

languid pulse, dilated pupils, cool surface, pale face, and by a look of weariness and depression.

The treatment requires quietude of body and mind, stimulating and anodyne remedies, ammonia, camphor, opiates, ext. guarana—3 ss. to 3 j.; spirits—brandy, whisky, etc., during the attack; and iron, strychnia, quinia, arsenic, bathing, electricity, and nourishing diet to tone up the system during the interval.

In the hyperæsthetic headache we have excitement and a peculiar sensitiveness of the brain, that render it painfully cognizant of impressions that ordinarily would not affect it at all, as we have spasms and convulsions from slight noises—as the rattling of water—in similar conditions of motorial irritation, caused by brain poisoning from strychnia, hydrophobia, and other poisonous agents. The accumulation of urea in the system produces this irritable, painful neurotic condition of the brain so favorable to headache. Some of the most severe and persistent headaches I ever saw were associated with Bright's disease of the kidneys. Other poisonous agents also affect it thus. This painful predisposition and impressibility is sometimes left by sunstroke. Sometimes it is the legacy of inheritance. Come as it may, or however produced, when this painful predisposition exists, slight exciting causes from without or from within are sufficient to develop an attack.

Mental and bodily fatigue, exposure to the sun's rays, loss of sleep, imprudence in diet, the excessive use of tea, coffee, tobacco, and spirits, may be mentioned as familiar examples. The irritations reflected from distant parts and organs, as those of the uterus, bladder, and stomach, have been mentioned. This neurotic condition of the brain may be more or less present in all the varieties of headache. It may be associated with anæmia or with hyperæmia.

In the treatment, opium or its alkaloids, morphia or codeia, when not contraindicated by some individual idiosyncrasy, is the surest and speediest remedy we possess to alleviate the attack. Hydrate of chloral in fifteen grain doses, repeated every hour or two till relief is obtained, is a valuable remedy, especially where there is some hyperæmia. So, in the same condition are the bromides, in full doses, caffeine, in two to five grain doses, in tea or coffee, fluid extract of guarana (*Paulinia sorbillis*) in one-half to one drachm doses, are pleasant and good remedies.

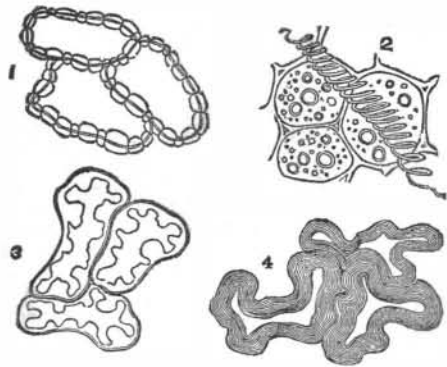
To prevent a return of an attack the system should be toned up during the interval and put in as perfect a state of health as is possible. In most cases tonics are indicated. Other organs should be carefully interrogated for sources of reflex excitability.

A SAMPLE OF CAYENNE.*

By THOMAS GREENISH, F.C.S.

A SHORT time since a sample of Cayenne was placed in my hands by Mr. Holmes with a request that I would submit it to microscopical examination. It had been sent to him as an article which had recently made its appearance in commerce.

The sample possessed all the external characters of the true Cayenne, and such a one as is grown in Natal, ground in the colony, and sent in that state to this country. It had an oily appearance which seemed artificial, and communicated to the paper in which it was folded, together with the oil, a reddish color; the oil which permeated the paper was a fixed oil.



CHARACTERISTIC CELLS OF THE CAPSICUM FRUIT.

There are two distinct Cayennes grown in Natal, one is a brilliant red, and the other yellowish and corresponding to the Nepaul pepper; they are both, and more especially the former, extremely pungent. This sample, however, although possessing, to the naked eye, all the external characters of the Natal red pepper was entirely devoid of pungency.

At first it was thought probable that some other pod than that of the capsicum had been ground and forwarded to this country for the purpose of adulterating the genuine article; to determine this point with certainty, a portion of it was subjected to careful histological examination, and the cellular structure compared with that of true Natal samples which I had previously examined.

The annexed drawing shows the characteristic cells of the capsicum fruit, isolated, and mounted separately for the purpose of reference on such an occasion as the present, where they were required for comparison with those of the sample. The cells, Fig. 1, are the external cells of the capsicum pod; usually they possess more or less of a beaded appearance as represented in the drawing. Within them are parenchymatous cells, Fig. 2, traversed by spiral vessels. The surface of the internal coat is covered by the cells, Fig. 3. The irregularities seen on the internal surface of individual cells and so conspicuous in Fig. 1 and 3, as compared with the parenchymatous cells (Fig. 2), are caused by the irregular deposition of the secondary matter, assuming very different and interesting forms, a circumstance frequently observed in histological investigation.

With the pod must necessarily be ground the seed which it contains, and hence is met with in an examination of the powder a remarkably characteristic cell, serpentine in form, and with its secondary deposit in regular laminae (Fig. 4), which are rendered conspicuous by the appropriate reagents.

Having given considerable attention to the anatomical examinations of different capsicums, without meeting with one that was not more or less pungent, the question arose, how has this sample been deprived of its pungency, so as still to retain its color?

In the first place, heat was employed to drive off the acrid

principles of the capsicum, but this was not successful; decomposition occurred just when volatilization was taking place; this may possibly have been due to the fact that the pungent principle resides in a resin as well as a volatile oil. Diluted spirit was then tried and by this agent the acrid matter was removed without or with very little loss of color, leaving a marc devoid of pungency, and possessing much the appearance of the sample in question.

From subsequent information it is believed that the more brilliant samples of Cayenne, but deprived of pungency, or perhaps a by-product of some manufacture, are used for giving the special plumage to canaries, and that the sample in question was most probably one intended for this purpose, and not an adulterant of commercial Cayenne.

The investigation of this subject has afforded me the opportunity of describing the structural details of the capsicum fruit, and will probably be accepted as another illustration of the value of histological investigation in determining, by anatomical detail, the true from the false in materia medica specimens or any product of the vegetable kingdom which may be submitted to the pharmacist.

BIOLOGY AND MICROSCOPY.

At the meeting, November 1, 1880, of the Biological and Microscopical Section of the Academy of Natural Sciences, Philadelphia, Dr. Carl Seiler in the chair,

Dr. J. Gibbons Hunt, in referring to a communication made some time ago, said the announcement then made by him that ciliated epithelia covered the intestines of vertebrate animals was received with considerable doubt by some of the members of the section. Since then a German journal contained a similar statement, which also fully verified his observations.

CARMINE HAIR.

Dr. Hunt presented for examination some hairs taken from the head of an aged lady which were of a beautiful carmine color. They were short hairs growing underneath the gray and covered the entire head. They presented no pathological condition. The color is permanent and of a uniform carmine tint. Under the microscope there was no other abnormal appearance.

MICROSCOPICAL IMPROVEMENTS.

Dr. Hunt, chairman of the committee appointed to prepare a report upon the exhibits and improvements in microscopical science at the fifteenth annual exhibition of the section, held October 15, 1880, read the following paper:

The committee appointed at the last meeting of the section to report matters of interest brought forward at the fifteenth annual meeting of the "Microscopical and Biological Section" of the Academy of Natural Sciences, beg leave to offer the following report:

The hall of the Academy was comfortably filled with, perhaps, 2,000 visitors, who were distributed all over the building, the museum being opened and lighted for the fuller entertainment of our guests. The entomological section contributed to our success by generously displaying a portion of their magnificent collection of butterflies, moths, and beetles; insects of most gorgeous color, and forms so curious and rare that they will be remembered by many for a long time to come.

Without seeking ungenerously to depreciate other scientific organizations by unduly exalting the Academy, we say that no other scientific society in our city ever had within its walls such an assembly of interested and intelligent citizens as was in the Academy on that occasion.

On firm tables arranged for the purpose one hundred and twenty-seven microscopes were in position, displaying objects ranging through many classes of the mineral, vegetable, and animal kingdoms, and illuminated in nearly all approved ways. Of this number of microscopes, Zentmayer made 48, Beck 30, Crouch 23, Bausch & Lomb 7, Queen & Co. 5, Hartnack 2, Lillie & Poalk 2, Gundlach 1, Ross 1, J. C. Green 1, J. H. Steward 1, unknown 6.

Your committee can look back to the beginning of microscopy in Philadelphia, and at that time, and for a long period after, Næchet's microscopes were the only ones—with few exceptions—then in use. Now those inferior French instruments are not reported at our meetings.

It would be neither profitable nor interesting to report all the commoner objects shown at the meeting, not because such exhibits have not equal educational value with rarer things, but for the reason that they have been mentioned on previous occasions and in the reports of similar meetings elsewhere. We will ask attention, therefore, to such objects only as best mark the progress of microscopy at this time.

Many preparations of animal tissues, human and comparative, were shown; such as injected lung, kidney, brain, skin, etc., and some were stained with carmine, then bathed in acid and mounted in balsam, *secundum artem obsoletum*; and all such looked about as well as could be expected.

Best experience, however, is becoming convinced that it is no longer good work to stain *only* the bioplasts, and to fill the vessels with gelatine colored with carmine, and mounted in balsam. Around every bioplast so treated is the cell-body, larger or smaller, which remains invisible. Moreover, growing and finest vessels cannot be structurally demonstrated in that way, neither can the connecting tissues which bind all other parts together be demonstrated or studied by these old processes.

Such work has no longer any significance in the entire and correct interpretation of the tissues, but it does create abnormal stomata, and apocryphal perivascular spaces to be found only in the books. These relics of a *past* era in microscopy should now be placed carefully away in the back drawers of histological cabinets, thence to be dug out like strange fossils by coming generations of microscopists.

The time has come to move forward by doing better work in which more tissue elements shall be demonstrated. Some recent sections, double stained, by Cole & Son, of London, were shown at the meeting, and they revealed more tissue elements than any other balsam mounts yet seen this side of the Atlantic.

The division of cartilage cells during change towards bone—the so-called osteoblasts—medullary cells and fat cells, all with bioplasts showing division and vacuolation; not nebulously and doubtfully, but sharply differentiated under 500 \times , with the binocular, could be seen, educating us more fully into a better understanding of such things. We welcome such advanced work, regardless whence it comes. A beautiful slide of the young bot fly (*Estrobus gasterophilus*), attached to a hair from the horse, is worthy of report.

Living polyps (*Pectenatella magnifica*), and the new rotifer (*Apocia emilia*), intermediate between Lacinularia and Melicerta, are reported, as well chosen illustrations of uncommon pond life.

In exhibits of plant tissues, by double staining, we saw

nothing new. Indeed, truth compels the acknowledgment that nearly all we saw were fatally spoiled by bleaching. There is something in plant tissues besides cell walls, matter what form they take. Is it still necessary to retain all secondary deposits and bioplasts from the cells before section is fit for study? We think not. After evisceration by bleaching solutions, plant sections are unfit for scientific study. Yet this fossiliferous work is still shown as something very fine. Put it, too, away on the back shelves for the micro-paleontologist; if well balsamed it will keep.

A new species (*Cribraria dictyoides*) from our park is reported on exhibition. Good slides of *Microsporon furfur*, probably the cause of *Tinea versicolor* of the skin, and of *Achorion Schonleini*, an alleged cause of *Tinea favosa*, or ringworm, both difficult to obtain and preserve, are reported.

We note a marked advance in the preservation of delicate fungi, and of fresh-water algae. Many of these slides retained the natural form and color almost unchanged, and all such were preserved in camphor water one ounce and glycerine about six drops.

Wickersheimer's fluid is totally unfit for such work. A few marine algae mounted in balsam obtained our sympathetic commiseration that these beautiful 'weeds of the sea' should be so viciously treated. No intelligible traces were left of the living things. May our eyes never be asked to witness such relics again. Put all marine algae in Goadby's solution, and many will be preserved unchanged.

Many beautiful polarizing objects were well shown; and the Camden Society contributed nice work in this line. Esculine and naphthaline were among the most beautiful, but it is an error to exhibit these thin crystals under the binocular with the second eye-pieces, because such displays give bad definition.

Among miscellaneous objects we report slides of young oysters *in motion*; sections of nummulitic limestone, from which the pyramids were built; diatoms covered with iron sulphuret; butterfly scales arranged in beautiful bouquets; micrographs, and the electric spark as developed between two pencil points. In turning from this part of our report we suggest the possibility of improvement in the manner of showing some objects. Expertness in microscopic display is best learned—and perhaps learned only—by much practice in the resolution of difficult test objects, because in such work greatest attention to illumination and adjustment of lenses is essential, and when that experience is once thus acquired it influences, for best results, all other displays.

We observed many binocular microscopes badly illuminated without achromatic condensers or an equivalent. This is an error. It is not possible to get best results with the binocular without a condenser below the stage. In all microscopic works command superabundant light; it is easy to moderate it to suit special wants.

In microscopes some improvements and novelties may be reported for the past year. A small folding microscope, standing very firmly when in use, costing fifteen dollars—exhibited by Queen & Co.—is worthy of report.

All of Crouch's instruments on exhibition, except his largest stand, turn down beyond the horizontal, thus giving great facility for the eye-piece to slip out, and also for observing the stars, advantages not useful in this country. His binocular prisms slip entirely out, instead of being checked in proper position by a stop. The fine adjustment is still retained on the end of the body.

Beck has removed the flat foot, of whatever shape, from all of his instruments, and they all stand on three toes and are therefore steady. His new "international" stand, which was exhibited, presents some improvements of interest. The stage is 6½ inches in diameter, and has ¾ of an inch lateral motion, and nearly that in vertical direction. Motion is given by a screw and rack opposed by springs, which are claimed to obviate loss of motion—a great improvement over his former stages. The stage rotates around the optical axis; and also around its own axis by means of a milled-head pinion, enabling it to be completely inverted, and a graduated circle registers the degrees as it goes round. All the illuminating apparatus, if desired, swings around a center level with the stage. The obliquity of illumination is registered on a large graduated circle, which is movable up and down, carrying with it all illuminating apparatus. To fix the body in any position a lever handled-clamp is attached to one trunnion. The fine adjustment is retained on the end of the body. If the microscope can be claimed as an instrument of supreme precision, it is wrong to place the fine adjustment on the body. Every time it is moved the magnifying power of the instrument is changed, and an error is introduced, and the microscope is just that much *not* an instrument of precision. Means have been found to remedy that defect, and all possible sources of error should be eliminated from the microscopes of the future, just as soon as means are found to do it.

Another large instrument made by Beck, having a stage motion of four inches in either direction, is reported. The binocular body is carried at the end of a long horizontal bar. As in some other microscopes the body may be detached when the instrument can be used for dissection. The plan of carrying the body on a horizontal bar is a retrograde step in the construction of microscopes. Only for special purposes such plan has been abandoned by most makers, because steadiness cannot be secured except by great massiveness or by some compensating contrivance.

Zentmayer's improved "Centennial" stand was shown at our meeting. Its new mechanical stage, five inches in diameter, is claimed as the thinnest yet made. Light 70° oblique is admitted beneath it. Milled heads move it vertically 1½ inches, and laterally 1½ inches. It may be inverted, if desired, retaining still the object in the center of rotation of the sub-stage. This point is realized by an ingenious eccentric fitting, which carries the stage and does not interfere with greatest stability. The centering of the sub-stage is effected by means compact and ridiculously simple. The plan of swinging the sub-stage is well known and not capable of improvement. It is the most simple plan yet devised for that purpose. The fine adjustment moves the entire body without changing its length. The finish and workmanship, and the motions of this instrument place it in precision, simplicity, and excellence far ahead of all other microscopes at our meeting. Since this microscope appeared at our Centennial Exhibition for the first time, many skillful makers have aimed to receive some of its advantages by ingenious mechanical devices, but none yet have approached its classical simplicity and fewness of parts. This instrument marked a new departure in the construction of microscopes, and without injustice your committee can say no less.

We report two lamps attached to microscopes in place of the mirrors. One was an ordinary Beck's lamp fitted with a carrier for the purpose. It has facilities for centering in all directions. The other, made by Zentmayer, was three

* From a paper read before the British Pharmaceutical Conference.