

On ailantus excelsa, a new Indian remedy / by Náráyan Dájí.

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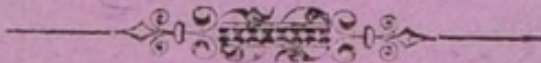
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AILANTUS EXCELSA,

A NEW INDIAN REMEDY.

BY

MR. NARAYAN DÁJÍ, G. G. M. C.



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A NEW INDIAN REMEDY



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1890





A NEW INDIAN REMEDY.

BY, MR. NÁRAYAN DÁJÍ, GRADUATE OF THE GRANT MEDICAL
COLLEGE, BOMBAY.

A paper read before the Grant College Medical Society, July 1870.

Ailantus excelsa, ROXB.—Indian Ailantus.

(NAT. ORD. SIMARUBACEÆ.)

IN the following paper my object is to bring to the notice of the society a new indigenous article of materia medica yielded by the Indian Ailantus, upon which I have experimented for some time past. My investigations into the medicinal properties of this simple, cheap and agreeable vegetable bitter, have led me to form a favourable opinion of its efficacy in certain diseases; and believing that an extended notice of this article, so common in many parts of India, might not be unacceptable to the members of the profession, I submit this communication to you, and trust that others may be induced as opportunities offer, to determine for themselves its medicinal virtues.

The bark of the *Ailantus excelsa*, Roxb. which is the article in question, is interesting firstly on account of its being almost unknown to the medical profession and secondly from the likelihood of its proving a useful substitute for one of the officinal drugs of the British Pharmacopœia. The tree is pretty common in many parts of India, and its bark can be obtained in sufficient quantity for general use. If attention be paid to the cultivation of the tree, the bark will no doubt be found to be still cheaper and being an indigenous product, its use will tend to our advantage.

HISTORY.—The bark of this tree appears to have been in use

as a bitter tonic and alterative amongst the natives of India from the earliest periods. The juice of the fresh bark has been regarded by them as a valuable remedy against indigestion and diarrhœa. The juice of the leaves also is occasionally administered by them in bronchitic affections as an emetic. The tree however is not known to the generality of natives, nor is its account and identification accurately given in Hindu works on materia medica.*

The native vaidyas (physicians) on this side of India, are ignorant of the medicinal virtues of the tree. In Southern India it appears to be more extensively known, for Dr. Ainslie says :—" This bark has a pleasant and somewhat aromatic taste, and is prescribed by the native practitioners in infusion, in dyspeptic complaints to the extent of three ounces twice daily."†

In allusion to this Dr. Wight says :—" In confirmation of that statement I may add that some time ago specimens of this plant were sent me, as those of a tree, the bark of which is prescribed in the Circars as a powerful febrifuge and tonic in diseases of debility."‡

Royle, Oshaughnessy, Piddington, Roxburgh, Drury and other writers on Indian plants that I know of do not allude to the medicinal virtues of this plant; and Waring reiterates in the Pharmacopœia of India the statements already made by Ainslie and Wight.

SYNONYMES.—This plant is the *Ailantus excelsa*, Roxb.; W. and A. Prod. I. p. 150.; Roxb. fl. Ind. II. p. 450; De Cand. Prod. II. p. 89; Spr. Syst. I. p. 939; Willd. 4. 974; Roxb.

* अरु *Aralu* is the sanskrit name of this tree according to Ainslie (vide *Materia Indica*. v. II. p. 302); but on this side of India, that name is a synonyme of "*Tetú*" or *Calosanthos Indica* (Bignoniaceæ), as appears from several sanskrit compendiums of medicinal plants and drugs, viz :—*Chúdāmani*, *Dravyaratnākara*, *Bhāvaprakāśa*, &c. The properties and uses of *Aralu* there mentioned are applicable more to *Calosanthos Indica* (" *Tetú*") than to the tree under consideration.

† p. 302. v. II. Ainslie's *Materia Indica*.

‡ p. 170. III. Ind. Bot. by R. Wight.

Cor. P. t. 23.; Wight's Illust. I. t. 67. In the vernacular languages of India, it is known by the following synonymes:—

अरलु *Aralu*, Sanscrit. अरडुसो *Araduso*,* Gujaráti. महारूख *Mahárúkha*† (lit. great tree.); महाडुंग *Mahádunga*, महानिंब *Mahánimba*‡, Maráthi. पेरुमरम् *Peru maram* (lit. great tree), Tamil. पेदमान चेट्टु *Pedda mán chettu* (lit. great tree), *Pedda mán*, *Pedda mánu*, Telugu. अररमदार *Arar madára*, Hindi, (Allahabad).

Etymology.—The generic name, *Ailantus*, is derived from *Ailanto*, the name of *A. glandulosa* in the Moluccas,|| which signifies, “the tree of heaven,” so called from its lofty growth. The specific name *excelsa* refers to its lofty size.

BOTANY.—The genus *Ailantus* has at different times been variously placed by systematic botanists. It was formerly referred by De Candolle to his tribe *Connaraceæ* of the order *Terebinthaceæ*.§ A closer research led for a short time to its transference to the extensive order *Rutaceæ*, of which “*Ailanthææ*” was considered a second suborder by Dr. Arnott, and which was partially referred by Meissner to the distinct tribe of *Zanthoxylaceæ*. Bentham and other latest systematic botanists have placed this genus in the order *Simarubaceæ*, an arrangement which is here adopted.

“**GENERIC CHARACTER**.—*Ailantus*, Desf. *Flowers* polygamous. *Calyx* small, 5. lobed. *Petals* 5, valvate in the bud. *Disk* 10-lobed. *Stamens* 10, fewer or none in the female flowers; filaments without scales. *Ovary* 2 to 5 lobed; *styles* connate, with plumose stigmas; *Ovules* solitary in each cell. *Fruit* of 1 to 5, oblong, membranous samaræ thickened in the centre

* *Aradusi* is the name in Gujarati of *Adhatoda Vasica*.

† *Mahárúkha* is also the name in Maráthi of *Cinnamomum Tamala* and species; the other synonymes are corruptions of the above. It is so named probably from its immense size.

‡ This name signifies “great Nimba,” so named probably from some resemblance of its leaves to those of “Nimba” (*Azadirachta Indica*). *Mahánimba* is also the name of *Melia Azaderach*.

|| see Don's Gardening and Botany. v. 1.; Miller's Gardener's Dictionary V. I. p. Ail.

§ Wight's Illust. p. 169.

round the seed. *Seed* flattened, testa membranous; *albumen* scanty; *Cotyledons* leafy, nearly orbicular. *Trees*. *Leaves* alternate, pinnate; leaflets oblique; *Flowers* small, in terminal panicles.*"

"SPECIFIC CHARACTERS.—*A. excelsa*, Roxb. *Trunk* perfectly straight, rising like that of the fir tree to a very great height. *Bark* smooth, ash colored. *Branches* pretty numerous, ascending. *Leaves* about the extremities of the branchlets, abruptly pinnated, generally about three feet long. *Leaflets* short petiolated, from ten to fourteen pair, obliquely oblong, or somewhat sickle-formed, the nerve runs so as to make the exterior portion twice as broad as the interior, very remotely and grossly serrated, or indented, smooth, about four inches long and two broad. *Petiole* round, smooth. *Panicle* terminal, very large. *Bracts* minute. *Flowers* exceedingly numerous, small, slightly tinged with yellow, hermaphrodite and male mixed."

Hermaphrodite Flowers.

"*Calyx* as in the genus. *Petals* five, many times larger than the calyx. *Nectary* or *Receptacle* is a perforated, glandulous, notched body, which surrounds, and in a great measure hides the germs. *Filaments* ten, shorter than the petals, inserted into the lower edge of the nectary. *Germs* above, from one to four, very minute, immersed in the perforation of the nectary. *Style* none. *Stigma* small. *Capsules* from one to four, but generally one or two; not connected at the base, linear, oblong, surrounded with a large membranaceous wing, a little twisted at the apex and base. *Seed* one, flattened."

Male Flowers.

Calyx, *Corol*, *Nectary*, and *Stamens* as in the hermaphrodite, but no rudiment of a pistil. †"

The tree flowers in the cold season and ripens its fruit in April and May. Its wood is soft, white and light; it is readily attacked by insects. At Baroda and other places the wood is

* Bentham's *Flora Australienses* v. i. p. 373.

† Roxburgh's *Coromandel Plants* v. i. p. 24.

used for making handles and sheathes for swords and for other light work; in the Circars it is commonly made into catamarans.

Explanation of Plate.

(REDUCED FROM WIGHT'S ILLUSTRATIONS OF INDIAN BOTANY).

1. *Ailantus excelsa*, male-flowering branch, nearly half the natural size.
2. A male flower seen from above.
3. Anthers, back and front views.
4. An ovary.—*Half the natural size.*
5. The same magnified; (red.)
6. Cluster of carpels.—*half the natural size.*
7. A carpel cut transversely, showing the solitary seed.

HABITAT.—This species of *Ailantus* is found in a native state in India and in Ceylon. Roxburgh mentions it as an immense tree, a native of the interior of Coromandel. It flowers during the cold season.* Royle found it around Delhi, along the Jumna, as well as on the Coromandel coast.† It is found growing in the jungles of Travancore, Coorg, Mysore, Malabar and Ceylon.‡ In the Bombay presidency it chiefly occurs in Gujarat and Kattiawar, particularly so, near Ahmedabad, Baroda and Broach; and is thinly scattered over the Deccan.

Its growth is not so rapid as one would believe from the soft nature of its wood. At Mehmoodabad a tree of the age of about 70 years is to be seen. Its circumference at the base measures eight feet. Trees of still larger girth and greater age are seen in other parts of India.

This tree grows on the plains and open valleys, amongst mountains and a few miles inland from the coast. It thrives on a somewhat barren sandy alluvium containing lime-stone. In Gujarat particularly about Ahmedabad and Baroda, it flourishes in the neighbourhood of villages where the soil abounds in calcareous matter, which largely enters into the structure of this plant. A somewhat dry climate having a con-

* Rox. fl. Ind. v. II. p. 450.

† Royle. Ill. Himal. Bot. p. 157.

‡ Cleghorn, forests of S. India; and Moon, Cat. Ceylon Plants.

siderable range of temperature appears to be favourable to its growth.

Collection, preservation, &c. The only part of the tree which is commonly employed as a remedial agent is the bark, frequently of the trunk and rarely of the root. The leaves are said to be occasionally used in medicine, but they are free from the characteristic bitterness of the bark. The usual season for collecting the bark is either the cold or beginning of the hot season; during the rains the process should be stopped on account of the difficulty of drying it, a point requiring particular attention. In order to strip the tree of its bark, it is convenient to fell it with a hatchet. When the tree is down and the useless smaller branches are cut off, the bark is easily removed by first striking it with the back of the hatchet which causes the liber to loosen from off the sap-wood. Before this is done the useless and thick corky layer (epiphloeum) must be scraped off. The bark is then cut longitudinally so as to admit of its being turned up by the hand, when it comes off in large pieces which are further cut into small ones so as to expedite its drying. The drying should be done as quickly as possible by exposing the pieces to the sun's rays; at night they should be covered to avoid the effects of dew. The hygroscopic nature of the active principle of the bark must be kept in view. If the precaution of early desiccation is not taken, a fermentative decomposition soon commences, the bark becomes mouldy, of a blackish color and begins to stink. A quantity of bark thus decomposed was in my possession, which on being subjected to the usual process of extracting its active principle yielded a dark blue compound having the smell of an indigo-vat and apparently resembling indigo itself, and which tinged the comparatively small quantity of the bitter principle obtained.

GENERAL CHARACTERISTICS.—The bark of *Ailantus excelsa* is in flat pieces, of various sizes and lengths depending upon the manner in which it is removed and preserved. The largest pieces are sometimes one foot or more in length and about six inches in breadth, but on account of their friable nature, they

easily go into small pieces by rough handling. In thickness the bark varies generally from a quarter of an inch to half an inch or more ; the age of the tree as well as the part, from which the bark is chopped much affect its thickness and general qualities. Its external surface is rough and irregular from a coat of corky layer (epiphylœum) which varies in thickness from two to four lines, and is marked with deep irregular furrows and protuberances ; its colour varies from dirty grey to yellowish green ; its substance is rather hard, gritty and insipid. The *derm* (which in fact is the bark proper, consists of a porous outer portion (mesophylœum), and a compact inner portion (endophylœum.) The former is about half an inch thick, of a uniform pale yellowish colour, porous and fibrous. Its longitudinal section presents a reticulated fibrous structure marked with numerous pores, in which here and there are observed concrete masses of gummy exudation (pectine), which is of a pale brownish color and insipid.* Its transverse section is rough, granular, porous and somewhat lamellar. The inner portion of the bark (endophylœum or liber) is about a line in thickness pale yellow, smoother and more compact than the outer portion.

It is tough and fibrous, and when fresh, sticky. In the fresh state the endophylœum and the mesophylœum, particularly the former, contain a glutinous and bitter substance of a deep orange color which is the active principle in a state of combination.

The mesophylœum is easily pulverizable forming a greenish grey powder which when examined under the microscope presents numerous crystals of carbonate of lime. The liber (endophylœum) is tough, and leaves fibrous pieces on being pounded. The dry bark is light and breaks easily across with a fibrous, porous fracture. It scarcely possesses any smell but has a pure strongly bitter taste especially at its inner surface. The wood as well as the leaves of this tree are entirely devoid of bitterness.

Seat of the Active Principle.—On examining a section of the

* This is particularly seen in the bark of very old trees.

fresh bark with an ordinary magnifying glass, the meshes between the interlacing fibres of the liber are seen filled up here and there with a reddish or orange yellow and somewhat glistening amorphous substance, which abounds within the inner part of the liber. Intermixed with it and covering the whole of the fibrous texture of the mesophlœum are seen shiny rhombic particles of crystalline carbonate of lime. The yellow amorphous substance is very soluble in water, and extremely bitter and is the active principle of the bark in a state of combination. It is found in the largest proportion in the thick bark of old trees. The thinner bark of the top and branches is less valuable, for it contains a smaller amount of the active principle.

COMPOSITION AND CHEMICAL CHARACTERISTICS.—No complete analysis of the *Ailantus* bark has as yet been made. My experiments, however, lead me to conclude the presence in it of an *uncrystallizable bitter principle* in combination with *lime, carbonate of lime, salts of magnesia and alumina, uncrystallizable sugar, gum, a trace of volatile oil and lignin*. The medicinal virtues of the bark depend entirely upon an azotized bitter principle possessing an acid nature, to which I propose to give the name of "*Ailantic acid*." It is to this that the bark owes its bitterness.

A cold infusion of the bark, in the proportion of one ounce to twenty-four ounces of cold water, and allowed to macerate for twenty four hours, was somewhat turbid, lemon colored, and very bitter. A strong decoction of it was turbid and highly bitter; when kept for some days, it slowly deposited a sediment and the liquid became of a clear pale lemon color and retained its bitterness. A tincture of the powdered bark prepared with rectified spirit was of a pale yellow color and much less bitter than the decoction or infusion. The decoction exhibited the following reactions:—*Tincture of iodine* or *tincture of the sesquichloride of iron* produced no change; *oxalic acid* or *oxalalate* or *ammonia* caused a copious white precipitate (oxalate of lime) insoluble in acetic acid; *alcohol* produced muddiness (from the precipitation of gum) in a concentrated decoction; *protonitrate of mercury*

solution gave a copious white precipitate of a complex compound of the acid principle with mercury; *solution of basic acetate of lead* produced abundant white precipitate; *alkalies* produced no change except removing its bitterness which reappears on the addition of acids; *alkaline carbonates* and *earths* showed no such effect; *acids* produced no change; *litmus paper* showed no signs of acidity (evidently showing that the acid principle was in combination with a base).

Ailantic Acid.—It was in the beginning of the year 1867 that I first noticed the existence of this principle in the Ailantus bark. Owing to its uncrystallizable nature and its comparative insolubility in other solvents than water, the difficulty of obtaining it in a pure state is such as to make its analysis still unsatisfactory. I leave to abler chemists its further examination. The following method gives the process of manufacturing this substance:—

Exhaust the powdered Ailantus bark by repeatedly boiling it with water, collect and concentrate the decoctions. When cold, filter and add a sufficient quantity of a strong solution of oxalic acid to precipitate the lime. Add a sufficient quantity of strong solution of basic acetate of lead which precipitates gum, extractive matter, colouring matter and excess of oxalic acid; filter. Concentrate the clear liquor on a slow fire, remove it when cold into a proper vessel and pass through it sulphuretted hydrogen gas so as to precipitate all the lead; boil, filter and evaporate the clear liquid on a water bath.*

The proportion of *Ailantic acid* contained in the bark varies a good deal according to the age of the tree, as well as the thickness, collection and preservation of the bark. The average quantity of acid I obtained from two pounds of good thick bark was nearly one ounce.

Properties &c.—When solid, *Ailantic acid* is of a waxy consistence, reddish brown, becoming dark colored when liqui-

* In this process *Ailantic acid* still retains a small per centage of uncrystallizable sugar which is difficult of removal.

fied, almost inodorous, deliquescent, very soluble in water, much less so in alcohol or ether, insoluble in chloroform or benzole. It is uncrystallizable and is extremely prone to become glutinous even when kept in a stoppered phial; on account of its hygroscopic properties it swells so much as to be preserved with great difficulty in an ordinary bottle. Its aqueous solution absorbs oxygen. When heated it swells, burns and leaves ash consisting chiefly of carbonate of lime and salts of alumina. Its taste is purely and strongly bitter, it reddens litmus, is neutralized by *alkalies* and *strong earths*, forming combinations which are devoid of bitterness. Its compound with *ammonia* is readily decomposed by heat, leaving the acid free. It decomposes the *carbonates of alkalies*, of *earths* and of several metals, especially when aided by heat, and takes the place of carbonic acid, which escapes with effervescence; the compounds thus formed are all more or less soluble in water and are bitter. When heated along with a strong solution of *caustic potash* ammoniacal fumes are given off, indicating the presence of nitrogen in its composition. When heated along with *strong sulphuric acid*, it becomes blackened and a penetrating odour is evolved. *Hydrochloric acid* produces no change when cold, but on boiling it changes its color to a deep dark red. *Nitric acid* oxidizes it immediately with the production of effervescence (from the escape of nitrogen) especially when boiled, it makes the liquid clearer and paler. *Chromic acid* produces no change. *Tincture of galls* gives no precipitate. *Proto-nitrate of mercury* solution gives a copious white precipitate, which is blackened by the addition of ammonia; this forms one of its characteristic tests. *Persalts of mercury* give no precipitate. *Chloride of gold* gives a dirty purple precipitate, which slowly exhibits greenish and purplish tints by reflected light. *Chloride of platinum* gives no precipitate. *Nitrate of silver* gives a whitish precipitate, which soon turns dark colored. *Diacetate of lead* gives a white precipitate, but does not throw down the whole of the *ailantic acid*. *Acetate of lead* produces no change. No evident changes were produced under the following tests:—*Chlorine* water and *ammonia*;

oxalate of ammonia ; *red and yellow prussiates of potash* ; *sulphocyanide of potassium* ; *proto-chloride of tin* ; *potassio-tartrate of antimony* ; *proto and per-salts of iron* ; and *sulphate of copper*.

Ailantic acid does not possess the power of setting free iodine from a solution of *iodide of potassium*. A concentrated solution of it dissolves oxalate of lime.

Ailantate of lime.—In this form *ailantic acid* exists in nature. It is soluble in water forming a pale orange coloured solution, which is very bitter. Oxalic acid and oxalate of ammonia separate the lime from combination. It can be dried into a hard, solid, reddish brown mass, which when exposed to air, attracts moisture but less quickly than the pure acid, and is less sticky to the feel. When drying, it swells much more than the pure acid. Its taste is not so bitter as that of the pure acid ; it dissolves freely in water and is uncrystallizable.

Ailantate of lead.—This compound is formed during the preparation of *ailantic acid*. It is of an ochre yellow color when fresh, but changing to a darker red when kept. When hot and dry it is hard and brittle like resin, but when cool and kept for some time even in an air-tight bottle, it gets sticky and soft. While hot and soft it can be moulded into any shape like wax or gutta-percha and can be drawn into silk-like fibres, which on cooling become soft and glutinous. The freshly dried salt can be easily powdered, a property not observed in other compounds of this acid ; the powder if inhaled through the nose, excites sneezing ; it readily attracts moisture when cool ; sulphuric acid or sulphuretted hydrogen removes the lead and leaves the acid free. Its taste is as bitter as that of the free acid. It is freely soluble in water and is uncrystallizable.

MEDICINAL PROPERTIES AND USES.—From the natural order to which this tree belongs it may be inferred a priori that it would possess the characteristic properties of that order, and this is found from experiment to be true. The medicinal and physiological properties of this tree resemble so closely those of the officinal *Picræna excelsa* or Jamaica Quassia tree, that our Indian plant may safely be considered a substitute for it.

As Ailantus bark owes its efficacy to the Ailantic acid contained in it, there is scarcely any difference of action between the two except in the dose.

Physiological effects of Ailantic acid. a. on vegetables.—In a strong aqueous solution of the acid, the leaves of *Hydrocotyle Asiatica* were immersed and kept there for about eighteen hours without any appearance of contraction, or other perceptible change in the leaves.

b. On animals.—Monads (infusoria) developed during the decomposition of hay in water, were placed in a dilute watery solution of the acid and examined under a microscope, when their motion became less active, and were observed to perform a kind of rotatory motion round themselves. When a stronger solution was added to a drop on the plate, the animalcules became motionless contracted, and died; showing the poisonous influence of the acid.

Common flies avoid touching the acid even if it is mixed with sugar; but how far it proves poisonous to them is a matter of question. No poisonous effects were perceptible by its internal administration to a hen; nineteen grains of the acid were given in a single dose.

c. On man.—In doses of from one to three grains *Ailantic acid* when given internally acts as a *tonic* and *stomachic*, exciting the appetite and promoting digestion. When given continually in larger doses (from grs. III to grs. v, two or three times a day) its *digestive* and *alterative* action is distinctly marked, especially in cases of torpid states of the digestive function attended with muscular and nervous relaxation and constipation. It increases secretions especially that of the liver, as indicated by the stools changing their colour to yellow, improves the tone of the muscular and nervous system and produces a corresponding healthy change in the general system. Although it much resembles the pure bitters such as gentian or chiretta, yet its action is specially marked by a peculiar stimulation of the digestive and secretory processes. In larger doses (from grs. xv to grs. xxx) it is apt to occasion uneasiness about the stomach, nausea, vertigo, vomiting and purging but

without any distressing symptoms. It does not produce narcotism, its powers being chiefly directed towards the sympathetic system. It does not exhibit antiseptic properties when placed in contact with dead animal or vegetable matter. It does not prevent coagulation of blood.

The dry *ailantate of lead* acts as a sternutatory, causing an irritant effect on the mucous lining of the nose.

Therapeutic uses.—In *dyspepsia*, *anorexia* and torpid states of the digestive organs accompanied with habitual *constipation*, Ailantic acid has been found very serviceable. It is particularly useful in cases where the indigestion results from a want of tone in the general system, such as occasionally occurs in the convalescence from fevers and from the frequent use of purgatives. Its beneficial effects in these cases have been more marked than those from the use of other ordinary bitter tonics.

In *hæmorrhoids* and *prolapsus recti*, it can be advantageously administered in combination with other remedies which are employed with the view of freeing the portal circulation.

In *watery diarrhœa*, brought on either from errors of diet or changes of temperature or sedantary habits, and which is characterized by a catarrhal state of the mucous lining of the stomach and bowels, this remedy proves very useful; it arrests the exhalations from the mucous surface and restores the secreting functions. In the catarrhal diarrhœa of children I have seen remarkably good effects from the use of it. In diarrhœa attendant on inflammatory causes it is found comparatively inefficient.

In *cholera*, it has been found of considerable benefit especially when given in the first stage, when it appeared to have considerable power in preventing the disease from passing to its second stage. It has been also observed that it checked vomiting and purging sooner than the ordinary remedies, and to have changed the color of the stools to yellow without the use of mercurials. It did not however prove effectual in severe epidemics.

In *intermittent* and *remittent fevers*, it was found to have con-

siderable *febrifuge* powers; its beneficial action in these cases depended more on its property of restoring and augmenting the checked secretions, than from any sedative effects on the vascular or nervous systems. Its *antiperiodic* properties are not trustworthy, but are much more marked than those of several other bitters. It proves very useful as an *alterative* in reducing the congestion of the liver and other organs often met with in these diseases. In fevers complicated with brain symptoms and accompanied with derangement of the stomach and liver I have often found it very beneficial.

In *general debility* from various causes complicated with an atonic state of the digestive organs, it proves a very valuable tonic and alterative and may be advantageously combined with preparations of iron.

In *rheumatism* and *gout* its use was found of considerable benefit by improving the state of the digestive function, a point of great importance in the treatment of these diseases.

In "*Elephantoid fever*", attended with recurring inflammation of the scrotum (varix lymphaticus) and chylous condition of the urine, the continued administration of this remedy has a marked effect in checking the progress of the disease. Its use in this disease is deserving of further trial.

I have not observed any decided anthelmintic properties from the use of it.

ADMINISTRATION, PREPARATIONS AND DOSES.—*Ailantus bark** can be best prescribed in the form of decoction, infusion, extract or tincture. The following formulæ were used for the different preparations:—

Decoction of *Ailantus bark*.—Take of *Ailantus bark* bruised, four drachms; distilled water, one pint; boil for ten minutes in a covered vessel, then strain and pour as much distilled water over the contents of the strainer as will make the strained product measure a pint.

Dose.—From one to two fluid ounces twice or thrice daily. It contains *ailantate of lime*.

* *The bark should always be deprived of its thick epiphloeum before use.*

Infusion of Ailantus bark.—Take of Ailantus bark bruised, two drachms; cold water, ten fluid ounces. Infuse in a covered vessel for half an hour and strain.

Dose.—From one to two fluid ounces twice or thrice daily. It is a cleaner preparation than the decoction; often prescribed in dyspepsia.

Tincture of Ailantus bark.—Take of Ailantus bark, bruised, one ounce and a half; proof spirit one pint; macerate for seven days in a closed vessel with occasional agitation; then strain, press, filter and add sufficient spirit to make one pint.

Dose.—From half a drachm to two fluid drachms.

Extract of Ailantus bark.—Take of Ailantus bark, bruised, one pound; distilled water a sufficiency. Macerate the bark with eight fluid ounces of the water for twelve hours; then pack in a percolator, and adding more of the water, allow the liquor slowly to pass until the bark is exhausted. Evaporate the liquor; filter before it becomes too thick; and again evaporate by water-bath until the extract is of a suitable consistence for forming pills.

Dose.—From three to five grains, either alone or combined with other tonics or alteratives.

Infusion of Allantoin bark. - Take of Allantoin bark, bruised,
two drachms; cold water, ten fluid ounces. Infuse in a covered
vessel for half an hour and strain.
Dose. - From one to two fluid ounces twice or thrice daily.
It is a stronger preparation than the decoction; often prescribed
in dyspepsia.
Tincture of Allantoin bark. - Take of Allantoin bark, bruised,
one ounce and a half; proof spirit one pint; macerate for
seven days in a closed vessel with occasional agitation; then
strain, press, filter and add sufficient spirit to make one pint.
Dose. - From half a drachm to two fluid drachms.
Extract of Allantoin bark. - Take of Allantoin bark, bruised,
one pound; distilled water a sufficient quantity. Macerate the bark
with eight fluid ounces of the water for twelve hours; then
press in a press, and adding more of the water, allow the
liquid slowly to pass until the bark is exhausted. Evaporate
the liquid; filter before it becomes too thick; and again ex-
haust by water-bath until the extract is of a suitable con-
sistence for forming pills.
Dose. - From three to five grains, either alone or combined
with other tonics or alteratives.
Tincture of Allantoin bark. - Take of Allantoin bark, bruised,
one ounce and a half; proof spirit one pint; macerate for
seven days in a closed vessel with occasional agitation; then
strain, press, filter and add sufficient spirit to make one pint.
Dose. - From half a drachm to two fluid drachms.
Extract of Allantoin bark. - Take of Allantoin bark, bruised,
one pound; distilled water a sufficient quantity. Macerate the bark
with eight fluid ounces of the water for twelve hours; then
press in a press, and adding more of the water, allow the
liquid slowly to pass until the bark is exhausted. Evaporate
the liquid; filter before it becomes too thick; and again ex-
haust by water-bath until the extract is of a suitable con-
sistence for forming pills.
Dose. - From three to five grains, either alone or combined
with other tonics or alteratives.