



## REVIEW ARTICLE

# HARATALA ( $AS_2S_3$ ): AN IMPORTANT ARSENIC COMPOUND USED IN AYURVEDA

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### ABSTRACT

Ayurveda, the science of life is being practiced by Aryans from Vedic period. Arsenic compounds are popularly used in Ayurveda therapeutics since centuries. Haratala, Manahshila and Somala are important arsenic compounds used in Ayurveda. Haratala being important among them is commonly used in treating the diseases like Sleshmaroga, Raktapitta, Vatarakta, Kustha etc. Haratala is called orpiment of yellow arsenic with two molecules of Arsenic and three molecules of Sulphur ( $AS_2S_3$ ). Haratala (Arsenic) is a poison which vary with the type and concentration of the poison. Haratala consumed without proper Shodhana shortens the life span, causes diseases of Kapha and Vata, Prameha, Santapa, Spotha, Snayu Sankocha. Hence Shodhana of Haratala is essential. Shodhana is the process of removal of physical, chemical impurities and potentiating of the drugs. Generally Shuddha Haratala is not given alone. It is administered along with herbal drugs or in the form of Rasamanikya or also as a main ingredient in most of the popular formulations like Samirapannaga Rasa, Vatagajankusha Rasa etc. There are different medias explained in literature for Shodhana of Haratala. According to the media of purification the quality and pharmacological properties of Haratala will vary. Depending on the change in properties the therapeutic effect may also vary. The present study includes the introduction of Haratala, origin of Haratala, types, properties, uses, Ashudha Haratala Guna, its management, modern review of Haratala and different Shodana Dravyas is explained.

**Key Words:** Ayurveda, Drug, Arsenic Compounds, Haratala, Shodhana etc

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## INTRODUCTION:

*Vedas* are the first step in regard of knowledge which was compiled for the welfare of the humanity all over the world. Ancient importance of any reference is rooted from *Vedas*. In the subject of orpiment, a stanza in *Rigveda*<sup>[1]</sup> is available, showing its importance. According to this stanza, an arrow whose above part is prepared with a part of the Horn of deer named *Ruru* is coated with *Haratala*. Moreover, the front part of this arrow is made of iron and is prepared with different chemical procedures. Such type of arrow is to be released in the sky, and very good rain can be obtained with its influence. This type of specific arrow, who prepares and possesses, we are bowing to that goddess. However, here there is no any reference of medicinal application of orpiment in this incantation. But, for the sake of human welfare an experiment of artificial raining is indicated here.

Thus, it can be said that orpiment is familiar in the age of *Vedas*.

At that time when treatises of *Ayurveda* were written the prosperity of *Ayurveda* was at its peak. It was the starting phase but the golden age of *Ayurveda* due to the basic principles established at this stage itself. These two treatises of *Ayurveda* are considered as authentic texts even up to this time viz. *Charaka Samhita* and *Sushruta Samhita*. These

are dealing with medical and surgical aspects respectively.

In *Charaka Samhita* fourteen references of *Haratala* in different places with different aspects are available. Out of fourteen, five references can be seen in *Sutrasthana*, such as in counting of *Parthiva Dravyas*, an external application in various skin disorders and in the subject of *Sirovirecana* as an ingredient of *Dhumapana*.

In *Chikitsasthana* also *Haratala* is indicated for skin diseases apart from *Unmada* (insanity), *ikka* (Hiccups), *Shwasa* (Dyspnoea), *Kasa* (Cough) and in *Visa Chikitsa* (Toxicosis) in the form of oil and *Sura* etc. it is used for *Pradeha Pralepa* (the external applications) *Dhumapana* (smoking) *Anjana* (collrium) and in the form of powder and *Agada* for internal uses.

In *Sushruta Samhita*, orpiment has been counted in *Sthavara Vishas*. Moreover, he has described arsenic and orpiment as two *Dhatuvishas*.

Totally 29 times orpiment is quoted for various points of views as follows.

In *Sutrasthana* only two references are there which are in the subject of *Vranas Odhana Dravyas* (for cleansing wounds).

In *Chikitsasthana*, is references are available. They are mainly in the subject of *Varana Sodhana* (wound cleaning), *Pandu Karma* (Coloring the skin after scars of wounds) *Arsha* (Piles), various skin disorders, *Granthi* (nodules)

*Upadamsa* (Syphletic pimples) *Visarpa* (spreading poisonous wounds) and as a hair remover in different *Yogas*.

In *Kalpasthan* two references are available in the counting of *Dhatuvishas* and *Lutadansa Chikitsa*.

Simultaneously in *Uttara Tantram*, seven references are available in the subject of warms, eye diseases, skin diseases and several paediatric disorders in the form of oil, powder, and *Dhumapana*.

In the age of *Sangraha Granthas*, *Vagbhata* has applied *Haratala* mainly on *Nasa Rogas*, (Nasal diseases), *Sotha* (oedema), *Vriscika Dansa* (scorpion sting), for *Vidarana* action i.e. self opening of the abscess and as per the actions and uses given by *Charaka* and *Sushruta*.

In *Bhela Samhita*, *Kashyapa Samhita* etc. have described the indications of *Haratala*.

The development of *Rasa* therapy and *Nagarjuna* are the two sides of a coin. From the age of *Nagarjuna*, the description of orpiment regarding properties, indications, contraindication, *Sodhana*, *Marana* and *Satva Patana* etc. are more elaborately described. He has utilized this drug for various alchemical processes for converting basic metal into noble one.

In the texts of *Rasa Sastra* and *Nighantus* the literature of *Haratala* is available in details.

#### Chart showing *Haratala* – Origin (*Shatapathabrahman*)<sup>[2]</sup>

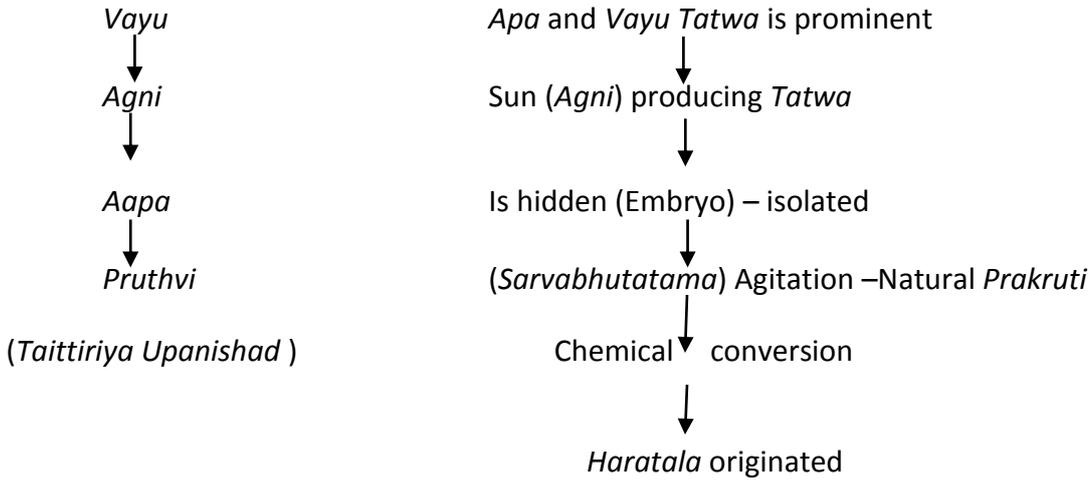


Most of the texts of *Rasa Shastra* have described *Haratala* with its synonyms, properties, *Shodhana*, *Marana*, *Satva Patana* etc. the texts of 12<sup>th</sup> and 13<sup>th</sup> centuries as *Rasa Prakasa Sudhakara*, *Rasendra Sarasangraha*, *Rasa Sara*, *Rasachintamani*, *Rasa Ratna Kara* (By *Nityanatha*) have described alchemical and pharmaceutical processes and the pharmacology of *Haratala* thoroughly.

In 13<sup>th</sup> century the author of *Rasakamadhenu* compiled the uses of *Haratala* and remedies according to diseases and systems. *Rasatarangini*, *Rasacandamshu*, *Rasajalanidhi* etc. texts are considered to be of 20<sup>th</sup> century. In these texts, the description of *Haratala* has been modified.

#### ORIGIN OF HARATALA :

In ancient literature there are various stories regarding the origin of *Haratala* (orpiment). One of those is in *Shatapatha Brahmana*<sup>[2]</sup>. Here it is described that when in the circles of *Parama Ojas*, *Aap* and *Vayu Tatvas* are prominent, the sun, and *Agni* producing *Tatva* is hidden in the embryo like formation. At that time due to those extreme pure *Tatvas*, intermingling together an agitation takes place. It is actually an intercourse of Lord with *Prakriti* which is known as *Sarvabhutamayi*, described in a mythological way with this agitation, orpiment is being originated<sup>[3]</sup>.



### COLOR AND TYPES OF HARATALA <sup>[4],[5]</sup> :

तालकं द्विविधं ख्यातं रससिद्धैः पुरातनैः ।

प्रथमं पत्रतालं स्याद् द्वितियं पिण्डतालकम् ॥४॥

Rasatarangini 11/4

हरतालं द्विधा प्रोक्तं पत्रथ्यं पिण्डसंज्ञकम् । Rasa

Ratna Samucchaya 3/66

*Haratala* is a solid, yellowish, lustrous, material. Most of the texts have described its two types. However the number for the types varies two to four. It is mentioned in **Table -1**

**Table – 1 Showing the types of *Haratala***

<b><i>Haratala</i> two types</b>	<b><i>Haratala</i> four types</b>
1. <i>Patra Haratala</i>	1. <i>Patra Haratala</i>
2. <i>Pinda Haratala</i>	2. <i>Pinda Haratala</i>
	3. <i>Godanti haritala</i>
	4. <i>Bagdadi</i>
A. <i>Rasendra Chudamani</i>	A. <i>Siddhamata</i> (given in <i>Ayurveda Prakasha</i> )
B. <i>Rasaratna Sammuchaya</i>	
C. <i>Ayurveda Prakasa</i>	
D. <i>Rasendra Sara Sangraha</i>	
E. <i>Rasarnava</i>	
F. <i>Rasa Prakasha Sudhakara</i>	
G. <i>Rasa Paddhati</i>	
H. <i>Basavarajiyam</i>	
I. <i>Rasakamadhenu</i>	

J. Dhanwantari Nighantu	
K. Bhavaprakasa	
L. Rasa Chandansu	
M. Rasatarangini	

Types of orpiment have been classified on the basis of colour. Majority of *Acharyas* are in favour of two types.

**1. PATRA HARATALA** [6],[7],[8] :

सुवर्णावर्णं विमलं गुरु चापि महोज्ज्वलम् ।

तनुपत्राचितं स्निग्धं मतं तत्पत्रतालकम् ॥५॥

Rasatarangini 11/5

स्वर्णं गुरुस्निग्धं तनुपत्रं च भासुरम् ॥६६॥

तत्पत्रतालकं प्रोक्तं बहुपत्र रसयायनम् । Rasa Ratna

Samucchaya 3/66

It is usually preferred and practiced for the therapeutic purposes. According to the classics of *Rasashastra* this is the best quality of orpiment.

Following properties are there in according to various texts:

1. Better in qualities. *Patra Haratala*
2. It is formed with mica-like thin layers.
3. It is seemed like gold in color.
4. *Snigdha*
5. *Guru*
6. *Bhasuram*
7. *Sukshma Patras*
8. Having *Rasayana* properties
9. Lustrous
10. Beautiful
11. *Tridoshagna*
12. *Kusthagna*

For the present study *Patra Haratala* is selected. **(Figure-1)**



**Figure 1: Haratala (Orpiment)**

**2. PINDA HARATALA** [9],[10],[11] :

निष्प्रभं स्वल्पसत्त्वञ्च पत्रहीनं तथा लघु ।

निष्पन्नं पिण्डसदृशं स्वल्प सत्त्वं तथा गुरु ।

स्त्रीपुष्पहरणं तत्तु गुणाल्पं पिण्डतालकम् ॥ Rasa Ratna

Samucchaya 3/67

विशेषतः पिण्डरूपं स्मृतं तत्पिण्डतालकम् ॥

Rasatarangini 11/6

This type of *Haratala* is not preferred for the oral use because the portion of clay has not mixed with it. Generally it is preferred for the external applications like ointments etc. according to classics it possess following properties:

1. Lesser qualities
2. Yellowish in color
3. Without layers
4. Without luster
5. Stone like form
6. Low weight (*Abharavahi*)
7. Not good in appearance
8. *Bhrusam*
9. *Svalpasatva*
10. *Stripushpa Haranam*

### 3. GODANTI HARITALA <sup>[12]</sup> :

It is not actually orpiment, so it has not been counted in the types of *Haratala* by *Rasacharyas*. Only in *Ayurveda Prakasha*, according to *Siddhamata* it is noted. According to the text *Rasa Jala Nidhi* this orpiment possesses the shape of teeth of cow, and it has a long portion in its form. It is yellowish in color but in the middle of the specimen, there is a bluish lining, it is smooth in touch.

Only if it is yellowish in color and smooth in touch it has been counted in the types of orpiment. Actually, it does not possess arsenic in its chemical form. It is formed chemically with Ca, S and O and properties are also different. Therapeutically also it is different. Only in shape there are some similarities.

### 4. BAGDADI OR TABAKI OR VARKI HARITALA

[13] :

It is the fourth type of orpiment which is prepared artificially in modern age. It has been described in *Rasa Jala Nidhi*. It is very much smooth in touch. It possesses the layers and marked weight too. It is prepared with previously said ratio of arsenic and sulphur. It is of course, chemically pure and seems beautiful in physical appearance too.

**DOHSAGHNATA:** It is used in the diseases of *Vata* and *Kapha*<sup>[14]</sup>

**USES** <sup>[14],[15],[16],[17]</sup>:

#### External Uses:

*Nadi Vrana, Bhagandara, Shotha* etc. with *Shankha* (CaCO<sub>3</sub>) as a hair remover.

#### Internal Uses:

*Nadi Sansthana* - *Nadi Daurbalya*  
, *Vata Vyadhi*

*Pacana Sansthana* - *Agnimandya,*  
*Shula, Gulma, Pleeharoga*

*Raktavaha Sansthana* - *Vatarakta,*  
*Phiranga*

*Swasana Sansthana* - *Kasa, Swasa*

**Ashuddha Haratala Guna** <sup>[18],[19]</sup> :

विशोधितं तु तालं परिशीलितं प्रकामम् ।  
जनवत्यनल्पदाहक्षोभप्रकम्पतोदान् ॥  
मलिनीकरोति गात्रं प्रकरोति कुष्ठभीतिम् ।  
कमनीयतां प्रकामं विनिहन्ति कायजाताम् ॥  
अशुद्धं तालकं कुर्याद् रेगान् वातकफोद्भवान् ।  
मृत्युशङ्काकरान् यस्माद् भिषक् तस्माद्विशोधयेत् ॥

Rasatarangini 11/13-15

अशुद्धं तालमायुध्नं कफमारुतमेहकृत् ।  
तापस्फोटांगसको च कुरुते तेन शोधयेत् ॥ Rasa Ratna  
Samucchaya 3/69  
When the *Ashuddha Haratala* is consumed it shows the symptoms as tabulated in **Table-2** from various classics.

**Table- 2 Showing the toxic effects of *Ashuddha Haratala*.**

Name of the Text →															
Toxic symptom ↓	A.P.	Bh..P.	D.N.	R.Cha.	R.J.	R.K.D.	R.M.	R.R.	R.R.S.	R.T.	R.sa.sa	.S.N.	Ba.R.	Y.R.	
<i>Anga diptihara</i>						+									
<i>Anga sankocakara</i>	+	+	+	+	+		+	+	+		+	+		+	
<i>Arucikara</i>						+									
<i>Asmakara</i>			+			+									
<i>Atughnam</i>			+	+			+	+	+		+	+	+	+	
<i>Balahanikara</i>						+									
<i>Dahakara</i>										+					
<i>Dehanasaka</i>												+			
<i>Kampakara</i>										+					
<i>Kapharogakara</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Ksobhakara</i>										+					
<i>Kusthakara</i>	+	+			+					+		+			
<i>Mehakara</i>	+		+	+	+		+	+	+		+	+	+	+	
<i>Murchakara</i>			+			+									
<i>Malinikaroti angam</i>										+					
<i>Pangutva kara</i>												+			
<i>Pidika kara</i>	+	+	+		+										
<i>Sphotakara</i>			+	+			+	+	+		+	+	+	+	
<i>Tapakara</i>	+	+	+	+	+	+	+	+	+		+	+	+	+	
<i>Todakara</i>										+					
<i>Vatarogakara</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	

**Management of poisonous effect of *Haratala* [20]:**

As it is clear that *Haratala* is a poisonous drug containing arsenic. It has been given in almost all the classics for purification of *Haratala*. Purified *Haratala* is used therapeutically. If the purification is not conducted properly or accidentally the *Haratala* is taken orally in impure form it is harmful.

*Acharyas* have mentioned various management of *Haratala* poisoning. These are as follows:

- 1) In *Rasendra Purana* and in *Rasa Tarangini* it is mentioned that for the management of the poisoning of *Haratala*, *Jeeraka* (seed of the powder of *Carum carvi*) with sugar should be given for three days [20].
- 2) *Kusmanda Svarasa* can also be given.
- 3) According to *Rasendra Chudamani*, *Hansaraja Swarasa* is given internally.
- 4) In *Rasayana Sara*, six times exhausted mercury with sulphur is advised for seven days to manage the complications of impure orpiment.

**MODERN REVIEW [21]:**

**History:**

L. arsenicum, Gr. arsenikon, yellow orpiment, identified with arenikos, male, from the belief that metals were different sexes. Arabic, *Az-zernikh*, the orpiment from Persian *zerni-zar*, gold. Elemental arsenic occurs in two solid modifications: yellow, and gray or metallic,

with specific gravities of 1.97, and 5.73, respectively. It is believed that *Albertus Magnus* obtained the element in 1250 A.D. In 1649 *Schroeder* published two methods of preparing the element. *Mispickel*, arsenopyrite, (FeSAs) is the most common mineral from which, on heating, the arsenic sublimes leaving ferrous sulfide. The element is a steel gray, very brittle, crystalline, semimetallic solid; it tarnishes in air, and when heated is rapidly oxidized to arsenous oxide with the odor of garlic. Arsenic and its compounds are poisonous. Arsenic is used in bronzing, pyrotechny, and for hardening and improving the sphericity of shot. The most important compounds are white arsenic, the sulfide, Paris green, calcium arsenate, and lead arsenate; the last three have been used as agricultural insecticides and poisons. *Marsh's* test makes use of the formation and ready decomposition of arsine. Arsenic is finding increasing uses as a doping agent in solid-state devices such as transistors. Gallium arsenide is used as a laser material to convert electricity directly into coherent light.

Arsenic was used more than 2400 years ago, in Greece and Rome as a therapeutic agent and poison. Indeed, It is the foundation of many modern concepts of chemotherapy derive from *Ehrlich's* early work with organic arsenicals and such drugs were once a mainstay of chemotherapy. In current therapeutics

arsenicals are important only in the treatment of certain tropical diseases.

Purification of *Haratala* is necessary before it is used for therapeutic purpose which is explained as *Shodana*.

**Definition of *Shodhana***<sup>[22]</sup>:

उद्दिष्टैरौषधैः सार्धं क्रियते पेषणादिकम् ।

मलविच्छिन्नये यत्तु शोधनं तदिहोच्यते ॥ Rasa  
Tarangini 2/52

The process which eliminates the blemishes from substances is called *Shodhana*. According to *Rasatarangini* <sup>[22]</sup> it is the process intended for elimination of impurities from substances by various procedures like *Mardana*, *Swedana*, *Nirvapa* etc. This makes the substance nontoxic, easily absorbable, assumable and more effective therapeutically.

**Concept of *Shodhana*:**

The *Shodhana* process described in classics of *Ayurveda* is not merely a process of separation, purification or detoxification. Rather it increases the therapeutic potency of the drug also. The main objective of *Shodhana* process is to increase the biological efficacy of the drug.

**Definition:**

*Shodhana* is a process of separation by which physical and chemical impurities get separated from the substances by treatment with various drugs <sup>[23]</sup>

It is a process by which blemishes are separated from the substance by various processing like grinding, etc. with specific drugs <sup>[24]</sup>

*Shodhana* is a process of removal of impurities from substances by means of pharmaceutical processing of *Swedana*, *Mardana* etc. with particular drugs <sup>[25]</sup>

In the context of *Haratala Shodhana*, different process of *Shodhana* and *Shodhana* media are given in classics as two types :

- 1) *Samanya Shodhana*
- 2) *Vishesha Shodhana*

**1. *Samanya Shodhana*:** It is mainly aimed for particular group of the drugs. It may be applied for every *Dravya* or for a concerned group. A general view is kept in mind while dealing with *Samanya Shodhana*.

As it is described previously that orpiment has been counted in the group of *Uparasas*, most of the *Acharyas* are having the same opinion for this classification. So the *Samanya Shodhana* for the *Uparasas* can be applied to this orpiment.

In *Rasa Ratna Sammucchaya*, the *Dravyas* described for *Samanya Shodhana* of *Uparasas* are used. Out of them, anyone drug can be used with its *Lavana*, *Ksara*, and *Amla* properties. For *Shodhana*, *Bhavana* for three to seven times should be given to the orpiment.

**2. *Vishesha Shodhana* :**

*Vishesha Shodhana* means particular *Shodhana* *Dravya* for particular drug. Most of the *Acharyas* have described the *Vishesha Shodhana* for orpiment. A compiled data is given in **Table 3**

**Table – 1.3 Vishesha Shodhana Dravya for Haratala**

<b>Shodhana Dravya</b>	A.P.	Bh.P.	R.Cha.	R.J.	R.A	R.Mitr	R.P.	R.P.S.	R.R.S.	R.T.	R.Chi	R.R.	Ras.M	R.Sa.s	Sar.S	Y.R.	V.K.
<i>Churnodaka</i>	+		+	+	+			+	+	+0				+			
<i>Grahadhumajala</i>										+							
<i>Kanjika</i>	+	+	+0					+	0	+		0+		0	0	+	
<i>Katukalaburasa</i>						+											
<i>Kushmanda Swarasa</i>	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	
<i>Nimbu Swarasa</i>			0	0	0			0				0					
<i>PalasamulaJjala</i>							+				+						+
<i>Salmalimula Kwatha</i>				+0			+		+								+
<i>Snuhi Ksira</i>						+											
<i>Tila Kshara Jala</i>			+	+				+	+								
<i>Tila Taila</i>	+	+	+		+						+	+		+	+	+	
<i>Triphala Jala</i>		+	+		+					+	+	+			+	+	

+ Used for fumigation. 0 Used for impregnation.

By the **Table 3** it is seen that *Vishesha Shodhana* process for *Haratala* is mentioned in seventeen classics of *Rasa Shastra* and with twelve different media which are indicated externally for fumigation and internally. Out of them *Kushmanda Swarasa* stands first which has been described by the maximum classics. *Triphala Jala*, *Tilaksara Jala*, *Curnodaka* and *Kanjika* are chief amongst fourteen remedies of *Shodhana* process.

#### **DISCUSSION:**

To prepare a standard formulation use of pure and quality raw drug is important. Quality in the mineral medicines depends upon a variety of factors good soils, air quality, climate, organoleptic factors such as intensity of colour, flavour and odour, and a variety of other

factors. *Haratala* is an Arsenic compound which poison. The process which eliminates the blemishes from substances is called *Shodhana*. According to *Rasatarangini* it is the process intended for elimination of impurities from substances by various procedures like *Mardana*, *Swedana*, *Nirvapa* etc. The commonly used drugs for *Shodhana* of *Haratala* are *Kushmanda Swarasa*, *Tila Kshara Jala* and *Churnodaka*. *Shuddha Haratala* is both used externally and internally. Externally used as *Lekhana*, *Jantughna* and *Romashatana*. It is internally used for *Nadi Balya*, *Dipana*, *Pachana*, *Anulomana*, *Shothahara*, *Raktashodhaka*, *Artavajanana*, *Kushtaghna* and *Jwaraghna*.

#### **CONCLUSION:**

*Haratala* is a well-known drug from the *Vedic* period and described in many legend *Ayurvedic* classics and *Rasa Granthas*.

*Haratala* is used both internally and externally. According to various literatures *Patra Haratala* is therapeutically used.

The properties of liquid media embedded into the *Haratala* during the process of *Shodhana* may augment the effect of *Haratala*.

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