

air by the refrigerating device, the temperature on deck being 80° F. and that of the water used 60°, showed a reduction of temperature of the air delivered to 62° F. This system may be regarded as on trial, as no complete reports of its performance under varying conditions at sea are yet available. Twelve hundred tons of fresh water may be shipped as ballast. Fresh-water tanks furnished with refrigerating coils are placed on the mess deck where they are accessible to the troops. The equipment of the ship includes fire plugs and hose and the customary marine life-saving apparatus. The commissary department is provided with a variety of subsistence stores, including the components of the ration and additional articles for sale to the troops and for issue to the sick, with fresh beef and vegetables in cold storage. Facilities for military exercises are afforded on the main deck by stowing the mess-room furniture. A library of miscellaneous books has been contributed to the hospitals of each one of the troop ships by the Red Cross organization through their New York agent.

A distinctive uniform is authorized for the employees of the transport service, and the ships fly the colors of the department. In general the object kept in view by officers of the army transport service has been to maintain the efficiency of the troops while on board by all practicable military methods, in order that on debarkation after a voyage they may be fit for active service without delay for recuperation. That this end has been attained in great measure is evident from reports of voyages made to distant oversea ports by troop ships refitted and despatched under the direction of the transport service. Recent experience has emphasized the fact that in modern warfare the most difficult problems are those involving celerity of movement of troops and the *matériel* of war without the precipitancy and disorder which invite loss and disaster. The development of land transportation by the American people has already reached an extent and efficiency which place them in the lead among nationalities. If this ascendancy is to be maintained a similar development appears requisite on the high seas. The work of the army transport service is a beginning in this direction. At the present writing a board of officers has completed its sessions for the purpose of revising the original Regulations of the transport service in order to adapt them to its requirements as determined by the condition of its operation from its organization to the present time.

Henry S. Kilbourne.

ARNICA.—*Leopard's Bane*; *Mountain Tobacco*. *Arnica L.* is a genus of the *Compositæ*, containing some eighteen species distributed through the cooler regions of the north temperate zone, of which *A. montana L.* has been extensively employed in medicine. It is a native of eastern and middle Europe, and yields two official articles, as follows: *Arnica Flores*, "the flower heads," and *Arnica Radix*, "the rhizome and roots."

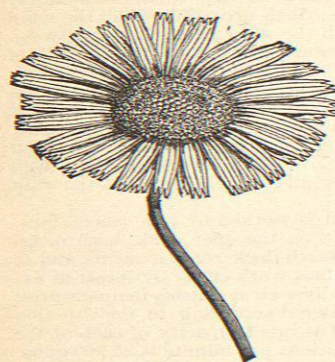


FIG. 284.—Arnica: flowering head. (Baillon.)

The plant is rather pretty, with a radical rosette of obovate leaves, from which rises a simple stem a foot or two high, bearing one or two large yellow flower heads. *Arnica Radix* is thus described in the Pharmacopœia: "Rhizome about 5 cm. long and 3 or 4 mm. thick; externally brown, rough from leaf scars; internally whitish,

with a rather thick bark, containing a circle of resin cells, surrounding the short, yellowish wood wedges, and large, spongy pith. The roots are numerous, thin, fragile, grayish brown, with a thick bark containing a circle of resin cells. Odor somewhat aromatic; taste pungently aromatic and bitter."

Arnica Flores are thus described: "Heads about 3 cm. broad, depressed-roundish, consisting of a scaly involucre in two rows, and a small, nearly flat, hairy receptacle, bearing about sixteen yellow, strap-shaped, ten-nerved ray florets, and numerous yellow, five-toothed, tubular disc florets, having slender, spindle-shaped akenes, crowned by a hairy pappus. Odor feeble, aromatic; taste bitter and acid."

The receptacle of this head is very apt to contain the larvæ of an insect, wherefore some pharmacopœias direct that the florets only shall be employed. Several other yellow flower heads have been employed to substitute or adulterate arnica, but all fail to combine the one to two serialled involucre with the pitted and hairy receptacle.

Both drugs have a strongly resinous odor and a pungent and acrid taste, that of the root being the stronger, and the dust of both is sternutatory. Their composition is similar, the rhizome being the stronger, with one-half to one per cent. of volatile oil, considerable resin, part of it acrid, ten per cent. of inulin, a little tannin, and the crystalline yellow acrid and bitter amaroid *Arnicin* ($C_{20}H_{30}O_4$), soluble in alcohol. The flowers lack the inulin, and their percentages of oil and resin are smaller. Their oil does not appear to be identical with that of the rhizome. Altogether, it would appear desirable to discontinue the use of the flowers.

Arnica is very active, both locally and systemically. It is a slow but powerful rubefacient to the external skin, and a powerful stimulant to raw surfaces, with some antiseptic power. It is highly irritating to mucous surfaces, being a stomachic and laxative in small doses, but an emetico-cathartic poison in overdoses. Besides its irritant poisonous properties, it is a systemic poison. Its systemic action is most concisely stated by Bartholow as follows: "In small medicinal doses arnica increases the action of the heart and arteries, and excites the functions of the skin and kidneys. In large doses, probably after a stage of excitement, depression of the circulation, of the respiration, and of the animal temperature ensues; violent headache is experienced, the pupils are dilated, and paresis of the muscular system comes on. In toxic doses, arnica paralyzes the nervous system of animal and organic life, and death ensues in a condition of collapse."

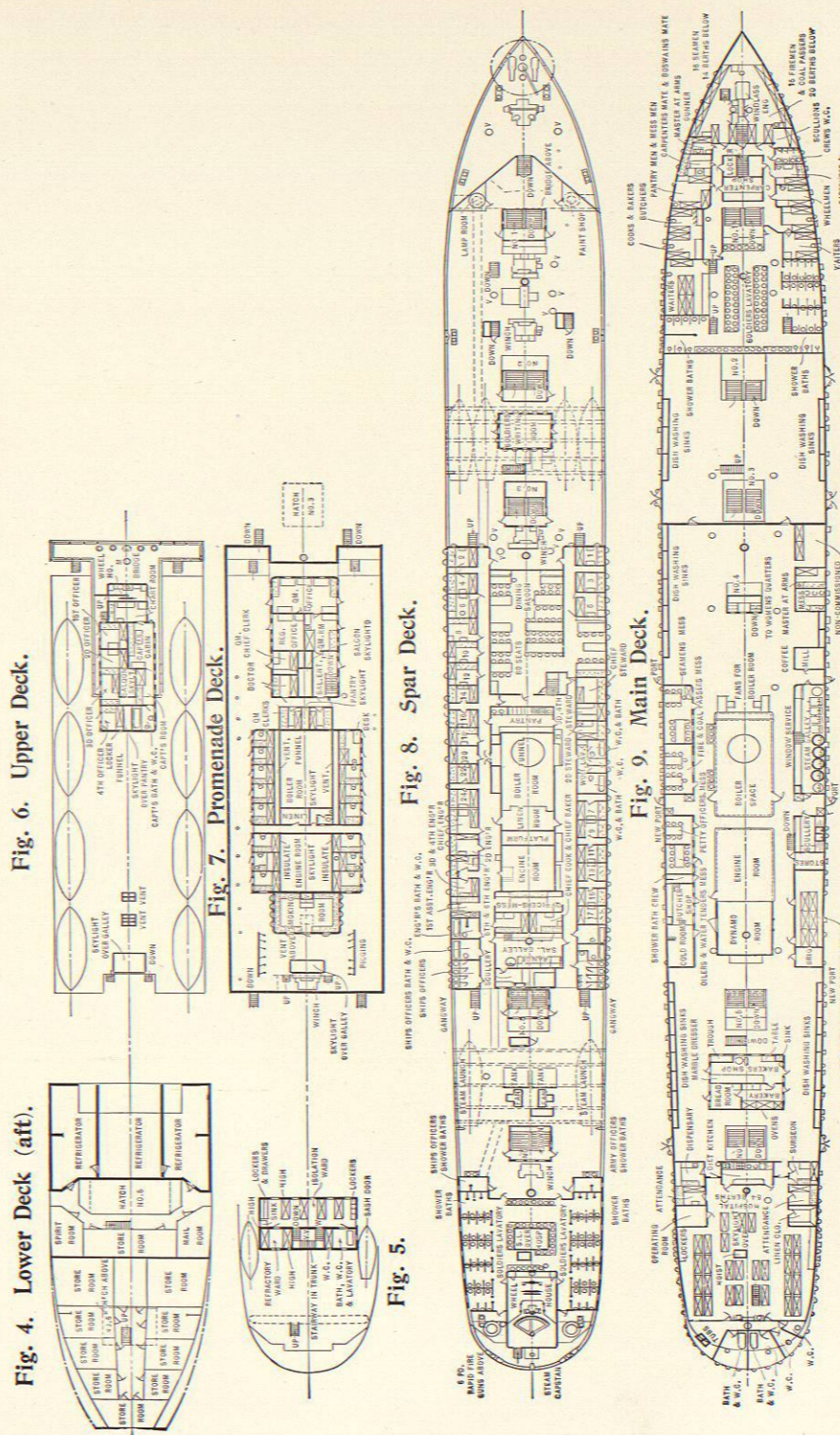
It would seem that some more important use might be found for a drug possessing such pronounced physiological actions as arnica than any yet developed. It has been used like aconite in reducing fever and decreasing the painful symptoms of many inflammations, especially in rheumatism, erysipelas, and painful menstruation. Externally it is a favorite vulnerary and rubefacient in



FIG. 285.—Involucre and Receptacle of Same. (Slightly enlarged.)



FIG. 286.—Single Flower of Same. (Enlarged.)



U. S. ARMY TRANSPORT "THOMAS."

domestic practice. We have a tincture of the flowers of twenty per cent., and one of the rhizomes of ten per cent. strength, the dose of each being 0.6 to 2 c.c. (℥ x. to xxx.); of the root a fluid extract, dose 0.3 to 0.6 c.c. (℥ v. to x.) and an extract, dose 0.06 to 0.2 gm. (gr. i. to ii.).
H. H. Rusby.

AROSA, Switzerland, is an Alpine high-altitude health resort of the Grisons in the southeastern portion of Switzerland. It is twenty miles from Coire, the railway terminus, and is reached by diligence in five and three-quarters hours. It is 5,900 feet above sea level, and lies in a sheltered position on the slopes of the Tschuggen, high above the Aroservasser valley. From the fact that it is situated on the mountainside, Dr. Williams ("Aerotherapeutics") thinks that it, as well as St. Moritz and Wiesen, possesses an advantage over Davos, which is mainly situated in the valley.

Arosa has come into favor as a health resort, especially in the winter, for tuberculosis patients, only within the last eight or ten years. "Arosa, the latest on the list of Alpine climatic stations," says Dr. Ewart, "offers all the guarantees for becoming one of the first among the best. I am astonished that a region possessing such qualifications should have remained unappreciated so long."

It is surrounded on all sides by massive mountains which protect it from high winds with the exception of the *foehn*, which appears occasionally here as in all Alpine valleys. The village is picturesquely situated in the midst of large fir forests, and the habitations are arranged in groups, terraced upon the mountain slope and facing the south. The hotel accommodations are good, and some if not all of the hotels are now arranged for winter occupancy. Dr. Egger here made his famous experiments upon the changes in the blood caused by altitude, and thus attracted the attention of the Profession to Arosa.

This table adapted from Regnard's "La Cure d'Altitude" shows the mean temperatures for the period 1889-92:

	Mean.	Maximum.	Minimum.
January.....	40.2° F.	40.8° F.	- 2.7° F.
February.....	40.7	41.3	- 1.6
March.....	38.0	48.5	- 3.8
April.....	32.7	52.5	12.0
May.....	43.7	63.1	21.5
June.....	48.3	72.0	30.9
July.....	50.1	73.7	30.4
August.....	51.8	66.7	29.1
September.....	47.1	60.4	9.7
October.....	37.4	47.5	10.0
November.....	31.3	43.5	- 0.9
December.....	23.7		

The mean temperatures of the winter (December, January, and February), and of the summer (June, July, and August) are as follows (Regnard):

	Mean.	Maximum.	Minimum.
Winter.....	23.0° F.	41.3° F.	- 1.8° F.
Summer.....	50.2	71.4	33.8

The mean temperature at Arosa is about three and a half degrees higher than that at Davos, although the latter station is nine hundred feet lower than the former.



FIG. 287.—Arosa, 5,900 Feet Above Sea Level.

The minimum winter temperature at the two places is as follows:

	Minimum.
Winter 1891-1892, Arosa.....	- 8.7° F.
Winter 1891-1892, Davos.....	- 12.6
Winter 1892-1893, Arosa.....	- 15.6
Winter 1892-1893, Davos.....	- 24.5

In comparison with Zürich, which represents the temperature of the lowlands of Switzerland, we have the following for summer and winter (Regnard):

	WINTER.			SUMMER.		
	Mean.	Maximum.	Minimum.	Mean.	Maximum.	Minimum.
Zürich, elevation 1,600 feet.....	26.6° F.	41.7° F.	11.48° F.	60.8° F.	81.3° F.	46.7° F.
Arosa, elevation 6,100 feet.....	23.0	41.0	-1.2	48.4	71.8	32.7

Violent variations of temperature are said to be rare at Arosa, and the fogs which are frequent in summer are very uncommon in winter.

The relative humidity for the winter of 1890 was as follows: The mean in December was 59 per cent., in January 62, in February 59, in March 65.

The greatest amount of precipitation occurs in summer in the form of rain; in winter it comes as snow, in sudden squalls which are soon over. In 1890 there were 1,886.4 hours of insolation at Arosa; and for the months of December and January, 492 hours of sun in compari-

son with 197 at Zurich at the same season, and 457.4 at Davos—an average of about five and a half hours a day.

The winter climate of Arosa, as we learn from the above, is characterized by a dry, cold, pure atmosphere, a high average of sunshine, absence of winds and fog, and the attenuation and clearness of the air which are the accompaniments of high altitudes. None of the Alpine health resorts would seem to offer more favorable climatic conditions for the high-altitude treatment of phthisis.

A discussion of the class of cases suitable for such a climate will be given under *Tuberculosis, Pulmonary*, but in brief it may be said that incipient cases with little constitutional disturbance have a better chance of recovery in high altitudes than elsewhere. The writer would express his indebtedness for much of the above data to Regnard's "La Cure d'Altitude."

Edward O. Otis.

ARRINGTON MINERAL SPRINGS.—Atchison County, Kansas.

POST-OFFICE.—Arrington.

ACCESS.—Via Union Pacific Railroad. Hotel.

These springs are located on a tract of land eighteen acres in extent, in a level, highly fertile farming country. The springs are three in number, and flow about eight gallons per minute. The following analyses of two of the springs were made by Juan H. Wright, M.D., chemist, of St. Louis, Mo.:

SPRING NO. 1 (REACTION DECIDEDLY ALKALINE).

ONE UNITED STATES GALLON CONTAINS:

Solids.	Grains.
Calcium carbonate.....	9.76
Magnesium carbonate.....	5.93
Sodium carbonate.....	11.45
Potassium carbonate.....	1.44
Iron carbonate.....	3.57
Lithium carbonate.....	0.47
Sodium carbonate.....	2.04
Calcium sulphate.....	1.29
Magnesium sulphate.....	1.87
Sodium chloride.....	3.63
Silica.....	0.97
Ammonium crenate.....	0.89
Organic matter.....	0.27
Total.....	43.58
Carbonic acid gas.....	42 cubic inches.

SPRING NO. 2 (REACTION ALKALINE).

ONE UNITED STATES GALLON CONTAINS:

Solids.	Grains.
Calcium carbonate.....	6.61
Magnesium carbonate.....	3.26
Sodium carbonate.....	3.55
Iron carbonate.....	2.01
Sodium chloride.....	2.16
Silica (soluble).....	0.55
Organic matter.....	0.91
Ammonia.....	Trace.
Total.....	19.05
Carbonic acid gas.....	39.30 cubic inches.

These waters are both of the alkaline-chalybeate-carbonated variety. They are highly esteemed in dyspepsia, general debility, rheumatism, constipation, hemorrhoids, and liver and kidney complaints. Commodious bath-rooms, supplying hot and cold water, are open to visitors.

James K. Crook.

ARROW-HEAD HOT SPRINGS.—San Bernardino County, California.

POST-OFFICE.—Arrow-Head Springs.

ACCESS.—By stage from San Bernardino, six and a half miles distant to the south. Parties leaving Los Angeles, sixty-seven miles distant, should take the 8:30 or 11 A.M., or the 12:20 P.M. Santa Fé train, or the 7:45 or 8:30 A.M. train on the Southern Pacific line. Hotel.

These springs burst from the mountain slope of the Sierra Madre, 2,000 feet above the level of the sea, and 1,000 feet above the foot of the mountain. A bench-like mesa, containing 100 acres, projects at this point from

the mountain, and is bounded on the east and on the west by two enormous cañons. Down the deep ravine or cañon on the east comes a mountain stream of water as cold as ice, while in the cañon on the west flows a stream formed by the boiling spring so hot that it fills the air with steam and sulphurous gas. The springs here were known to the Indians long before the settlement of the country by whites. On the face of the mountain back of the hotel is the figure of an arrow-head 1,360 feet long and 450 feet wide, believed to have been executed by the aborigines. The figure gives its name to the resort, and so perfect is its contour and so elevated its situation that it can be seen from almost every part of the valley, and stands as a prominent landmark for miles around. The Arrow-Head Hotel is located near the springs, on the plateau of land between the two cañons. It is a very comfortable modern structure with a capacity for 150 guests. The meteorological conditions are similar to those usually prevalent in Southern California, the weather being, as a rule, clear, balmy, and bright. The winter season is most favorable for visiting the springs. These are 37 in number, the aggregate flow of water being equal to 10 miner's inches. Following is an analysis of one of the fountains by Prof. E. W. Hilgard, of the State University:

ONE UNITED STATES GALLON CONTAINS:

Solids.	Grains.
Potassium sulphate.....	4.00
Sodium sulphate.....	42.48
Sodium chloride.....	8.18
Lithium.....	Strong test.
Calcium sulphate.....	1.34
Calcium carbonate.....	1.34
Barium.....	Faint test.
Strontium.....	Well marked.
Magnesium sulphate.....	0.15
Magnesium carbonate.....	0.32
Silica.....	4.94
Organic matter.....	Trace.
Total.....	62.75
Free sulphureted hydrogen.....	0.264 cubic inches.

The water shows a very high temperature, 193° F. The analysis bears some resemblance to that of the Carlsbad springs. The water is soft, clear, and pleasant to drink and is believed to aid in the elimination of malarial and miasmatic poisons from the system when taken internally. The springs owe their chief reputation, however, to the beneficial effects of the water when used for bathing purposes. It is employed in the form of vapor, hot mineral water, and mud baths. These baths have proved of value in cases of glandular enlargements, rheumatism, and rheumatoid arthritis, as well as in some of the manifestations of syphilis and in various neuralgic conditions.

James K. Crook.

ARROWROOT.—*Arrowroot Starch; Maranta Starch.* The starch obtained from *Maranta arundinacea* L. (fam. *Marantaceae*). The genus *Maranta* contains some fifteen species, natives of tropical America. They are perennial herbs, with tuberous or thickened, starch-laden, scaly rhizomes, and leafy, often branched stems.

The arrowroot plant is extensively cultivated in nearly all tropical countries. A large amount of arrowroot is now produced in Southern Asia. The Indian plant differs somewhat from the American, but is considered as only a variety of it.

The early medicinal application of arrowroot among the aborigines appears to have been as a remedy for the wounds of their arrows, to which it owes its name. It was both given internally and applied as a poultice to the injured part. It was also used as a food. Accounts of its cultivation in the West Indies date back about a hundred and fifty years, since which time it has been an article of general commerce.

Arrowroot is prepared in essentially the same way as other starches, namely, by washing it out of the cellular tissue. The yield is about ten per cent. of the fresh rhizome. That of the West Indies, generally called

Bermuda arrowroot, is regarded as the best. It is a beautifully white, lumpy powder, without odor or taste; rubbed between the fingers it gives a slight crackling sound, or rather, feeling, for the sensation is conveyed more through the fingers than the ears. Its other properties are simply those of starch in general, to which the reader is referred.

When the antiphlogistic treatment of diseases was more in vogue than at present, arrowroot took quite an important place in the dietary of the sick. It was also extensively used as an ingredient of foods for infants. For neither of these purposes is it to be much recommended. As a food, it has scarcely any advantages over the cheaper indigenous starches now so admirably prepared.

Florida Arrowroot is a starch prepared from the large fleshy stem of *Zamia integrifolia* Jacq. W. P. Bolles.

ARROWROOT, INDIAN. See *Curcuma*.

ARSENIC.—1. GENERAL MEDICINAL PROPERTIES OF THE COMPOUNDS OF ARSENIC.—The predominant feature of the action of arsenical preparations is intense irritation. Locally applied in fairly concentrated form to a denuded surface the irritation is so severe as to excite the extreme of reaction, namely, gangrenous inflammation; the part sloughs, strangulated by congestion and inflammation. Arsenic is thus indirectly, and, because indirectly, is slowly, painfully, and dangerously caustic. When arsenic is used to cauterize, there is also a risk of absorption of enough of the mineral to produce constitutional poisoning, a risk greater when the application is weak than when it is strong, since in the latter case congestion is developed early, whereby absorption is impeded. When arsenic is taken internally, gastro-intestinal irritation is easily produced, a result which, in acute arsenical poisoning, constitutes the most prominent feature of the derangement. Apart from tendency to irritate, arsenic is fairly antiseptic, and in the higher organisms, such as man, has an action upon the nervous system. In arsenical poisoning nervous symptoms are prominent, and, therapeutically, much of the avail of arsenicals hinges upon the allaying of nervous derangements.

For the purposes for which arsenic is used in medicine, the remedy has to be administered continuously for days, weeks, or months. In this medication the rule is so to adjust the dosage as not to develop constitutional disturbance. The initial symptoms of over-impregnation of the system with arsenic are, first, an irritation of the conjunctiva, showing itself in suffusion and smarting of the eye, and edema of the lower lid; and secondly, an irritation of the stomach, shown by failure of appetite and soreness and sensation of weight at the epigastrium. In some persons the gastric symptoms precede the conjunctival. The two sets of symptoms should be watched for in arsenical medication, and the dosing diminished or temporarily discontinued until their abatement, which speedily follows the withdrawal of the poison.

The properties of arsenic valuable therapeutically are as follows:

(a) *Improvement of Nutrition.*—Even in the healthy, carefully graduated dosage with arsenic tends to improve general nutrition, the individual fattening, the skin being specially rosy and smooth, or, in animals, the fur sleek and glossy, and the bones thick and dense.¹ In the case of the so-called arsenic-eaters of Styria, the women are said to indulge for the beautifying of their complexion, and the men for an improvement of wind and increased physical endurance which they claim to derive from the use of arsenic. This habit of regular consumption of arsenic among certain of the working class in Styria seems now established as a fact by competent and reliable testimony.² Arsenous acid is the preparation commonly used, and the daily allowance has been known to reach five and even ten grains. But attempts in other countries to acquire the tolerance of the

poison which the Styrian peasantry show commonly end in disaster. The property of arsenic to modify nutrition is utilized principally in the following diseases: *Progressive Pernicious Anæmia*: In this affection, where iron is so notoriously futile, arsenic has in many cases proved of great benefit, patients even recovering fully under its use. *Scaly Skin Diseases*: In skin diseases arsenic is more or less used, but experience agrees that it is much more likely to be of benefit in affections of the epidermis than in those involving the corium. *Psoriasis* is a typical disease of the former kind, and in its treatment arsenic is a standard remedy. At the beginning of an arsenical course the symptoms often suffer an exacerbation, but this commonly subsides in a few days. The medicine should not be prescribed during the inflammatory stage of a skin disease, but when used should be persisted in for weeks, or even months, after apparent cure. Under all circumstances the remedial action is slow.

(b) *Control of Neuroses.*—The property of arsenic to affect nerve functions, seen in the nervous phenomena that attend arsenical poisoning, shows itself therapeutically in a tendency to abate pain, spasm, and undue reflex irritability. The property is utilized most especially in the following conditions: *Gastric Irritability*: In idiopathic dyspeptic irritability of the stomach, or in the irritability attending the chronic gastritis of drunkards, or ulcer or cancer of the stomach, arsenic is often of considerable benefit, and is especially efficacious when the nervous disturbance is disproportionately great. *Neuroses of the Respiratory Organs*: Some asthmatics find a certain amount of temporary relief from arsenic, a relief more likely to be obtained in the pure neurotic form of the disease than when the symptoms are secondary to bronchitis, emphysema, or disease of the heart. Yet also the nerve irritation in coryza may be relieved, and, according to Ringer, paroxysmal sneezing is often promptly broken by the remedy, except when caused by true hay fever the result of the inhalation of pollen. *Other Neuroses*: In *chorea* arsenic is probably the most generally serviceable of medicines. Simple uncomplicated cases recover under the use of the remedy more frequently than not. *Neuralgia* also sometimes yields to arsenic, more particularly when the attacks show a regular periodicity of onset; in other words, when the affection is very likely of malarial origin. Other neuroses also, such as angina pectoris, and even epilepsy, have occasionally been treated by arsenic, and isolated cases have been reported in which benefit has been claimed from the medication.

(c) *Control of Malarial Diseases.*—Arsenic has a notorious power over malarial affections, being commonly resorted to as next choice after the cinchona alkaloids. In a broad way arsenic is inferior in potency to those alkaloids, but yet in old cases, and particularly in intermittents of tertian and quartan rather than quotidian type, it may succeed even after quinine has failed. As compared with quinine, furthermore, arsenical preparations have the advantage of being tasteless and cheap, and for those reasons alone may be selected for prescription in malarial disease in the case of poor people or of children.

Besides the foregoing, arsenic has been used in a great variety of diseases on the general principle of being an "alterative," with alleged success in many cases.

2. THE PREPARATIONS OF ARSENIC USED IN MEDICINE.—The arsenical compounds used in medicine are the *trioxide* (arsenous acid), *triiodide*, and the two salts, *potassium arsenite* and *sodium arsenate*.

Arsenic Trioxide, As₂O₃, or As₂O₆. This well-known compound is official in the U. S. P. as *Acidum Arsenosum*, Arsenous Acid, an appellation which chemically belongs only to the aqueous solution of the oxide. This is the preparation known also as *white arsenic*, or, in common parlance, simply *arsenic*. Arsenous acid, so-called, is a heavy solid, occurring either as an opaque, white powder, or in irregular masses of two varieties: the one amorphous, transparent and colorless, like glass; the other crystalline, opaque or white, resembling porce-