

the inferior and posterior portion of this lobe, above and behind the tympanic roof and the petrous portion of the temporal bone. In cases of cerebellar abscess the most usual site is at a point close to the anterior and lateral surface of the cerebellum, behind the petrous portion of the temporal bone.

In cases in which the surgeon, although convinced that an abscess exists in some part of the encephalon, is nevertheless unable to decide whether it is located in the cerebrum or in the cerebellum, it is his duty to explore first the most likely sites in the cerebrum, and then, if he fails to find the abscess in this part of the brain, to explore the cerebellum.

Meningitis of otitic origin is sometimes non-suppurative (meningitis serosa). Usually, however, it is purulent in character and limited to a comparatively small area by a preceding adhesive inflammation. In these cases of serous meningitis the early recognition of the presence of the disease and the drainage of the affected region—by the establishment of an opening in the bony wall of the cranial cavity, by incising the dura, and finally by inserting a gauze drain—has in some few cases been the means of saving a patient's life. As a preliminary to these steps one may, according to the acuteness or the chronicity of the causal ear disease, either make a simple opening into the mastoid cells, in order to reach the deeper-lying structures, or perform the radical operation. The tympanic roof must be removed and the dura incised. In cases of meningitis serosa, the ventricle should also be drained, by means of a tent or drain left *in situ*, and in addition it may be well to make a lumbar puncture.

In all cases of intracranial complications of otitic origin, the mastoid cells and the antrum—and, in chronic cases, the tympanic cavity as well—are first to be opened into. Then the surgeon, bearing in mind that in the large majority of instances the intracranial complication lies nearest the focus of infection in the ear, and realizing also that it is desirable to enter the cranial cavity by that route which is at once the easiest and nearest as well as the one which admits of the best drainage, proceeds—in the case of a lesion which he believes to be located in the middle fossa or vicinity—to remove the thin plate of bone which separates the tympanum, antrum, and adjacent cells from the cranial cavity (see Fig. 3329). One surface of this plate of bone—it should be remembered—forms the tympanic roof, the other the floor of the middle fossa. The first opening through the bone is to be made with the chisel, but afterward the curette and rongeur forceps are to be employed for the purpose of enlarging it. Either of these instruments is much to be preferred to the chisel, the trephine, or the dental burr. They are not only fully as effective as these, but they possess in addition the great advantage of not being likely, as are the other instruments, which have to work from without inward, of wounding the deeper-lying soft structures. In the removal of bone by means of the curette or the rongeur forceps the tip of the former or the beak of the latter is inserted between the dura and the bone, and a portion of the latter of the size desired is then easily broken or bitten off; the force applied always working in the direction away from the soft parts. If the cortex is unusually thick and sclerosed at any one point it may be best to employ the chisel for the purpose of removing the more superficial portions, and thus gradually to reduce the bone to the desired degree of thinness. It is surprising, however, how thick a mass of bone the forceps shown in Fig. 3325 is capable of biting off. After the tympanic roof has been removed it is easy to extend the opening in any given direction—as may be indicated by the route taken by the infection—by removing the lateral wall of the middle fossa (the squamous plate of the temporal bone). In removing this plate care must be taken to avoid the middle meningeal artery, as the wounding of this vessel is likely to cause a hemorrhage which it is difficult to control. As has been said above, the larger number of intracranial complications are seated in the

lower and posterior portion of the temporal lobe, and consequently, as soon as the plate of bone above the excavated mastoid cells has been removed, it is most likely that the nature of the lesion will then be revealed. Furthermore, the affected area will by this mode of procedure be exposed at its most dependent point. When once the diseased tissues are exposed, bone must be removed until normal tissue shows around the diseased area. If a localized pachymeningitis (an extradural abscess) is present, the simple laying bare of the site of the disease and establishing good drainage, after carefully cleansing the parts, will result in a cure. It is best not to curette any granulations that may be present. If, after they have thus been exposed, they do not soon disappear, cauterization by means of the nitrate-of-silver stick may be resorted to. The wound should be left widely open and antiseptic or sterilized dressings applied.

When an encephalic abscess is suspected but not located, the best way of searching for it is first to incise the dura in the centre of the bone opening so that hemorrhage from any bleeding vessels may be readily controlled. (The reason why the bleeding may more easily be controlled at this part of the wound becomes apparent if we consider the fact that these vessels have a tendency to retract, and if the opening is made near the bony edge the vessels may retract under this bone and so make it difficult for the surgeon to seize them with the artery clamp.) In incising the dura, merely the outer layer should be opened with a knife and the inner layers penetrated with a blunt-pointed, deeply grooved director. The same instrument should be used in exploring the cerebral tissues for the purpose of locating the pus; a trocar and cannula do not answer equally well, as the latter readily becomes clogged, and, besides, it is easily possible to pass the two instruments directly through a pus cavity into sound brain tissue beyond and thus fail to obtain any pus when the suction syringe is applied to the cannula after the withdrawal of the trocar. But when a grooved director is employed in exploring the brain, especially if a little downward pressure is exerted upon the brain tissue at the same time, and if the outer part of the sinus is stretched open by means of an artery clamp or a pair of dressing forceps, the pus—if any has been encountered in the track of the instrument—will almost surely escape by way of the groove in the director. When the brain is exposed in the manner described care must be exercised to prevent the director from penetrating to a vertical depth of more than 3 cm. It may be necessary to introduce the instrument several times before the abscess is located. It should first be introduced in a direction upward, inward, and backward, in the temporo-sphenoidal lobe; then, if the abscess is not found in this direction, the director may next be passed directly inward and upward. If here too no pus should be discovered, it will be well to introduce the director inward, upward, and forward. As regards the proper mode of conducting the exploration I will simply add that the director should be advanced slowly for a short distance and then withdrawn for a part of this distance; then it should be pushed in a second time to a still greater depth and again withdrawn as in the first instance; and so on. When the pus is encountered, the track made by the director should be freely enlarged with the scalpel, and the pus allowed to flow out. The finger should then be introduced to explore the wall of the cavity and the latter should be cleansed with gauze wipes. I prefer this procedure to even gentle syringing with a saline solution and the employment of the double catheter; it is less likely, as it seems to me, to force the pus into the loose open cerebral structures. I also prefer to rely upon a gauze drain rather than upon a rubber or bone drainage tube; for these tubes, as it seems to me, are more unyielding and therefore more irritating to the soft cerebral tissues. A wick formed of a number of strands of catgut or silkworm gut make a good drain. In the subsequent care of the wound it will be found advisable to dry out the cavity in the brain every other day, and sometimes even daily, and on each occasion a shorter drain should be inserted, until the cavity finally

closes. When, as occasionally happens, a hernia cerebri develops after the evacuation of the abscess, moderate pressure and the cicatrization of the tissues will have to be depended upon for the reduction and eventual obliteration of the protruding mass. Celluloid and other materials have been employed to take the place of the loss of bone substance. I have had no personal experience with their use, and am therefore unable to pass judgment upon their value.

When the lesion exists in the posterior fossa or in the cerebellum, the sinus is first uncovered (see Fig. 3329) and the bone gradually removed backward and upward throughout the entire area invaded by the infection. Such removal of bone should not stop until normal tissues appear on every side of the bone opening. It is easy to explore the cerebellum posteriorly to the sinus, the point of entrance being in the angle formed by the junction of the horizontal portion of the lateral sinus with its sigmoid portion. The exploring director is introduced at first inward and forward toward the petrous portion of the temporal bone. If pus is not found here, the director, in the subsequent explorations, should be turned more and more in a backward direction. It is a much more delicate task to enter the cerebellum anteriorly to the sinus. If the director is introduced at this point, it should be kept on a level with the *aditus ad antrum*, and the surgeon should be cautious about pushing the instrument in a downward direction in the vicinity of the jugular bulb.

The route from the excavated mastoid cells to the seat of the intracranial lesion is of course the only route to be followed by the surgeon in cases in which the infection has clearly spread along a pathway leading from necrotic tissue in the mastoid region to the deeper-lying area of disease within the cranial cavity.

There are those who claim, with some show of reason, that the removal of the tympanic roof exposes the cranial contents to a greater danger from infection than if a separate opening were to be made, by means of a trephine or chisel, into the middle or posterior fossa, the floor of the middle fossa or the anterior wall of the posterior fossa being allowed to serve as a barrier between the infected mastoid cells and the contents of the cranial cavity. But, as I have already stated above, this method of operating does not afford the best drainage (especially when the middle fossa is involved), and furthermore if one or the other of the cavities is already infected—as is presumably the case—additional infection is not likely to augment the danger. On the other hand, if the cranial contents are found to be normal, it is easy to prevent an extension of the infection from the middle ear by means of proper dressings. Then again, there is ample evidence to show that, when provision has been made for good drainage, infection does not so readily pass from the antrum or the tympanum to the soft parts within the cranial cavity when the latter are deprived of the wall of bone that separates them from the middle ear. In a number of instances which have come under my direct observation an opening has been inadvertently established in the middle or posterior fossa, during the course of the operation for a simple uncomplicated mastoiditis, and yet in not a single one of these cases have I known any symptoms to develop which would justify the belief that any infection had spread to these deeper structures after the establishment of this opening.

In operations for suspected intracranial lesions the preference should be given to chloroform as an anesthetic, owing to the fact that it produces less congestion of the cerebral vessels, etc.

The course of events after the evacuation of a brain abscess by operative interference can perhaps best be shown by the report of a case: A child, four years of age, was admitted to my service in the New York Eye and Ear Infirmary on March 29th, 1902. The history of a long-continued, foul-smelling discharge from the right ear, with the development, some ten days previously, of a swelling behind and above the ear, was obtained. The child was prepared for immediate operation. The mastoid incision was extended upward to and above the parietal eminence.

This unusually long incision was rendered necessary by the existence of a large subperiosteal abscess, filled with a most foul-smelling pus and occupying a space extending upward, from the mastoid tip, over three inches and from an inch to an inch and a half in width. The periosteal walls were found to be gangrenous. The bone, over a small area immediately below the parietal eminence, was of a purple-red color (evidently a beginning necrosis). The mastoid cells were opened and much cholesteatomatous material was evacuated; the posterior canal wall was removed and the tympanic cavity cleared of all granulations by means of the curette; the usual flap was made from the membranous external auditory canal. The dura was exposed above the tympanic roof and found to be normal. Owing to the necrotic condition of the periosteum the wound was left open throughout its entire extent.

Notwithstanding the fact that the child was a puny specimen of humanity and did not possess much recuperative power, the wound made fair progress toward healing. Suddenly, while she was sitting up in bed, on the morning of April 22d, the child collapsed. When I reached the patient, a few hours later, she was unconscious, with a pulse of 120 and a temperature of 106° F. The resident surgeon reported that, before she became unconscious, he had failed to find any evidence of paralysis or of anesthesia. The patient was prepared for another operation. The opening in the tympanic roof, made at the first operation, was enlarged, a portion of the squamous plate of the temporal bone was removed, and the dura mater was exposed from the tympanic roof to the parietal eminence a distance of about three inches; its width measured about one inch. The dura mater immediately above the tympanic roof, which had been exposed at the first operation, was covered with healthy granulations, and the dura mater, on further exposure, was found to be healthy for a distance of from half an inch to three-quarters of an inch beyond. As the work of removing the bone advanced in an upward direction, it was found that the portion of the skull which at the time of the first operation had presented a purple-red color, was now noticeably softer and more friable, and immediately under the centre of this area was found a perforation in the dura mater. Granulations covered all this portion of the dura mater, but they were most exuberant in the immediate vicinity of the perforation. Pus exuded from the opening. A grooved director, introduced into this opening and pushed on toward the centre of the brain, met with no resistance until it had reached a depth of about two inches. As the next step an incision was made through the dura mater at this point. This liberated a small amount of odorless pus and some clotted blood. On introducing an encephaloscope into the abscess cavity its bottom was found to be filled with a blood clot. This clot, it was inferred, was the result of a recent hemorrhage and the cause of the collapse which had occurred a few hours previously; it was therefore not disturbed.

During the period that followed the operation the wound was dressed daily up to the fifth day, when, as very little pus was present, the blood clot, with the aid of the encephaloscope, was removed. Upon taking away the last piece of this clot I was surprised to see that the lumen of the encephaloscope filled up with a clear fluid. I introduced cotton-tipped applicators in quick succession and in this way I was able to stop the flow for a sufficiently long time to obtain a view of the bottom of the cavity. It presented a smooth surface of a pinkish-white color, and I noted the fact that the fluid rose and fell with each inspiration and expiration. There can scarcely be any doubt that the descending horn of the lateral ventricle constituted the floor of the cavity into which I was looking.

A week later, as only cerebral fluid was exuding from the cavity, the gauze drain was removed, and on the next day I found that the cavity had closed. From this time onward the patient improved steadily, both as regards her general health and as regards the condition of the

wound. In fact, at the end of four months she had visibly gained in flesh and I had every reason to expect a favorable result. But at about the beginning of the fifth month after the operation, the patient developed a slight paresis of the left hand and leg; two weeks later the body temperature suddenly rose to 106° F. Further operative interference revealed a softening of the superficial brain structure, near the outer wound, but no abscess was discovered. The patient sank gradually, and at the end of another two weeks died. No autopsy was allowed, but the brain was explored through the wound of the operation. No abscess was found, but the lining of the lateral ventricle was covered with a purulent exudate; in all likelihood this condition extended throughout the whole ventricular system of the brain.

In all probability the abscess, in the case just narrated, was situated in the posterior portion of the first temporo-sphenoidal convolution. As regards the operation it seems to me that it would have been better if I had entered the cranial cavity below the parietal eminence. If I had done this I would not have found it necessary to remove the bone over the tympanic roof nor the lateral wall of the middle fossa, for a distance of over half an inch above the linea temporalis; and, besides, I would have left a smaller area of brain surface unprotected by bone.

The infection, in this case, evidently spread from the middle ear to the antrum, and thence to the cortex of the mastoid process, where it caused the formation of a subperiosteal abscess which extended forward as far as to the parietal eminence and even a short distance above it; it then spread to the bone in the region situated below the parietal eminence, causing a necrosis which extended from the outer table of the bone to and through its inner table; it then finally invaded the dura mater (pachymeningitis and an extradural abscess), causing necrosis of the portion invaded, and eventually involving the cerebral structures themselves (abscess of the brain).

II. *Septic Sigmoid Sinus Thrombosis.*—In cases of septic sigmoid sinus thrombosis the surgical measures required are the following: The mastoid operation having been completed in the manner already described in the earlier part of this article, the sinus wall is to be gradually removed by the use of a broad curette, and, when an opening has been made in the wall, it should be enlarged upward and downward with a pair of rongeur forceps. The sinus should be exposed for a sufficient distance beyond the knee, so that, if it should become necessary to introduce a curette at this point, there would be no obstructing curve to interfere with its use. In the downward direction the sinus should be exposed to view as far as the jugular bulb (see Fig. 3329). Near the bulb the operator must proceed cautiously, in order that he may avoid wounding the facial nerve in front of it; he must also remember that the foramen lacerum posterius does not give exit, from the skull, to the jugular vein alone, but that it also affords a passage, through its anterior portion, to the glosso-pharyngeal, the pneumogastric, and the spinal accessory nerves. The inferior petrosal enters the sigmoid sinus immediately above the jugular bulb.

As soon as the wall of the sinus has been fully exposed to view the question at once presents itself, Does it or does it not contain a thrombus? Unless the clot is large enough to occupy the entire lumen of the sinus canal, this question is a very difficult one to answer. From palpation alone it may be impossible to determine whether fluid blood is present or not; and it is practically useless to endeavor to make a diagnosis by aspiration of the sinus; for if the clot is centrally located the trocar will be likely to push it to one side, or if it hugs the wall of the vein the instrument will pass entirely through it. In either case, therefore, only fluid blood is likely to be obtained. It is therefore generally necessary to make the diagnosis from the general and the local symptoms alone (see Vol. III., p. 658). In some cases, however, the symptoms are not sufficiently marked to enable the surgeon to make a positive diagnosis. When this is the case he will

be compelled to make a small incision in the sinus wall, the blood current being shut off above and below by the fingers of an assistant. If no clot is found, a simple pressure tampon will control the bleeding, and this tampon may be removed in the course of a few days. On the other hand, if a clot is found the sinus should be opened from a point a little above the jugular bulb to one situated a short distance above the knee, the bleeding during this procedure being under the control of the assistant. The curette is then introduced into the sinus through the incised opening and directed toward the torcular. At the instant when this is done, the assistant should cease to make pressure upon the sinus, thus permitting the surgeon rapidly to curette the interior of the vein in the direction named. In carrying out this part of the operation it is permissible to use a fair degree of firmness in scraping the external wall of the sinus, but a more delicate touch is necessary when the pressure is applied against the internal wall—that which lies next the cerebellum. Free bleeding is allowed for a few seconds so that the blood current may wash out any small particles of clot that may have escaped the curette. An iodoform gauze tampon (placed over, not in the sinus) is used to control the hemorrhage; if it should be inserted into the lumen of the canal it would hold it open, and when it became necessary to remove it the withdrawal of the tent would be likely to pull the clot out with it and so cause a recurrence of the hemorrhage. The mode of procedure recommended for the upper portion should also be applied to the jugular end of the sinus. The wound is then to be dressed as after a mastoid operation. If the wall of the sinus is found to be necrotic, as much of the diseased tissues as possible should be cut away. Very little pressure is required to control the hemorrhage; that exerted by the usual packing of gauze and by the outer dressings is all that is required.

III. *Ligation and Excision of the Internal Jugular.*—This is the last of the series of operations which the surgeon may have to perform in order to rescue a patient from the fatal effects of an inflammation of the middle ear. The patient is placed on the operating table with the shoulders raised and the head turned to the opposite side; this sharply defines the anterior border of the sterno-cleido-mastoid muscle, which is the guide to be followed by the surgeon in cutting down on the vein. The neck should of course be thoroughly cleansed and the field of operation rendered aseptic. The incision in the skin extends from the sterno-clavicular articulation to a point midway between the angle of the jaw and the mastoid process. It is carried through the superficial fasciæ and the platysma myoides muscle. On reaching the deep cervical fasciæ the surgeon should do whatever further dissecting may be needed, with the handle of the scalpel, or with some other blunt instrument, rather than with the cutting edge of the knife. The latter is to be used only where the tissues are too firm to be torn apart. The branches of the superficial cervical nerve and of the external jugular vein are encountered in the course of the operation. About two-thirds of the way down the neck, and beneath the sterno-cleido-mastoid muscle, is the omohyoid muscle, which must be drawn down out of the way. Some small vessels are encountered, and if they get in the way, they should be ligated and divided. The jugular vein lies in the same sheath with the internal carotid artery and the pneumogastric nerve, and is covered by a fibrous sheath which also constitutes the posterior wall of the sheath of the sterno-cleido-mastoid muscle. The muscle is retracted and this sheath is divided and then opened throughout its entire length. The vein, it must be remembered, is very thin and easily punctured, especially if distended. It usually lies to the outside of the artery, the nerve lying between the two. At times the vein is collapsed and so small that it is difficult to find.

When the vein has been freed throughout this entire length its branches are next to be tied off (*i.e.*, the facial, the superior and middle thyroid, and the lingual veins). The internal jugular is then to be tied at two different

points—one a little above its union with the subclavian vein, and the other at its upper end. At each of these two points two separate ligatures are to be placed around the vein, which is then to be divided at each of these points; the knife (guided by a director, which at the same time protects the surrounding structures from injury) passing between the two ligatures in each case. The division is to be made at the lower point of ligation first, and the vessel is to be carefully dissected out from its bed until the upper point of ligation is reached. At this point the vein is again to be divided and the expected portion entirely removed. Under no circumstances should this infected part of the vein be allowed to remain behind. If there has been no sloughing of the sinus, and if no pus is present in the wound, it may be entirely closed with sutures, or a drain may be placed at either end or at both ends, and the usual dressings applied.

Jansen (*Archives of Otolaryngology*, vol. xxx., p. 367), in a discussion on otogenous sinus thrombosis, in which the question of whether or not the jugular vein should be ligated before or after the opening of the sinus, or at all, constituted the most important point discussed, promulgated the following rules:

Ligation of the jugular vein is done—

I. As the first step of the operation: (1) in undisputed cases of jugular phlebitis; (2) in septicæmia.

II. After exposure of the sinus: (1) if the sinus appears healthy, having no perisinos affections, but being accompanied by rigors and marked oscillations of temperature indicative of a marked septicæmia; (2) in periphlebitis and parietal thrombosis under the same conditions.

III. After incision of the sinus: (1) if the septic thrombus is or was situated in the immediate neighborhood of the jugular bulb; (2) if, after the incision, the rigors do not cease, nor the temperature decrease materially.

The sinus is opened (1) when there is evidence of a septic disintegrated thrombus; (2) in gangrene of the sinus wall; (3) in repeated rigors, with marked oscillations of temperature and poor general condition; (4) when there is neuritis optica.

The weight of opinions as well as the weight of statistics would lead one to believe that the above-mentioned rules for guidance in these cases are very judicious, being neither too conservative nor too radical.

Randall (*University Medical Journal*, October, 1900), in an article entitled "A Review of Surgery, with Special Reference to Operation for Phlebothrombosis of the Lateral Sinus" and containing a most excellent summary, draws the following conclusions: Shock should be forestalled by avoiding loss of blood, by maintaining the body temperature, by the injection of a hot saline solution, and by the rapid use of the chisel, curette, and the rongeur with the minimum use of the mallet.* Metastases already formed, even in the lungs, are not necessarily contraindications for operation, since the secondary foci are generally less virulent and may heal. Brain abscess, especially in the cerebellum, should be constantly watched for, and may yield to prompt evacuation. Leptomeningitis alone seems to preclude recovery; and yet, in some cases, the symptoms of this serious complication may promptly disappear after operation.

The carotid artery and the bulb of the jugular vein because of their displacement forward into the tympanic cavity, have, in a few rare cases, been wounded in operations upon the drum membrane or in the middle ear. Bruhl mentions a case in which the carotid canal almost reached to the promontory of the middle ear. If this accident should occur, packing with iodoform gauze may control the hemorrhage, and continued pressure over the carotid will assist in the formation of a clot.

In cases in which the internal ear is the seat of a purulent inflammation, the labyrinth will have to be opened

* The inhalation of oxygen, especially in septic cases or in those in which the lungs are involved, is an excellent sustaining measure.

and drained; and if sequestra of the bony labyrinth exist, they will have to be removed. Robert Lewis, Jr.

LITERATURE.

Broca: The Surgical Anatomy and Operative Surgery of the Middle Ear. Buck: Diseases of the Ear. Bacon: Manual of Otolaryngology. Bruhl and Politzer: Atlas and Epitome of Otolaryngology. Macewen: Diseases of the Brain and Spinal Cord. Jacobson and Steward: The Operations of Surgery. The Archives of Otolaryngology, The Journal of Laryngology, Rhinology and Otolaryngology, and various monographs by different authors.

MATCHLESS MINERAL WELLS.—Butler County, Alabama.

Post-Office.—Greenville. Hotels in Greenville.

These wells, two in number, are situated two and one-half miles from Greenville, a pleasant little town of about 4,500 inhabitants, in the pine region of Alabama. Greenville is located on the main line of the Louisville and Nashville Railroad, forty-four miles south of Montgomery. The following somewhat remarkable analysis of the water of these wells is said to have been made by Profs. E. A. Smith and J. B. Little, and to have been indorsed by Prof. Henry W. Leffmann:

ONE UNITED STATES GALLON CONTAINS:

Solids.	Grains.
Sulphuric acid	314.09
Ferric oxide	86.33
Ferrous oxide	81.38
Calcic oxide	24.53
Magnesian oxide	22.71
Potassic oxide	1.11
Alumina	3.65
Silica	5.04
Sodium oxide	4.09
Chlorine	2.47

Total solids..... 545.60

Carbonic acid undetermined. Specific gravity of water, 1.007.

This analysis shows the water to be a powerful chalybeate. It is bottled, and is said to have an extensive sale in the South. The water is recommended for dyspepsia, diarrhœa, anæmia, general debility, etc. As a local application it is used in indolent ulcerations and hemorrhoids, as an injection in gonorrhœa and vaginitis, and as a spray or gargle in throat affections. The dose as a tonic is one or two drachms three times a day, diluted with plain water; as a cathartic, six, ten, or twelve drachms in an equal quantity of water.

James K. Crook.

MATÉ—YERBA MATÉ. PARAGUAY TEA. The dried leaves of *Ilex Paraguensis* St. Hil. (fam. *Illiciaceæ*). The plant yielding this important article is a shrub or small tree, growing both wild and cultivated in the country for which it is named, and in other parts of South America. The leaves are evergreen, lanceolate or oblong, blunt, and sparsely serrate. For use they are collected, dried, and generally broken into fine fragments.

It is not a drug in the proper sense of the term, but a beverage substance, being drunk in South America as a substitute for tea, for the sake of its one-half to one and one-half per cent. of caffeine. With this there occur about fifteen per cent. of tannin and a trace of volatile oil, so that the resemblance to tea is very close. It is the staple beverage of millions of people, who are quite as fond of it as any people are of other beverages, and it has the advantage of being very cheap. Various spasmodic attempts have been made to introduce it abroad, as a cheap substitute for tea, for the poorer classes, but they have not succeeded. At the present time (A. D. 1901), a much more powerful and sustained commercial attempt is under way, which bids fair to succeed. In doses about double those of tea, the characteristic action of theine or caffeine is to be obtained.

Henry H. Rusby.

MATICO.—"The leaves of *Piper angustifolium* R. et P. (fam. *Piperaceæ*)" (U. S. P.). This plant is a large shrub or small tree, growing upon the eastern slope of