Heat, light, electric and mechanical power and magnetism are the agencies acting upon this nucleus through the agency of nitrogen, causing and bringing by colonization the many kinds of animal bodies into existence.

The spectroscope shows that sulphur and phosphorus are compounds and not elements; and that phosphorus is produced from a differentiation of sulphur by the action of chlorin and hydrogen. It is the potential action of nitrogen upon this that causes the chemical and physical changes, and starts the process of ultimate production of protoplasm and afterward animation. It is brought about by action of sunlight upon the phosphorus contained in the nucleus, attracting the electric energy that is pent up in the so-called useless nitrogen. Then by the aid of magnetic iron, carbon and amorphous matter draws forth the electric energy from the earth through phosphorus as a nucleus, which starts the oxygenating process.

Nature requires motion in animal bodies before locomotion can take place, the force and power of such motion being supplied from the food and air.

If it were not for nitrogen locomotion could not take place. Pent up it is more electric potentiality than any other element in nature. This potentiality institutes the power of locomotion in all animals either by direct or indirect transmission and modification.

It is not the vivifying power of oxygen but the explosive power of nitrogen that originates locomotion, and by its rhythmic explosion the respiratory process originates and continues, which is the cause of that motion in nutrition.

Nitrogen, which is supposed to be the most indolent thing in nature, is indeed the most powerful and essential to the movement of all bodies, since explosion depends upon the constant instantaneous liberation of nitrogen, it also acts as a controlling agent to prevent the too rapid reduction of the tissues. It controls the chemical action of respiration.

Nitrogen enables the body to perform its functions to the end of the organizing process, which culminates in the separation of the vital from the chemical.

Conclusion.—If life is made up of motions and emotions, and if nitrogen is such a kinetic agent actual and potential as has been pointed out, then it appears reasonable that it is not a mere diluent and negative in human food.

THE ACTION OF ODORS, PLEASANT AND UNPLEASANT, UPON BLOOD FLOW.

Presented to the Section on Physiology and Dietetics at the Forty-eighth Annual Meeting of the American Medical Association, at Philadelphia, Pa., June, 1-4, 1897.

BY EPHRAIM CUTTER, M.D., LL.D.
NEW YORK, N. Y.

In 1859, Alvan Clarke made me a laryngoscope. After 1862 I studied auto-laryngoscopy and auto-rhinoscopy. I took the first photographs in this continent of the living larynx in 1866; copies of these are deposited in the United States Army Medical Museum, Washington.

I was and am able to demonstrate to myself, my posterior nares, either Eustachian orifice, turbinated bones, dome of pharynx, vomer, etc.

Among the physiologic studies made in 1866 was the action of cologne, roses, camphor, ammonia, sulphur fumes, etc., upon the erectile tissues of the turbinated bones. They were of a pale ashy white color ordinarily. A few whiffs through the nose of any of these odors increased the blood flow and produced immediately a livid injection and turgescence of the erectile tissues on the turbinated bones, that stood out as clearly and positively as the erection and turgescence of the livid wattles of an excited turkey cock. It was a surprise to find that these pleasant and unpleasant odors acted alike. I found in the case of sulphur fumes, that when I could not inhale them from a match ignited before my face, with open mouth, I could breathe readily through my nose. This proved that the erectile turgescence availed to remove the sulphurous oxid so as to have respirable air and protect the inhaler.

The morphology of nasal excretions excited by the morphologic elements found in the impure air, also proved the value of the irritated turgescent mucous membrane of the nares in arresting foreign bodies borne in on the atmosphere.

ARROW-ROOT, CASSAVA AND KOONTI.

Presented to the Section on Physiology and Dietetics, at the Forty-eighth Annual Meeting of the American Medical Association, held at Philadelphia, Pa., June 1-4, 1897.

BY A. T. CUZNER, M.D.
GILMORE, FLA.

ARROW-ROOT.

Arrow-root (*Maranta Arundinacea*) is the name the Indians of America gave this plant. In German arrow-root is called *pfeilwurz*, *pfeil* meaning arrow, and *wurz* meaning root. It is the English name of the botanical genus *maranta*, the type of the endogenous order *Marantacea*, called by Lindley in his "Natural System of Botany" the arrow-root tribe, but altered in his "Vegetable Kingdom" to maranta.

The flowers of this plant are in long, close spike-like panicles with irregular corollas, each having a single perfect stamen with half another. The veins of the leaves run out obliquely from the midrib to the margin. The root is a fleshy corm which when washed, grated and strained, and again repeatedly washed, furnishes the substance so much prized as food for invalids.

The starch extracted from the rhizomes of different *maranta*, and imported into the United States and England, takes the name of the place from which it comes. Thus we have Bermuda arrow-root, East Indian, St. Vincent, Natal, etc., True arrow-root is without doubt the best of all the starch foods to be obtained in the market; hence it is largely adulterated with other and inferior starches, which adulteration is readily detected under the microscope. In England attempts have been made to call every prepared starch arrow-root bearing the slightest resemblance to the true *maranta*. This has failed there owing to the passage of the "Adulteration Act."

It is now understood by public analysts, magistrates, etc., that arrow-root must consist entirely of the starch extracted from the rhizomes of a *maranta*, and any admixture of potato or other starch is regarded as an adulteration. Arrow-root is much more used in England than in the United States, both as ordinary food and as a preparation for the use of invalids and infants. In the former country they prepare what is called white soup by the addition of arrow-root.

The price of arrow-root in England ranges from 13 to 50 cents per pound. It is not much used in the United States. This may be owing to the difficulty of obtaining a pure article, and therefore the true value of arrow-root is not properly appreciated.

It is an excellent material to mix with cow's milk in order to cut up and dilute the excessive proportion of casein. Human milk contains but 1 per cent. of casein, while that of cow's contains 4 per cent.

As a food for young children (and even infants) I prefer arrow-root to barley. Arrow-root should be more largely used in inflammatory diseases of the alimentary canal. It is by far the most palatable of all the different starch preparations.

Figure 1 represents an arrow-root plant, with A, an enlarged drawing of a rhizome. These drawings were made by the writer from a specimen plant of Bermuda arrow-root grown on his own place in Florida.

The drawing of starch cells (Fig. 2), was made from sample of starch obtained from the roots and viewed under the microscope.

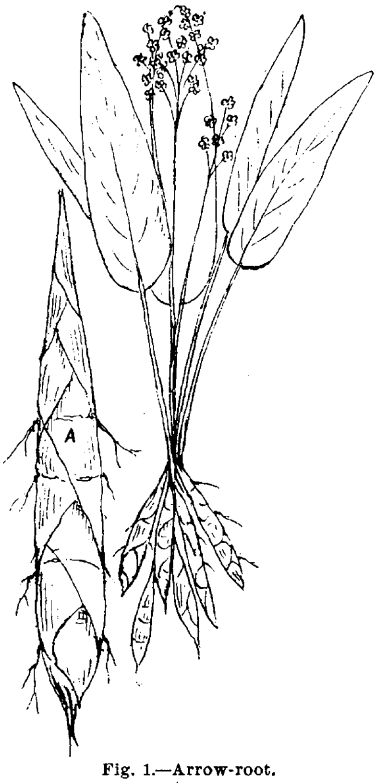

Fig. 1.—Arrow-root.

The plant is easy to cultivate. In fact once planted it is very hard to get rid of, as the smallest piece of root left in the ground multiplies rapidly.

The process of extracting the farina is very simple, and the ordinary housewife finds no difficulty in obtaining the starch from the fresh roots. These are first washed. They are then grated on an ordinary grater into a pan or vessel of water. The pulp is thoroughly stirred in the water in order to separate the starch cells from the fibrous portion. The vessel containing the grated roots is now set aside for a short time to allow the starch cells to settle. These cells being heavier than the fibrous portion, sink to the bottom. The water containing the débris can now be poured off and fresh water added. The starch and fresh water are well mixed together and then set aside for the starch to settle as before. This washing process may be repeated a number of times. The more thoroughly the starch is washed the purer it becomes.

Owing to the limited demand for arrow-root the plant is not cultivated much in Florida. Many of the negroes raise it on their small farms in limited quantities in order to obtain starch for laundry purposes. The supply can, and doubtless will be, always equal to the demand.

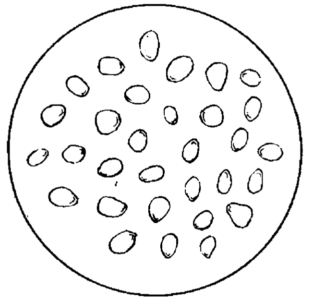

Fig. 2.—Starch cells, Arrow-root.

CASSAVA.

"Cassava" belongs to the family of euphorbiaceæ, and the bitter variety of Brazil (*Manihot utilissima*) is said to contain a large per cent. of hydrocyanic acid.

The sweet variety is indigenous to both Africa and the West Indies. From the last it was introduced into Florida under the name of "cassava" (also aboriginal).

The wild variety was eaten by the South American and Caribbean Indians centuries before this country was discovered by Europeans. In Brazil today mandioca is as much in use as wheat and corn in the United States.

The Indian mode of preparing the roots for food, in vogue nobody knows how many centuries before the first Spaniard or Portuguese came to the country, has not been much improved upon. With a shell or a rude grater made by setting a small sharp stone into a bit of bark, the roots are scraped to a fine pulp. The pulp is then rubbed between stones until all the poisonous juice is squeezed out, and the remaining moisture evaporated by exposure to the fire or hot sun. During the drying it is stirred or broken into coarse grains. This is the farina or mandioca flour, the bread of the rural Brazilians. The Portuguese invented mills for preparing mandioca, not unlike Yankee cider presses. The roots are first washed and then the rind is removed. Then the pieces are held in the hand, in contact with a circular grater.

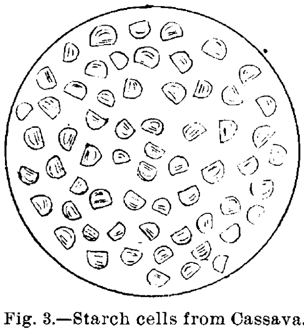

Fig. 3.—Starch cells from Cassava.

The pulverized material is placed in sacks, several of which are subjected to the action of a screw press, or they are suspended from a pole and weights attached to them. These processes cause the expulsion of the poisonous fluid. The mass thus treated is next beaten fine in a mortar. It is now transferred to open ovens and stirred constantly until thoroughly dry. When properly prepared, the farina is very white and beautiful.

Mandioca is said to have medicinal virtues. A poultice made of the grated pulp and moistened with the juice, is considered a cure for abscess. A drop or two of the poisonous juice is administered for tapeworm. But it is principally with the sweet variety or true cassava grown in Florida that the reader is most interested. It is undoubtedly destined to take high rank as a food plant not only on account of its richness in starch, but also from its enormous yield under proper cultivation. It is said to yield 600 bushels per acre, while sweet potatoes (or yams) yield but 500 under the same conditions.

The following is the United States Department of Agriculture analysis:

Water	70.44 per cent.
Ash	.57
Oil and fat	.38
Glucose	.28
Sugar	5.19
Crude fiber	1.19
Nitrogenous bodies	1.03
Starch	21.24

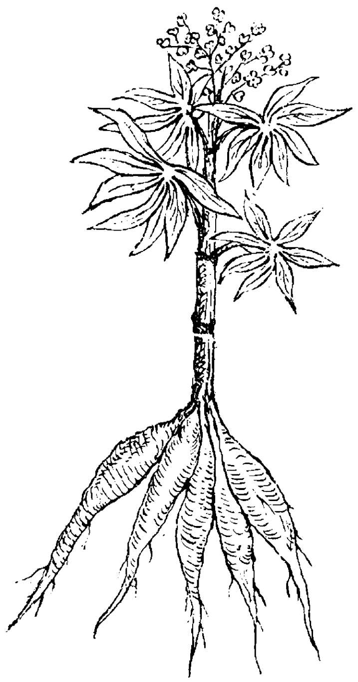

Fig. 4.—Cassava Plant.

Sweet cassava (*Manihot aipi*, Pohl.) abounds in a milky non-poisonous juice. The roots are grated the same as the bitter variety and the juice extracted.

The resulting farina consists largely of broken cell-walls containing a certain quantity of starch. The farina or meal is dried on plates, and is made into cassava cakes. The liquor, which passes away under pressure, contains a large amount of starch. This may be recovered if the liquor is allowed to stand until settled, when the liquid portion can be poured off, and the starch reclaimed. (Fig. 3.)

In the illustration it will be seen that the starch cells are muller-shaped. Tapioca is prepared by heating moistened cassava starch on hot plates.

This process alters the starch cells, causing them to swell up, many of them bursting and agglomerating in small irregular masses. Tapioca is not pure starch. By the process adopted part of the starch is changed into gum; there are also traces of sugar to be found in tapioca.

In the liquor that is poured from the deposited starch much gum and some albumin may be obtained.

The illustration shows the entire plant. It is not propagated either from the root or seed. Pieces of the stalk are planted and from the buds grow the future plants. In this way sugar cane is also propagated.

KOONTI.

This plant (*Zamia intregrifolia*) is a native of South Florida, and is called "Indian Bread-root." In its foliage it bears a resemblance to the palm and tree fern. In affinity it is nearer the latter than the former. Figure 5 represents the appearance of the plant. Its root is the edible portion.

When the poor whites on the east coast are greatly in need of money they go to the woods and dig koonti, finding a ready market for the roots. Indeed, it is the sole occupation of many people. The roots are not cultivated, as they grow wild in great abundance. A very fine quality of starch and tapioca is manufactured from them, which may be found at all times in the Key West market.

Figure 6 shows the appearance of the starch cells of

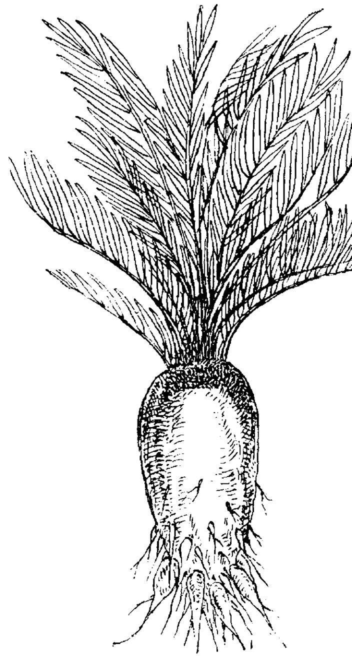

Figure 5.

koonti. They are muller-shaped, like those of cassava, but smaller. The starch is said to be equal to the best Bermuda arrow-root, and lately its worth as an article of commerce has been fully recognized in Florida. There are a number of factories for its preparation in Southern Florida. A correspondent of the United States Agricultural Department writes: "I ate of a koonti pudding, at Miami, and can say that, as it was there prepared and served, with milk and guava jelly, it was delicious."

The unique industry (in the more limited sense of the word) of the Seminole is the making of the koonti flour. The Indian process is this. The roots are gathered, the earth is washed from them, and they are laid in heaps near the "koonti log." The koonti log, so-called, is the trunk of a lage pine tree, in which a number of holes, about nine inches square at the top, their sides sloping downward to a point, have been cut side by side. Each of these holes is the property of some one of the squaws or children of the camp. For each of the holes, which serve as mortars, a pestle made of some hard wood is furnished.

The first step in the process is to reduce the washed koonti to a kind of pulp by chopping it into small pieces and filling with it one of the mortars, and pounding it with a pestle. The contents of the mortars are then laid upon a small platform; each worker has one. When a sufficient quantity of the root has been pounded, the whole mass is thoroughly saturated with water, in a vessel made of bark. The pulp is then washed in a straining cloth, the starch of the koonti draining into a deer hide suspended below. When the starch has been thoroughly washed from the mass, the latter is thrown away, and the starchy sediment in the water left to macerate. After some days the sediment is taken from the water and spread upon palmetto leaves to dry. When dried, it is a yellowish white flour, ready for use.

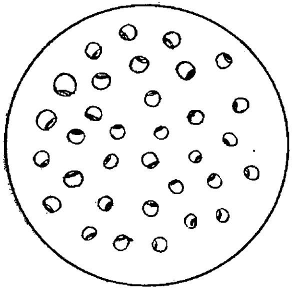

Figure 6.

In the factories this process is substantially followed but with improved appliances. The chief variation being that the koonti starch undergoes several successive macerations, thereby making it purer and whiter than the Indian product.

The koonti bread made by the Indians is of a bright orange color. It is rather insipid, though not unpleasant to the taste. It is made without salt. Its yellow color is due to the fact that the flour has had but one maceration.

A STUDY OF THE DEFORMITIES OF THE JAWS AMONG THE DEGENERATE CLASSES OF EUROPE.

BY EUGENE S. TALBOT, M.D., D.D.S.
FELLOW OF THE CHICAGO ACADEMY OF MEDICINE.
CHICAGO.

The Twelfth International Medical Congress in Moscow, afforded me a long-sought-for opportunity, not merely to visit Russia, but also to cover nearly all the countries of Europe. In visiting the various cities I made special observations of the degenerates in each of the various institutions for the defective classes. The objective points of interest were the prisons, insane hospitals, schools of idiocy, foundlings' homes, etc. The features of the soldiers, police and cabmen, as well as the citizens themselves, were incidentally noted for the purpose of comparison. These observations, however, were for an entirely different purpose, the object of this paper being to record results as to the deformities of the jaws and teeth of the mature degenerate classes.

In a prison in Athens containing 452 convicts, not a single V or saddle arch was found, although slight irregularities of the teeth due to local causes were observed. Arrest of the lower jaw, however, was the rule, which together with the recession of the forehead gave to the individual an idiotic appearance. Irregularity, in the relation of the upper to the lower jaw due to excessive and arrest of development, was very common. The third molars, upper and lower, were present, but the vault was lower than the average.

In a Greek insane hospital (idiots are here confined with the insane), in Constantinople, of 332 inmates (equally divided as to sex) only one case of V-shaped arch was noted. The vaults were low, upper jaws large and full, but 48 per cent. of the lower jaws arrested, the third molars normally developed.

In an Armenian insane hospital (idiots are here confined with the insane) in Constantinople, of 250 inmates (175 males, 75 females) there was one partial V-shaped arch, the third molars normal, and the lower jaw arrested in 18 per cent. There were many mongoloid faces.

In the Vienna Insane Hospital, among 326 insane and idiots there were 4 partial V and 1 saddle-shaped. The third molars were normally developed in 311 cases.

In a prison in Moscow, with 2,000 convicts (247 of which were in the hospital) there were no contracted jaws nor irregularities of the teeth. The jaws were very large and vaults low. In the Moscow Reform School, 112 boys were ranging from 10 to 18 years. Three had partial V-shaped arches; no saddle-shaped arches. The jaws, as a rule, were large and broad with low vaults.

In a Moscow insane hospital with 400 patients, of which 12 were idiots, no contracted arches were observed. The jaws were large and broad with low vaults.

In the Stockholm Insane Hospital, with 270 patients, 6 V-shaped arches, 12 partial V, 4 semi V, 23 saddle-shaped, 4 partial saddle, 11 excessively developed upper jaws, 3 excessively developed lower jaws, 9 hypertrophy of the alveolar process, 42 missing third molars, 6 missing laterals were noted. Deformities of individual teeth were numerous.

The School of Idiocy of Stockholm with 120 inmates, 80 boys, 40 girls, gave the following results:

BOYS.	GIRLS.
14 normal jaws.	15 normal jaws.
12 V-shaped.	1 V-shaped.
10 partial V-shaped.	5 partial V.
4 semi V-shaped.	5 semi V.
8 saddle-shaped.	8 saddle-shaped.
1 partial saddle.	1 semi-saddle.
2 semi-saddle.	6 macrocephalic.
12 macrocephalic.	4 microcephalic.
5 microcephalic.	

Thirty-two boys and fourteen girls had hypertrophy of the alveolar process on the upper jaw. One boy, aged 13 years, who was able to take care of himself, had a head thirty-two inches in circumference, one of the largest on record. The prison at Hamburg had 1800 convicts. Large, well-developed jaws were the rule. Asymmetry in development, however, was frequently noticed as well as other stigmata.

The School of Idiocy at Hamburg had 600 children, 396 boys, 204 girls, and gave the following results:

BOYS.	GIRLS.
62 normal jaws.	28 normal jaws.
12 V-shaped.	4 V-shaped.
16 partial V.	7 partial V.
8 semi-V.	3 semi-V.
4 saddle.	1 saddle.
3 partial saddle.	1 partial saddle.