NOTES ON THE JOURNAL OF
CAPTAIN CHARLES O’HARA BOOTH.
Sometime Commandant of Port Arthur.

By
R. W. GIBLIN, F.R.G.S., F.R.C.I.
Plate Xl.
(Read 9th November, 1925.)
(Communicated by Sir Alfred Ashbolt, Kt.)

A document of considerable importance has recently been presented to the Royal Society of Tasmania under circumstances which are not without a touch of romance. Perhaps it would be more correct to say that a copy of part of a very human document has been so made available for the use of the Society. The original manuscript is the private journal kept by Captain Charles O’Hara Booth, for some years Commandant of the Penal Establishment at Port Arthur, and afterwards Superintendent of the Queen’s Orphan School, male and female, at New Town. [1]

Charles Booth was born on the 30th August, 1800, at Basingstoke, Hampshire, where his parents occupied a house of some importance in that neighbourhood. They were of that class in England, of good family, which presented its sons freely to the public services of the country, and was able in many cases to advance the interests of the children by the system of purchase in use in the Army of that day. An elder brother was in the Navy when Charles Booth began his military career, while a younger brother also entered that Service, and died as recently as 1898 with the rank of Admiral.

The journal was begun on the 5th of July, 1815—Waterloo year—when the youth set out for India in the hope of obtaining a commission in the Honourable East India Company’s service. Things moved slowly in those days; the ship did not arrive at Calcutta till the 11th of January, 1816, and no Ensigncy was forthcoming till the following September, when he was appointed to the 83rd Regiment. Then followed some years of service, but a rude shock came in 1819,

[1) Booth was appointed Superintendent of the Queen’s Orphan School at New Town in 1844; vide Gazette of 16/3/1844. His appointment was confirmed by the Home authorities in Gazette of 24/7/1844. Booth remained in charge until his death, which occurred on 11/8/1851.—Ed.]
when, with others, he was reduced to half-pay and compelled "in low spirits" to return to England. On the way thither, this also being a six months' voyage (April to October), a call was made at St. Helena, the inevitable visit paid to Longwood, and a reputed view of the fallen Emperor obtained. In December of that year his brother James, home on two days' leave from his ship, mentioned that a Second Lieutenant of the 21st Fusiliers wished to sell out. This was too good a chance to be missed, and a month later Charles Booth found himself an officer by purchase in that regiment. In 1821 he was stationed at Demerara, in British Guiana. It is uncertain how long he stayed there.

Now, an interesting feature of this journal is that the writer used the right-hand page only when making his chronological entries. When he came to the end of the book, which was thus only half filled in, he turned it round and wrote on the blank half of each opening, which had, of course, now become the right-hand page. For a certain reason this has had rather a disastrous result from a Tasmanian point of view. At some time someone has torn out from the book a number of pages. There is no apparent reason for this action; it may have been that the period so dealt with, April to December, 1826, covered a period that it gave little pleasure to recall. Be that as it may, the elimination of those pages had as a consequence a serious gap in the record of a later time, and the hiatus created happened to be from March, 1835, two years after Captain Booth became Commandant of Port Arthur, to January, 1836.

On their return from the West Indies the 21st Fusiliers were stationed at Windsor. On the 20th June, 1827, Booth writes, "Went to Ascot. His Majesty's entry to the course "one of the finest sights I ever witnessed—loudly cheered—"preceded by the Prickers—women lovely—and considerable "shew—should have regretted greatly missing the proceed- "ings." In 1828 Bath was the headquarters, and later in that year Fermoy in Ireland. It took several days' marching to reach the latter town from Waterford. One of those marches, a long and dreary one, caused the young Lieutenant to become irritable; "Damn the fellow," is the record in the journal, "damn the fellow who invented Bearskin caps—particularly in windy weather."

The regiment was in Mullingar in 1829 and Kilkenny in 1830. On the 16th of September of the latter year came
"the pleasing intelligence of Promotion by Purchase, thanks "to good fortune, a generous parent, and a dear sister. Paid "200 above regulation."

In 1831 the regiment was transferred to the Midlands. On its march thither from Liverpool Booth's detachment stayed for some days at Warrington, in Lancashire. The diary record of the 26th of October, 1831, is noteworthy. "After parade a party of us went on the railroad as far as "Newton by the 'Mary' steam coach, where it meets the "great Manchester train. At times we went a ¼ of a mile "in 22 seconds. Waited to see the Manchester train, which is "perfectly astonishing, and then returned." The excursion thus described took place only six years after the first public railroad in England was opened, between Stockton and Darlington. The seed sown that day in the writer's mind was to bear fruit in a humble way within another six years in a remote corner of the Empire. It is reasonable to suppose that the tramway between Long Bay and Norfolk Bay, projected and begun by the Commandant in 1836, owed its origin to the experience gained in Lancashire.

A shock for the Fusiliers came in December, 1831, when they heard that beyond doubt New South Wales was to be their next station. Rumour was not far astray on this occasion. In July, 1832, Captain Booth was at home on two months' leave, before sailing for the Antipodes. An interesting entry is that of the 27th of that month: "Went over to Oldham to "see the arrangements of the Dinner to the Poor in Com "memoration of the Passing of the 'Reform Bill'—went off "very well and arranged admirably."

On the 15th of September, 1832, Captain Booth, with his detachment, consisting of one Lieutenant, one Sergeant, and 28 men, left Deptford in the Gloriana bound for Hobart. Calling at Spithead they took convicts on board, but it was not till the 16th of October that a real start was made. The Lieutenant had to be left behind, being too ill for the journey. The ship made a good voyage, making her landfall at Port Davey on the 31st of January, 1833, anchoring that night opposite Green Island in D'Entrecasteaux Channel, and arriving at Hobart on the following afternoon.

The chief value of the journal as a Tasmanian historical document now comes into view. Booth's comments on pass-

(2) Although all the timber, rails, etc., have disappeared, the course of this railway can be traced plainly at the present day. The remains of the earthworks can be seen at many places, close to the road from Taranna to Long Bay—the latter settlement being now known as Oakwood, whilst the township at Port Arthur is known as Carnarvon.—Ed.)

ing events are short and to the point, nevertheless they will attract attention as affording a detail here and there of ways of life and of opinion about men in those days. His first remarks on landing are: "Went on His Excell­ency, the Lieut.-Governor, Col. Arthur, Strolled about the "town, a place that evidently will be before long of consider­able size and consequence. Went off again to the ship, the "orders being very strict here; find that we shall not be "landed for several days—no Corps but the 63rd in this "Command at present—several good posts still kept up here "—but the golden days have fled."

However, Booth's luck was fairly good, for within a month after his arrival the Governor appointed him Commandant at Port Arthur, and he entered on a little kingdom which he made all his own, as his journal shows. While waiting for the brig that was to take him and his junior, Macgregor, to the penal establishment, there were several functions and social events for the officers. On the 28th of February a field day was arranged in honour of Her Majesty's Birthday. A déjeûne at Government House surprised him: "Agreeably astounded," wrote the impressionable Booth, who was never able to resist a pretty face, "at the display of the "fair—a very nice party—but dispersed rather early." Arthur's partisans generally came to an end too soon for this sociable soldier man. Constantly this trait, this admiration for the fair sex, peeps out in the journal (I have said that this is a human document), but it was not allowed to interfere with duty.

That Booth was satisfied with his new post is shown by his entry on the 16th of March, after his arrival at the Settlement: "Took over the command—quite pleased with "my charge," and on the following day he wrote: "St. "Patrick's Day—Lowes and Detachment came in from Mac­gregor's post (at Eagle Hawk Neck), all dined with me, "and embarked, leaving me in Command of a very snug "(though responsible) post."

In that spirit Captain Booth took over charge and entered upon those heavy duties which were to try all his powers and to undermine his constitution before he relinquished his command eleven years later. Port Arthur was only in its third year as a Settlement when he first went there, and an enormous amount of constructive work still remained to be carried out to bring it to that state of polish and perfection as an ideal establishment for the punishment and correction of offenders that he so strongly desired and
aimed at. There is one thing that this newly appointed official must have made up his mind about, without mental reservations of any kind. He determined that he would never be found wanting in the way of personal exertions, physical and mental, but especially the former. Hard work he expected from others, those others being the free and the bond, guardians and guarded, who were his subjects, but then he was himself prepared to give his own hard work, fiercely hard work, to the good cause, the maintenance of absolute order and strict discipline.

It may not be amiss to digress here for a moment or two in order to glance at the manners, tendencies, and thoughts of the period when this soldier-commandant took over control of his post. The Reform Act had just been passed. That in itself marked a change in spirit compared with the previous century. Men were proposing to themselves to think in a more kindly way about their fellows and to act towards them in a more tolerant fashion. I refer to the governing classes, those in whose charge, to a great extent, hung the welfare, the health, the chance for any happiness in life, of the masses of the people. The harsh, cruel age of the previous hundred years had been found to be all wrong, unrighteous in fact. But laws and habits are not to be changed all at once, and those brought up during the first years of the 19th century could not be expected to alter their modes of thought and action in a moment. To invert an old saying: "Nobody becomes utterly benevolent "all at once," and public opinion prefers steady rather than rapid progress, knowing that reformers may be very unscrupulous at times. Least of all was it to be expected that the system of punishing those convicted of crimes, in prison ships, houses of correction or penal establishments, would be altered with ill-considered haste. Nevertheless the preaching of Wesley, the books of Howard the philanthropist, and the work of Mrs. Elizabeth Fry, were beginning to have their effect. These influences began to modify the ideas even of legislators, and the law which in 1827 made the use of man-traps and spring-guns illegal affords one proof of the working of a more liberal spirit. One historian, referring to a certain statesman's efforts towards reform, puts it thus: "Peel will be remembered for "many salutary changes during his tenure of the Home "Office (1822-1827, 1829-1830). He reformed the criminal "code (especially by drastically reducing the 200 offences for

"which capital punishment could be inflicted), and criminal "procedure; systematised the functions of juries; improved "the condition of the gaols; and established in London a "new police force." The same writer remarks later on: "The growth of a new feeling of refinement was shown "in the passing of an Act (carried in 1833 and two years "afterwards extended to the whole county), which made it "illegal to drive any ox or cattle, or to bait any bull, bear, "badger, or other animal, or to fight cocks within 5 miles "of Temple Bar."

Thus we see that in that first part of the nineteenth century the dingy figure of Justice had been subjected to a spring cleaning, and the bandage over her eyes, intended to blindfold her, rendered more effective for that purpose. We may be proud of the fact that the process has continued, but with increased vigour.

It was at such a time, then, that Captain Booth took command at Port Arthur. His training, like that of the Lieut.-Governor, had made him a strict disciplinarian, and a perusal of his journal will, I am sure, convince the reader that here was a firm, perhaps even a stern official, one determined to carry out his duties without departure from the rules and regulations fixed by the system. In other words, the Commandant was a servant of the system, and he felt it his duty to bend all others to the same code. It seems certain, however, that if he was compelled to be harsh in his treatment, he was equally desirous of being just under the terms and conditions of the system. Like Dr. Temple (8) and the schoolboy, if Booth appeared to the prisoners as a "beast," he was a "just beast." The conditions under which they were expected to live in the penal establishment were made known to the convicts. The consequences of departure from rules were explained to them. If they chose to err, then punishment, severe and strict, but according to the law, would certainly follow. Notwithstanding this, my own impression is that Booth was as kind to the unfortunate beings in his charge as it was possible for him to be.

To make himself a complete master of the situation the Commandant set himself to work to learn every detail about the geography of the peninsula. Not content with making a complete circuit by land, he took journeys by

(8) Afterwards Archbishop of Canterbury.
water in a whale-boat from the Settlement round Tasman Island to Eagle Hawk Neck, and from Wedge Bay round Cape Raoul to the Settlement. One land journey along the shore from Fortescue Bay to Eagle Hawk Neck, in 1834, is described at some length. It took four days to accomplish, and the party of three (it included the Doctor from the Settlement) was nearly exhausted from starvation when it reached the Blow-hole and "nearly eat Macgregor out of House" at the Neck. The characteristic entries are as follows: "Found three parties had been sent out in all directions, with provisions, as we were given up—it afforded me very infinite pleasure to see the interest that our situation had excited—even to the most depraved of the Prisoners," and again—"Found a number of gaol-birds, but from the general good feeling evinced by the Prisoners I gave them all a Benefit—not after the usual manner. I omitted to mention that this last expedition completed my "tour of the Peninsula, 'per terræ et mare'."

The Journal is in the main one long string of records of movement between the Settlement and outstations. In November, 1834, he felt so fit from the exercise of long inspection walks that he proudly recorded, after a 50-mile trip: "Open to the world for a cool £50 to go on foot the 'distance of 50 miles, within 12 successive hours.'"

When, after some years, roads were improved, a riding horse was kept for some sections of the rounds, but walking continued to be the principal means of locomotion. A twelve-hour day must have been the average working day for the Commandant when on tour. It is evident, however, that he was not a good bushman; once off the track he seemed to lose direction, and he had several escapes from being lost. One such occasion will be referred to later.

A feature that will strike a reader of this Journal is the choice made of descriptive expression. The writer preferred to use picturesque terms to express himself, if such could be found. The following are some instances: "Piscatorising with the Seine" means, of course, "fishing." "A brace of Lads off for a Slaunt" signified the absconding of two convicts. "Walked into the Bowels of the Earth" was his expression for descending one of the coal mines started in his time (May, 1833). "Ration'd at the Commissariat" was his way of noting down that he had dined with the Assistant Commissary and his wife. "To operate on flint and steel" pictured the lighting of a fire. In referring to punishment for some offence he wrote "Visited them with appropriate rewards for their conduct." A "peruke," by a play on words, indicated an official rebuke. This method of clothing the ordinary occurrences of a somewhat monotonous life of routine was probably resorted to in order to give a little colour, a something of variety in thought and word, to what might otherwise have seemed to the writer "a bald and uninteresting narrative." One is reminded of a person in a very different sphere of action, Dick Swiveller, who, as Charles Dickens has told us, "sought the downy" while others merely went to bed, and who "had some of the rosy," when his friends indulged in wine. That this officer of Fusiliers had a liking for poetry is shown by numerous extracts admired sufficiently to be copied into the Journal, and there are indications that some verses were of his own composition.

Captain Booth could enjoy conviviality on certain occasions, but it must not be carried to excess, and he would express in his notes playful disapproval of any lack of restraint on the part of his associates. Opportunities for hospitality were more frequent than one would have expected, considering that Port Arthur from its position and its purpose was not easy of access. Visits of the Lieutenant-Governors, Colonel Arthur and Sir John Franklin, are described, and the Commandant has recorded with justifiable satisfaction the praise expressed by those officials for the results obtained by his measures and by his efficient methods of control. Perhaps he enjoyed most of all having as guests brother-officers from the troops stationed at Hobart. But even on such occasions attention to regulations had to be observed, as the following entry shows: "25th March, 1834. "Introducing Wharton (4) and La Motte to the Workshops"—great difficulty in preventing the Rules being digressed "(a prisoner being at large, no shooting allowed)."

This intense determination to have the machinery of the system run smoothly and with the regularity of finest clockwork was bound to have its reactions when something occurred to disturb the balance. Here are three consecutive entries which should not be missed:

"28th Jan. 1837. Received communication enough to 'break my heart after all my efforts.'"

"31st Jan. Heartbroken and miserable."

(4) Wharton was afterwards drowned at the mouth of Little Swan Port, Feb., 1837.
"1st Feb. My poor heart a little relieved, but still greatly "harassed."

Now these might be taken as cries from the soul of a man desolated by a deep personal loss, such as the death of a beloved one. What, then, are they in reality? In the case of Captain Booth, with his mercurial temperament and passionate ardour, they express his grief—and it is very personal—because two convicts had broken through the supposedly rigid barriers, natural and artificial, surrounding the penitentiary, and had succeeded in getting away to the mainland.

Booth could appreciate and encourage the efforts of ministers of religion for the benefit of those in his charge, as the following items, in characteristic vein, will show:

"25th Nov., 1833. Cutter Shamrock came in with Messrs. Backhouse & Walker, Quakers, travelling with authority, "to visit different establishments; provoked them to take "up their quarters with me—after Breakfast danced them "through the Settlement and up to Mt. Arthur.

"26th. Suspicious looking morning, but notwithstanding "ventured with my companions of the Society of Friends "to visit Eagle Hawk Neck—got there about 11 a.m., well "drenched—made a good blow out and came back.

"27th. Friend Backhouse delivered a very good Dis- "course to the Prisoners—no labour this afternoon for "that purpose.

"28th. Went to the Chasm near the Bluff—got back "just in time for dinner. Friends Walker and Backhouse "took leave—rather pleased with them."

It is of interest to note that G. W. Walker, describing that visit in his Journal (Life and Labours of G. W. Wal- ker), makes this comment: "The system now adopted at "Port Arthur, notwithstanding its severity, leaves a door "open for the deserving, or those who evince a disposition "to conform to the regulations of the establishment."

The following entries, referring to the visit of another minister, must not be omitted.

"30th Sept., 1836. Dr. Browning arrived from Town.

"1st Oct. Dr. B. addressed the Prisoners at considerable "length and to the purpose.

"2nd. Oct. Service by Dr. B.
the nights at that time of the year being extremely cold. He hardly expected to survive through the night of the 27th. On the 28th his condition was pitiable; he had lost the use of his feet and his hands, and having been without food for fully three days his strength had given out, yet he did manage with a supreme effort to crawl down a hill to extricate himself from the depths of the dense bush he had occupied the previous day. At noon he heard gun shots and a bugle, and at three o'clock that afternoon he was found by one of the numerous rescue parties that were searching the peninsula in all directions.

In reality he owed his escape from death to his dogs, which had stuck to him all the time, and the good feeling also represented to have been evidenced by the Prisoners and wretched little Boys at Port Puer also speaks greatly in behalf of their still possess of some latent sparks of good—which, if only worked on firmly and rigidly, yet kindly—much good, it is to be hoped, may be done.

It is worthy of note that Lady Franklin, in a letter to her sister, dated the 21st June, 1838, and one of the series that has lately come into the possession of the Royal Society, makes this reference to the episode:

"The two young officers were sent for from the ballroom—the Colonial schooner was ordered to prepare for sailing at dawn of day—and these, another officer with a reinforcement of 50 soldiers, and buglemen for the bush, were dispatched on board of her. The next morning the Telegraph said that Capt. Booth was found, without stating whether dead or alive, and in this ignorance, but with every hope of his being safe, the Conway frigate (fresh or "jaded from the ballroom") set sail for Sydney, proposing to put into Port Arthur on her way. In the course of the day we learnt to our great delight that Captain Booth had been found alive in the bush, where he had lost his way apart from his convict companion, who, having been punished a few days before, it was suspected had murdered him. He was frost bitten and debatably weak, having been without food or drink for four days, unable to fire his pistols, or to answer the coo-ies (the usual bush cry) or the bugles which occasionally reached his ear. His Kangaroo dogs, which were his faithful companions, acted for him, they heard and answered the bugles, and brought the pursuers to the rescue.

"Sir John has laid a strict injunction, or, rather, command on Capt. Booth never to go into the bush again—"accompanied by an orderly to watch his footsteps; for, what with his daring, fearless nature, and his absence of mind, which is always at work upon the interests of the settlement (wherever he may be in the body), this is the third or fourth time the same accident has happened to him." I do not know to what extent Capt. Booth carried out the injunction so considerately laid on him for his own sake by Sir John Franklin. We may safely assume that after such an experience he would take far greater care in future
She had died in September, 1920, and although he had been too busy to study the book closely he had skimmed through it, and remembered the reference to the church.

Then Major Richmond began to consider. The journal was, of course, a private family record. There were parts of it which were of a purely personal nature. But other parts, those, for instance, dealing with the years spent as a Commandant at Port Arthur, surely might be of some historical value for all in Tasmania who cared for such things. At any rate, it should be easy to find out if that was so. Thereupon Major Richmond went to the Tasmanian Government Office and offered to lend the book to the Agent-General in order that any sections of it relating to Tasmania might be copied out. This opportunity was eagerly seized by Mr. Ashbolt, who saw at once that such a work might contain quite important matter, and that the private views of an official placed in a very responsible position would be a welcome and useful supplement to the public documents of the period covered by the diary, that is, from 1832 to 1838. There was another feature of the case that attracted, one might almost say, excited, the Agent-General. Major Richmond's proposition nearly coincided with the very handsome donation of Franklin Papers, the second of its kind, made by Mr. W. F. Rawnsley to the Royal Society. This feeling was enhanced, when it was noticed, as happened at once, that in one of Lady Franklin's letters to her sister there was a reference to Capt. Booth. What she had to say about him has already been stated. Major Richmond was pleased to have the copy of that letter, which was offered to him.

Following in Mr. Rawnsley's footsteps, the owner of the journal desired that any extracts taken from it should be presented to the Royal Society. It fell to the lot of the writer of these "Notes" to make those extracts, and as he read the whole diary and received permission from Major Richmond to utilise any passages and episodes in it other than those associated with Tasmania, it will be easily understood how and why the "Notes" came to be written.

By R. W. Giblin, F.R.G.S., F.R.C.I.

expeditions, and this for another reason than the Governor's command, namely, the influence and will of a still higher authority.

The journal closes abruptly on the 29th of August, 1838, but the last pages describe a visit to Hobart, and it was during those few days that he became engaged to be married.

It only remains now to relate how it came about that Extracts from Captain Booth's journal were made available for the Royal Society. I have given elsewhere an outline of the occurrence, but as, for certain good reasons, no names whatever were then mentioned, the story here set forth is new in the sense that it is now furnished with the details that properly belong to it. It will be admitted, I think, that it is not lacking in that touch of the romantic which manifests itself for our benefit and our enjoyment when the present and the past, each with its own ideas and impulses, are brought into association. Illuminating the present little instance of the process, there is the thought that it is what we ourselves bring to our studies of the past that to some extent secures for us the fascination we find in them.

One day in the summer of 1923 Major J. A. Richmond, formerly of the South Staffordshire Regiment, who fought in East Africa in the Great War, was seated in his Club in Pall Mall. He was turning over the pages of an illustrated paper, when he came across the picture of a ruined church. It was the church at Port Arthur. It flashed across his mind that he knew something about that building, for the laying of its foundation stone was referred to in his great-uncle's diary. This journal had only come into his possession a couple of years before, having been bequeathed to him by his great-uncle's daughter, Miss Amelia Patricia Booth, who was born at Port Arthur on the 25th of August, 1839.


[7] Miss Booth visited Tasmania in 1909, and upon her return to England she sent out to the Society the Signal Book compiled by and used by Captain Booth at Port Arthur. — Ed.

[8] Mr. Richmond, who was engaged to be married on 20/11/1838. — Ed.
NOTES ON THE JOURNAL OF CAPTAIN CHARLES O'HARA BOOTH.

EXPLANATION OF PLATE XI.

Figure 1.

Mrs. Charles O'Hara Booth (formerly Miss Elizabeth Charlotte Eagle).

Figure 2.


Apparently both portraits were painted by Mr. Lempriere at Port Arthur, Capt. Booth in 1836, and Mrs. Booth at a later date. The paintings are the property of Mr. Bernard Walpole, who placed them on loan for exhibition in the Tasmanian Museum and Art Gallery.

NOTES ON SOME RARE AND INTERESTING CRYPTOGAMS.

By

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Government Botanist, Tasmania.

(Read 9th November, 1925.)

Among the enthusiasts who have pushed the study of plants to its present high level, few have done much research amongst the lower groups, especially the fungi. Little more has been done than could be classed as simply scratching the surface. There is plenty of new material at hand ready for the worker. The only trouble is that sometimes when returns are copious it is not always easy to induce an estimable society to publish it.

The plants brought before you in the present paper are of exceptional interest, though few. The Hepatics here described by Pearson are the last lot collected by our old friend, W. A. Weymouth. Pearson, who died only a short time ago, was for many years a corresponding member of this Society.

Terfezia tasmanica, n.s. An irregular subterranean tuber, just emerging from the ground when mature, usually 1-3 cm. diameter, chestnut-brown, tough fleshy. Pileus with an obsolete stem piercing the centre of the tuber, tough fleshy, made up of bold convolutions with thick walls opening at the base by the side of the stem. Hymenium lining the internal surface of the convolutions. Asci 8-spored, globose-pyriform, minutely echinulate, coat thick, forming a double contour, hyaline till old, then brown, 20 μ. diameter.

Slopes of Mt. Wellington, 300 ft.

Xylaria tolosa, n.s. Sporophore usually arising with a long root from a loose subterranean sclerotium; erect, black surface, white and dense internally, about 4-6 cm. tall, the sterile stem rather flat at least when dry, about 2-3 cm. slender; fertile portion slightly thickened about 1-5 cm. Perithecia small, immersed, only the ostioles protruding; apex attenuated and sterile; asci narrow, cylindric, 8-spored; spores black, ellipsoid, oblique, smooth, 13 x 6-7 μ.