ART. XIII.—*Investigations into the Nature of Jequrity Inflammations*.^{*} By ARTHUR H. BENSON, M.B., F.R.C.S.I.; Ophthalmic Surgeon to City of Dublin Hospital; Assistant Surgeon to St. Mark's Ophthalmic Hospital; Examiner in Ophthalmic Surgery, Royal College of Surgeons.

THE seeds of the *abrus precatorius* (Nat. Ord. "Leguminosæ"), known in these countries as "prayer beads," have been lately introduced as therapeutic agents under the native Brazilian name of "jequrity."

Since Wecker, in the *Annales d'Oculistique* of July–August, 1882, made known to ophthalmic surgeons in Europe what had long been known to the natives of Brazil, this drug has attracted the attention of ophthalmologists in all parts of the world.

If the seeds are macerated in water for a day or two, then ground or crushed, and an infusion made or applied to the conjunctiva of the eyelids, it will produce no immediate result, but in from four to six hours a feeling of heat and tingling in the eyelids begins. In about twelve hours the lids have become markedly swollen, and, if they are everted, it will be seen that a fibrinous exudation is forming on the conjunctiva. This continues to increase in thickness for about twenty-four hours, when it resembles a croupous membrane. It can be readily raised off the conjunctiva, to which it is not firmly adherent. The conjunctiva under it is not bleeding, but rather pale and succulent.

The membrane, if removed, will reform for a variable length of time, generally about two days, after which the inflammation subsides rapidly.

During the first twenty-four hours the patient complains of considerable discomfort, in some cases amounting to intense pain in the eyes, headache, sickness of stomach, furred tongue, malaise, and general feverishness, with a considerable rise of temperature and pulse. These symptoms subside as the membrane forms, and disappear with its separation.

A single application will produce a comparatively mild attack; repeated applications, at short intervals, produce a more severe attack; and if repeated applications are made on consecutive days, the duration of the attack can be prolonged for weeks with the

^{*} Read in the Pathological Section of the Academy of Medicine in Ireland, May 2, 1884.

continuous formation of fresh membranes on the conjunctiva, accompanied by an abundant watery purulent discharge.

The strength of the infusion used has also an influence on the intensity of the resulting ophthalmia.

If the applications are continued for a certain time—usually several weeks—the effect gradually diminishes until the conjunctiva ceases entirely to be influenced by the infusion. After a variable period of rest the conjunctiva will again respond to the jequirity.

If the eye has previously suffered from granular ophthalmia, especially if it be the dry, hard, chronic type of the affection, it is found that, as the jequirity inflammation passes off, the conjunctiva assumes a more normal appearance than before, and, after a certain number of applications, the granular ophthalmia has disappeared.

To obtain this result in cases of old-standing ophthalmia several months are usually required. It was to supersede the old and dangerous method of treatment by inoculation with gonorrhœal pus that jequirity was first put forward. Since then its sphere of action has been greatly enlarged.

What is it in jequirity that produces this remarkable diphtheroid ophthalmia? To answer this question Sattler* instituted a series of experiments. He found in the infusion a large, freely moving, jointed, rod-shaped bacillus, which developed in great quantities, giving the liquid a dark, dirty, yellowish-green colour. To the presence of this bacillus he ascribed the potency of the drug. He found that if he destroyed the bacillus the effectiveness of the drug was also destroyed, and if he applied a pure cultivation of these bacilli he produced the characteristic results.

The spore producing the bacillus was, he considered, a very common aerial microbe, to be found everywhere in abundance, but (as had been observed in other similar cases) its noxious properties were developed only when it was cultivated on a special substance—jequirity infusion being, in this case, the one. The fact that ophthalmia was produced by the application of an infusion free from bacilli he accounted for by the ubiquity of the spores, some of which were sure to be on the conjunctiva itself.

This view of the bacillary nature of jequirity ophthalmia seemed to be everywhere accepted; the bacillus was easily seen, and I had the honour of demonstrating it in recent and in stained preparations, at a meeting of the Surgical Section of this Academy at the

* *Klinische Monatsblätter.* Mai, 1883.

beginning of the session. The theory fitted in so well with the micro-biological tendency of modern pathology that it passed current almost without inquiry; and as Sattler^a had previously stated that granular ophthalmia was produced by the presence of a small round micrococcus, it seemed quite natural that when the more vigorous jequirity bacillus invaded the territory of the easy-going and feeble micrococcus, the weakest should suffer, and, by the law of the survival of the fittest, the bacillus should reign in his stead. Thus the granular ophthalmia was cured.

It seemed that here, if anywhere, was the royal road to knowledge of disease. Through study of the jequirity bacillus the germ theory would cease to be an enigma, and would soon be placed on the shelf amongst the other established facts of science, no longer a mere working hypothesis, but an indisputable reality. Jequrity ophthalmia could be produced at will, and all its phenomena studied at leisure. The bacillus was large and easily cultivated, and took kindly to the staining fluids.

Wishing, therefore, to observe somewhat more fully the nature and habits of this bacillus, and its mode of development in the conjunctival sac, I admitted, in January last, into St. Mark's Hospital, three fresh cases of granular ophthalmia, and into each of their eyes I introduced a five per cent. infusion of jequirity. With the assistance of Dr. Keane, the House Surgeon at St. Mark's, whose energy on this occasion I must here gratefully acknowledge, I obtained specimens of the discharge and of the membrane formed in each eye at intervals during the whole attack. The total number of slides prepared and stained with gentian violet, and mounted in dammar, was about 70. On examining these we were much perplexed and disappointed to find that not a single bacillus could be seen, although the jequirity solution which caused the ophthalmia was swarming with them. Fearing that some error of preparation, or want of experience in such matters, had been the cause of our failure, I brought three other patients, each with well-marked jequirity ophthalmia, in different stages, to Professor Purser, in his laboratory in Trinity College.

From these he kindly made several preparations both of the discharge and of the membrane, but he, too, obtained only negative results, not a single bacillus being found in any of the preparations. Subsequently I brought other patients to have the secretions examined, but ever with the same result. We therefore concluded

^a Ophthalmic Review. Vol. I., p. 406.

that *the discharge and the membrane formed in jequirity ophthalmia contained no bacilli.*

If the bacilli caused the ophthalmia, how happened it that none were to be found in the conjunctival secretions? This suggested further investigation. Was the discharge infectious? Masses of the membrane and discharge formed in well-marked cases of jequirity ophthalmia were introduced into the conjunctival sacs of several hitherto untreated cases of granular ophthalmia. Some eyes were bandaged up immediately afterwards, whilst others were left uncovered. In no case was there the least trace of jequirity ophthalmia produced by the introduction of the discharge. The same result occurred when healthy eyes were similarly treated. We therefore concluded that *jequirity ophthalmia was not communicable*, and consequently that no ill result was likely to occur if such cases were allowed to remain in the same ward with others—a matter of very considerable practical importance.

It seemed necessary to investigate under what conditions the specific ophthalmia could be produced.

Preparations of jequirity were made in various ways, and it was found that the rather elaborate and troublesome directions given by Wecker were entirely unnecessary, and that as good results could be obtained from a freshly-prepared infusion made by grinding the seeds in a hand coffee-mill and mixing the powder with cold water as by the original method. For this suggestion as to grinding the seeds, &c., I am indebted to Mr. Winton, our Apothecary at St. Mark's. An infusion so made is free from bacilli, and will usually not show them until after thirty-six hours—in some cases not till the third day.

The bacilli then increase and multiply plentifully, and in several preparations which I examined after an interval of six weeks they still existed in great abundance, and exhibited undiminished activity of motion. In some preparations, apparently made in the same way, and treated similarly, the bacilli, after a week or ten days of activity, apparently died and sank to the bottom motionless.

These several preparations I applied to various eyes, and found that in each case an ophthalmia of the typical kind was produced. I then dusted some dry, very finely powdered jequirity on to the conjunctiva of an everted eyelid, and found that it also produced the typical ophthalmia, and in as short a time as did the infusion containing the bacilli ready-grown.

The specimens of membrane which I show were obtained as the

result of a single application of a jequirity infusion six weeks old. They were formed on three successive days, and exhibited complete casts of the conjunctiva of the lids and globe without interruption at the fornix conjunctivæ.

It was therefore established that the special ophthalmia—which Sattler considered was due to the presence of this bacillus—could be equally well produced by—

1. A freshly prepared cold infusion made from the ground-up seeds without previous maceration or subsequent filtration, and in which no bacilli had developed.

2. The same after bacilli had developed, and whilst they still retained active motion.

3. The same when over eight weeks old, and still swarming with an innumerable variety of micro-organisms of different kinds.

4. The same having for some ten days contained living moving bacilli, subsequently becoming clear, the bacilli falling to the bottom motionless.

5. And finally by jequirity powder itself, freshly ground, in which no bacilli existed.*

It appeared, therefore, that Sattler's views on the subject required modification.

Recently Neisser of Breslau,^b Klein of London,^c Salomonsen and Holmfeld of Copenhagen,^d have published the results of their investigations regarding the nature of jequirity ophthalmia. These all serve to confirm the idea that the inflammation excited by jequirity is not in any way dependent upon the presence of a bacillus, but that the active principle is more likely a non-particulate vegetable substance, possibly a ferment like pepsin, which is soluble in water and in glycerine, but is destructible by boiling. They further show that the bacilli, as they multiply, tend rather to diminish than to add to the efficacy of the preparation.

These investigators also failed to find bacilli or their spores in the conjunctival discharges, nor could they produce ophthalmia by inoculation with them.

Inoculation with jequirity bacilli cultivated in other fluids failed to produce the ophthalmia, whilst jequirity infusions which had

* Since writing the above I have obtained the characteristic ophthalmia by using a glycerine of jequirity. This preparation is free from bacilli, and will retain its specific properties for an almost indefinite length of time.—A. H. B.

^b Centralblatt f. prakt. Augenheilk. Feb., 1884. P. 51.

^c Centralblatt f. d. medicinischen Wissensch. Feb. 23rd, 1884.

^d Centralblatt f. prakt. Augenheilk. March, 1884. P. 91.

been sterilised by boiling produced the bacilli, but failed to produce the ophthalmia.

It would be quite impossible in a short note like this to refer to all the investigations that have been made, but the experiments of Cornil and Berlioz should not be omitted. They found that when jequirity infusion was introduced into the subcutaneous tissue of a frog, he died in a day or two, his blood being loaded with jequirity bacilli. Rabbits and guinea-pigs could also be killed by the same, but required proportionately much larger doses.

Salomonsen and Holmfeld inoculated the conjunctiva with some infected frog's blood, but without producing the ophthalmia. In this connexion it may be mentioned that in some countries animals are feloniously poisoned (*sui poisoning*) by shooting them with arrows tipped with jequirity. The head breaks off, remains in the animal, and produces his death.

We may conclude, therefore, that the bacillus is not the cause of the ophthalmia, and what Sattler regarded as an essential seems to be only an impurity in the infusion, and the true nature of jequirity inflammation has still to be discovered.

Professor Reynolds, of Trinity College, has kindly undertaken to examine the seeds with a view to the extraction of an active principle or alkaloid, if such be present.

As jequirity had shown itself so useful in granular ophthalmia, and, judging that its beneficial action consisted in establishing an acute sthenic inflammation with a distinct tendency towards recovery, in tissues occupied by an asthenic chronic inflammation with no tendency towards recovery, it occurred to me that it might be equally useful in the treatment of callous ulcers of the leg, &c. And I was the more tempted to try how it would act on such cases, as ulcers offered a much better field for investigating the nature of this inflammation than did the eye, where it was quite impossible to keep the parts under observation free from external influences.

Through the kindness of Dr. Joseph Kenny and Dr. Robert Kenny I was able to try the effects of the drug on a number of ulcers in the North Dublin Union Workhouse.

We dusted the fine powder on to about six square inches of the surface of a large vascular ulcer, and covered it up with a piece of lint soaked in carbolic oil. In about half an hour a slight tingling sensation occurred, which never amounted to pain; this lasted six or eight hours, but at no time was it very unpleasant.

Next day the whole surface of the ulcer where the powder had

been applied was a whitish-grey colour, and showed no tendency whatever to bleed, nor was there any free discharge of any kind. The surface was raised about half an inch above the rest of the ulcer, and was quite painless to touch, whilst the untouched portion remained extremely tender. After three or four days the ulcer had resumed its original appearance, and, as far as I could judge, was certainly not worse from the unwonted stimulation.

We then dusted the powder on a number of callous ulcers, some of them of very long standing, with depressed surfaces, more like wet chamois leather than anything else. Here, too, the effect was but little painful, and next day some red granulating points were visible on the floor of the ulcers.

Dr. Joseph Kenny has kindly furnished me with the following note regarding the effect produced on the cases above mentioned, which, with your permission, I shall read:—

“Five cases were treated with jequirity powder. One got three applications, two got two applications, and the remaining two got one application.

“Three of the cases were flabby ulcers, requiring stimulation, and excellent for testing the effects.

“All three were much improved, one especially so, a large, deep ulcer between the tendo-Achillis and the internal malleolus—this had been under treatment for over two years with but slight improvement. Subject weak and anæmic.

“One of the remaining two cases was a large freely granulating ulcer, encircling the ankle, and not at all a typical case for trial; it was, however, improved by one application on part of the ulcer.

“The fifth case was one of two small ulcers on a leg subject to occasional œdema from old-standing heart disease; the edges were inverted and devoid of healthy action. The effect of the jequirity was to cause slight spreading of the ulcer from breaking down of its edges—a decided advantage in such a case. In this instance the pellicle was not at all as well marked as in the others.

“The jequirity powder does not appear to give rise to any free discharge, purulent or otherwise, but simply to a thick furry pellicle which is thrown off in shreds or patches in the course of from thirty to forty-eight hours. This pellicle is easily detached as a whole once the process of separation has set in.”

Having thus established the fact that jequirity produced an inflammation on an ulcerated surface, similar in characters with that of the conjunctiva, Dr. Lentaigne and I are now engaged in

experimenting on the effects of septic, aseptic, antiseptic, and sterilised infusions and powders, and hope, by working on ulcers instead of on the conjunctiva, to arrive at more satisfactory results as to the nature of jequirity inflammations.

We hope, on a subsequent occasion, to bring our results before this Section.

ART. XIV.—*On the Increase of Insanity, with Suggestions for the Reform of Lunacy Law and Practice.*^a By THOMAS MORE MADDEN, M.D., F.R.C.S.E.; Physician, St. Joseph's Hospital, Dublin; Obstetric Physician, Mater Misericordiæ Hospital.

IN the "Transactions" of this Academy I recently discussed certain mental and nervous complaints, and I now desire to call attention to some medico-legal aspects of this subject. At the same time I shall offer further evidence of my former contention, that insanity and other cerebro-nervous disorders have lately increased to a very serious extent amongst all classes, and more especially amongst women in whom mental disturbances are frequently traceable to reflex irritation from utero-ovarian causes. Secondly, that owing to the general non-recognition and neglect of these sources of cerebral disturbances many women are now needlessly and improperly confined in lunatic asylums. Thirdly, I desire to point out that the present administration of these institutions, and the laws by which this is controlled, tend to various abuses, amongst which that just referred to may be numbered. Finally, I shall venture to offer some suggestions for the better administration of such asylums, and for certain amendments which appear urgently called for in the existing lunacy laws.

In the subjoined statistics will be found the clearest evidence that insanity has rapidly increased, and is still increasing, in these countries, whilst its curative treatment has not advanced in the smallest degree. This non-improvement in the curative treatment of mental diseases is probably largely due to the fact that all questions relating to insanity and other cerebro-nervous disorders are abandoned by medical practitioners, generally to those specialists who, being officially connected with lunatic asylums, are therefore considered to have an exclusive and vested interest in all that relates to psychological medicine. It appears to me, however, that

^a Read in the Sub-Section of State Medicine of the Academy of Medicine in Ireland, April 10, 1884.