundred *yojanas* without an exertion and can enjoy one hundred women. If it is kept into one's mouth, the striking from others on his body is not felt. The *guṭikā* kept into the mouth kills many other kinds of diseases.

It destroys (cures) all those diseases which are found in between the tongue and the palate (*tālu*), such as, *kaṅṭhasāluka* (a kind of mouth disease in throat), etc., two tongues etc., which are too serious, seventy-six kinds of diseases—heart diseases, nasal diseases, etc. (SRSS. 14-1).

SOME EXAMPLES OF OCCULTISM

Take black *Sarma* 1 (Sulphurate of antimony), flesh of boar (pork = *suhara-māsa*) 1, placenta of she-elephant 1, and placenta of black, she-cat 1. Rub them together, cover (wind up) them up with *aṣṭaloḥa* (eight kinds of metal-gold, etc.), i.e. put them into a *māduli* of *aṣṭaloḥa* (iron, lead, tin, copper, bell-metal, brass, silver and gold). If one puts it on, he becomes invisible. There is no doubt here. (SRSS. Ch. VI-13).

Make a ball out of the stool of *makarī* (she-crocodile), *gōrocanā*, stool of *vāgoli* (bat), *śivanirmālya* (sacred leaves and flowers need in the worship of Śiva), *śilārasa* (liquid storax), ash of *bahedā*. Let the lady smear, the mixture into the vagina herself. Husband is enchanted. He will not desire for other women (SRSS. Ch. XI.2).

Take jasmine's root during a solar eclipse of eastern side, being naked, while the eclipse is taking place. Rub *sāthī* rice with water. Sprinkle this thing on a woman, she becomes enchanted (*vaśī*). Take it in *ūṣara* of eclipse, i.e. when the eclipses is coming to an end. She is released by that (SRSS. ch. XI. 4).

The brief outlines of Alchemy thus give a glimpse into the picture of Jaina Alchemy in the Iatro-chemical period.

REFERENCES

¹ *Suvarṇaraupyasiddhiśāstra*, Jinadattasūri, ch. 1. 60.

² *Ibid.*, Ch. II. 4.

³ All the available Jaina MSS. on alchemy have been found in this region and they are written in Sanskrit, Prakrit, Apabhramśa, Old Gujarāti, and sometimes in Old Rājasthani.

⁴ Some trends in Alchemy in India, Dr. B. V. Subbarayappa, Abstracts of Scientific Sectionpapers, XV International Science Congress, Edinburg, August 1977, p. 48.

- ⁵ It is the work of Jinadattasūri (VS. 1210) belonging to the *Kharatara gaccha*.
- ⁶ It is also kept in the library of L. D. Institute of Indology, Ahmedabad.
- ⁷ Ibid.
- ⁸ Ibid.
- ⁹ Ibid.
- ¹⁰ Ibid.
- ¹¹ Ibid.
- ¹² Ibid.
- ¹³ Ibid.
- ¹⁴ Ibid.
- ¹⁵ *Suvarṇaraupyasiddhiśāstra*, ch. II, 1, 2, 4, 6, 8, 14; III. 1, 4, 6, 7, 9, 52, 53, 105, 103, 109; IV. 4, 5, 12, 15, 17, 18, 19, 25, 29, 40.
- ¹⁶ Ibid., Chs. 1-14.
- ¹⁷ Ibid.; 9, 10, 14.
- ¹⁸ Preparation of gold, silver, iron, copper, mercury, etc.
- ¹⁹ *Suvarṇaraupyasiddhiśāstra*
- ²⁰ Ibid., ch. II. 7, ch. III. 1.
- ²¹ Ibid.
- ²² Ibid.
- ²³ General Chemistry, Pauling, p. 82.
- ²⁴ *Suvarṇaraupyasiddhiśāstra*, Ch. II, *Vakhyā* 1.
- ²⁵ Ibid.
- ²⁶ Ibid.
- ²⁷ Ibid.
- ²⁸ Ibid.
- ²⁹ Ibid.
- ³⁰ Ibid.
- ³¹ Ibid.
- ³² Ibid., Ch. II. 1, 2, 4, 6, 8, 14; III. 1, 4, 6, 7, 9, 52, 53, 105, 107, 109; IV. 4. 3, 11, 14, 18, 25; V. 4, 5, 12, 15, 17, 18, 19, 25, 29, 40.
- ³³ Ibid., Ch. I. 10, 17, 21, 23, 42, 47, 50, 52, 53x; II. 7, 10; III. 6, 9, 10, 12, 18, 19, 44, 54, 56, 69, 71, 85, 104; IV. 2, 4, 13, 16, 19, V. 2, 33; VI. 5; IX. 33, 39; X. 5, 42; XI. 1.3, 15, 34, 35; etc.
- ³⁴ Ibid., cg. I. 27, 35; II. 15; III. 8, 11, 23, 24, 26, 29, 30, 31, 45, 67; IV. 8, 9, 16, 17; V. 21, 34; VI. 11, 36, 41; VII. 7, 11, 23; VIII. 5, 7, 7; IX. 1, 12, 13, 16, 35, 42, 56, 57; X. 1, 5, 37, 38; IX. 19, 37, XII. 11, 13, 15, 16, 27, 28; XIII. 2, 14, etc.
- ³⁵ SRSS. Ch. IX. 1.
- ³⁶ Ibid. VI. 13.
- ³⁷ Ibid., IX. 5; ch. 1, 56; II. 1, III. 12, 13, 18x, 22, 44.
- ³⁸ Ibid., Ch. IX 11.
- ³⁹ Ibid., II. 1, III. 66x.
- ⁴⁰ Ibid., Ch. II. 2, 4, 6, 8, 14; III. 2, 3, 4, 7, 9, 19, 20, 33, 36, 37.
- ⁴¹ Ibid., Ch. III.
- ⁴² Ibid., Ch. IV. 4, 6; V. 20, etc.; V. 44; IX. 15, 16; IX. 26.
- ⁴³ Ibid., Ch. V. 32, 37, 38; IX. 5, 6; X. 140.
- ⁴⁴ Ibid., Ch. X. 24.
- ⁴⁵ Ibid.
- ⁴⁶ Ibid., Ch. III. 30-31 (*aphiṇa*); VI. 7 (*aphi*); V. 26 (*aphiṇa*).
- ⁴⁷ See *Rasaratnasamuccaya* of Nityanātha, etc.
- ⁴⁸ SRSS. Ch. I. 60.
- ⁴⁹ Ibid., Ch. II. 4 (*Pālitaya Pādalipta*).
- ⁵⁰ Ibid., Ch. I. 24; I. 14, 15, 17, 36, 60.
- ⁵¹ Ibid., Ch. I. 18, 24
- ⁵² Ibid., Ch. II. Sekham Ali (Ch. I. 60) MS.B.

- ⁵³ Ibid *Rasaratnasamuccaya*; etc. Vide *Hindu Chemistry*, p. 159 and *Prācīna Bharat men Rasāyana kā Vikāśa*.
- ⁵⁴ Ibid.
- ⁵⁵ *SRSS.*, Ch. I. 56; II. 7; III. 12, 13, 18, 22, 44; IX. 5, 21, etc. *Rasaratnasamuccaya of Māṅikyadevasūri*.
- ⁵⁶ The chemical processes of making, gold, silver, iron, mercury, copper, killing of mercury, tin, etc., of making medicines. Ibid.
- ⁵⁷ See *Rasārṇava*, *Rasaratnasamuccaya*, etc. Vide *Hindu Chemistry* and *Prācīn Bhārat men Rasāyanakā Vikāśa*.
- ⁵⁸ *SRSS.*, Ch. I. 1.
- ⁵⁹ Ibid., Ch. I. 1. (MS. B).
- ⁶⁰ Ibid., Ch. I. 12, 3, 4, 6.
- ⁶¹ Ibid., Ch. I. 2; *Rasakalpa*, vide *Hindu Chemistry*, p. 156.
- ⁶² There are some references to the inclusion of some additional materials of the later period in *Suvarṇaraupyasiddhiśāstra* and other Jaina MSS. on alchemy, e.g. *phiringiroga*, *phiraṅgivāya*, etc.; besides the mention of chemical formulae of Nāgārjuna, Carpaṭa, Pādaliptasūri, Sekham Ali, etc.
- ⁶³ *SRSS.*, Ch. I. 60
- ⁶⁴ Ibid., Ch. II. 4, See the Second Chapter (comm).
- ⁶⁵ Ibid., Ch. I. 8, 14, 17, 36, 39.
- ⁶⁶ Ibid., Ch. I. 19.
- ⁶⁷ Ibid., Ch. I. 60 (Sekham Ali, MS. B).
- ⁶⁸ *Gaṇḍnu*; Ch. I. 11.
- ⁶⁹ See *Rasaratnākara*, *Rasārṇava*, *Rasaratnasamuccaya*, etc.
- ⁷⁰ *Suvarṇaraupyasiddhiśāstra* *Rasaratnasamuccaya*, *Nāgārjunividyā*, *Pāradavidhi*, etc.
- ⁷¹ See *Carakasamhitā*, *Suśrutasamhitā*, *Kalyāṇakāraka* in regard to *rasaprakaraṇa*. etc.
- ⁷² See *Rasaratnākara*, etc.
- In almost every country the progress of chemistry can be traced back to medicine and a belief in the making of artificial gold by a chemical process or the transformation of base metals into gold as well as to the elixir vitae of life or the philosophers' stone.
- ⁷³ *Rasaratnākara*, *Carapaṭasiddhānta*, *Rasārṇava*, *Rasaratnasamuccaya*, etc.
- ⁷⁴ *Suvarṇaraupyasiddhiśāstra* of Jinadattasūri, *Rasaratnasamuccaya*, etc.
See first *adhikāra* of *Rasaratnasamuccaya*, (beginning).
- ⁷⁵ Ibid.
- ⁷⁶ Ibid.
- ⁷⁷ Ibid.
- ⁷⁸ Ibid.
- ⁷⁹ Ibid.
- ⁸⁰ *Suvarṇaraupyasiddhiśāstra*, Ch. I, *Rasaratnasamuccaya* Ch. I.
- ⁸¹ *SRSS.* Ch. III. 1 (*jasta*); III. 2, 16 etc.
- ⁸² Ibid., Ch. VI. 13.
- ⁸³ Ibid., Ch. I. 7 (*Dhātuvāda*), 1.61; V. 60, Ch. III. 41 (*Hingulavidhi*); III. 9 (*golakaṃ vidhi*); III. 84, (*Khāpariya sattvavidhi*); IV. 23 (*Tālasattvavidhi*); VII. 27 (*abhrakavidhi*); VII. 27 (*Navasārāpāṅiprakaraṇavidhi*), etc.
- ⁸⁴ Ibid., Ch. II. 16.
- ⁸⁵ Ibid., Ch. VII. 27; II. 16; III. 27 (*abhraka*), I. 49; III. 84, 103; IV. 24; V. 1, 2, 24 (*manahsilā*); I. 19, 20, 25, 41, 42, (*gaṇḍhaka*).
- ⁸⁶ *Rasārṇava*, *Rasaratnasamuccaya*, etc.
- ⁸⁷ *SRSS.*, Ch. X. 6; IV. 39.
- ⁸⁸ Ibid., Ch. X. 33.
- ⁸⁹ Ibid., Ch. X. 34.
- ⁹⁰ Ibid. See *Hindu Chemistry*, p. 162 for *Samkhadravaka*.
- ⁹¹ *SRSS.*, Ch. VII. 9; IX. 14; X. 35.

- ⁹¹ Ibid., Ch. VI. 9; IX. 45; III. 36 (*patalayantra*); VI. 10 (*Kavacyantra*), etc.
- ⁹² *Nāgarjunīvidyā*, Ch. I. *gāthā*.
- ⁹³ Ray, P. C., *Hindu Chemistry*, p. 162.
- ⁹⁴ Ibid.
- ⁹⁵ A Jaina MS. of an unknown author of the 18th Century A.D. in the Collection of *Kalyāṇavijayaji*, No. 2095; *Vaidyaka Saṅgraha* in Old Gujarātī in the same collection No. 2093. They throw light on this *phiringiyāta*, and Syphilitic chanchre, etc. and their remedies.
- ⁹⁶ See *Hindu Chemistry*, p. 162.
- ⁹⁷ Ibid.
- ⁹⁸ SRSS. Ch. X. 1; *Vaidyaka Saṅgraha*. First Chapter
- ⁹⁹ Ibid., Ch. VIII. 35; IX. 68.
- ¹⁰⁰ *Vaidyakasaṅgraha*. First Chapter
- ¹⁰¹ *Hindu Chemistry*, p. 162.
- ¹⁰² SRSS. Ch. III. 30-31; VI. 17; X. 26 etc.
- ¹⁰³ Ibid.
- ¹⁰⁴ Ibid., Ch. IX, X, XIV.
- ¹⁰⁵ Caraka, Suśruta, Kalyāṇakāraka.
- ¹⁰⁶ SRSS., Ch. I, II, III, XIV. etc.
- ¹⁰⁷ Ibid., Ch. s. IC, X, XIV, particularly.
- ¹⁰⁸ Ibid., Chs. V. 79 (*pāro mardī saviroga jai*); Ch. IX. 21 *Rājā ṭa 5.....saryajvara jāi*); Ch. IX. 24 (*Himṅalo ṭa 1.....pāro ṭa.....gatabale.....*); Ch. IX. 25 (*Rājā sr ¼.....Saghalā jvara jāi*); IX. 20, 28, 29, etc.
- ¹⁰⁹ *Arkaprakāśa*, vide *Hindu Chemistry*, p. 163.
- ¹¹⁰ SRSS., Ch. VII. 2.
- ¹¹¹ *ekalo hajārane jīte, śatru hāre*, SRSS, Ch. III. 5.
- ¹¹² SRSS
- ¹¹³ SRSS, Ch. II. (comm).
- ¹¹⁴ Ibid., Ch. I, 1; Ch. II. (comm).
- ¹¹⁵ Ibid., Ch. I. 8; Ch. II (comm).
- ¹¹⁶ Ibid., Ch. IX. 11.
- ¹¹⁷ Ibid., Ch. IV. 26.
- ¹¹⁸ Ibid., Ch. V. 37.
- ¹¹⁹ Ibid., Ch. I. 52.