ANNELID HUNTING IN NOTTS.

THIRD PAPER.

BY THE

REV. HILDERIC FRIEND, F.R.M.S.

During another year my investigations into the Annelid fauna of this county have been continued with a good deal of vigour, the possibility of doing effective work being rendered all the easier by the splendid help which I have received from Mr. H. Hillman, of Nottingham, who has proved himself to be one of the most expert collectors it has ever been my good fortune to know. The following pages will show how great is the debt we owe to him for new additions and new localities. I have personally visited a few new districts since my last report was written, but unfortunately, just when I could have given special attention to the subject I was called on to change my abode, and now I am too far removed to be able to make visits to Notts. for the purpose of collecting material. I hope shortly, however, to be able to resume my studies in this interesting field, when, with the help of Mr. Hillman and other volunteers, it may be possible to fill some of the gaps which still remain in our lists. Every year makes it more difficult to add new species, and it is therefore occasion for congratulation that our third list contains so many new records.

As a result of the new knowledge acquired since these reports were commenced it is necessary to make one or two emendations in our former lists; but as a whole they still remain as a reliable record of work done and species known up to the time of their publication. I fear that the disadvantages under which I labour, in having to draw up this report while my library is still in chaos, will make it impossible for me to ensure the lucidity and accuracy which I should desire, and I may be unable at times to secure exact chronological sequence for my records: but it is hoped that the revised list at the end will give a fairly accurate idea of the position we have now attained. Reference should be made to the two reports already printed in order that the continuity may be discovered.

January 7th, 1913.—Re-examined the material collected at Burton Joyce, and found one specimen of *Henlea parva*, one of *Fridericia polychaeta*, two of *F. michaelseni* and seven of *F. bulbosa*. The colour of the Henleas, which led me last year to mistake them at first for Marioninas, was due to the beech leaves upon which they had been feeding. *F. bisetosa* was found in the Woodboro' material.

February, 1913.—Received from Prof. Carr and the Rev. A. Thornley, M.A., a small consignment of Annelids collected at Lambley Dumble which contained *Enchytraeus pellucidus*, *E. buchholzi*, *Lumbricus rubellus* and *Aporrectodea chlorotica*. Though it is frequently cold and dreary during this time of the year, many Enchytraeids may often be found by running water, or in humus in sheltered places, so that this kind of work is possible all the year round.

During this month I re-examined some of the material collected last year at Burton Joyce, and by the side of the canal in Nottingham. Three different forms of Henlea occurred in the gleanings from the latter site, but so perplexing are the Henleas as well as the Fridericias that I found it difficult to determine the species. My notes are as follows:

February 12th, 1913. "Re-examined material from canal side, and confirmed *Henlea dicksoni*, *H. rhaetica* and *H. lampas*. Are the two former one and the same?" *H. lampas* has proved to be even more problematic.

A further species of Marionina was also found at this time among the Burton Joyce specimens. It closely resembled *Henlea mariona* at first, but had red blood, and differed from all the species recorded by Michaelsen. Reference will be made to it under its proper heading hereafter.

April 2nd, 1913. Having a few hours' leisure I cycled to Hathern that I might work an entirely new district, and spent the afternoon exploring the banks of the Soar in the neighbourhood of Zouch Mills. In the soil under the high wooden pathway used in times of flood I found *Helodrilus oculatus* Hoff. in good numbers. Thus its indigenous character is fully established. Here also were large quantities of Allurus, or the small square-tailed worm, together with the green worm (*A. chlorotica*) and the young of *A. caliginosa*, a name which covers two forms. The other representatives of the Lumbricidae were *L. rubellus* Hoffm., *Eisenia mucosa* (= *rosea*), the young of which are with difficulty distinguished from Helodrilus; *Octolasium gracile* which is gregarious on the East Coast, but thins out towards the West; and *L. castaneus*.

There were many Enchytraeids, including *Fridericia michaelseni, F. reversa, F. helvetica, Enchytraeus buchholzi, E. minimus, Henlea rhaetica* and *Buchholzia fallax*, all adult. Strange to say, neither here not in any other locality on the banks of the Soar did I come across any Tubificidae. In a field close by, a heap of road scrapings was found, similar to that which yielded such splendid results at Rolleston on a previous occasion. Here *A. longa, A. chlorotica, L. rubellus* and other species were found, and a few Enchytraeids ; but much better results were obtained among the decaying sticks in the neighbouring ditch. It is very evident that the Enchytraeids especially, and in this Family the genus Fridericia in particular, render effective service in breaking down dead wood. Along with Allurus and *A. chlorotica* I found in the ditch such species as *Chamaedrilus chlorophilus* Friend, *Fridericia helvetica* Bretscher, *F. michaelseni* Br., *F. bisetosa* Lev., *F. polychaeta* Br., and *Enchytraeus buchholzi*, which is at once distinguished from Chamaedrilus by its salivary glands, and the presence of only three pairs of septal glands. Also *E. minimus* Br., and *Henlea rhaetica* Br. The material was kept for some time and re-examined in May and June, when the foregoing records were confirmed and a few additions, such as *Fridericia ratzeli, F. perrieri, F. galba* and *Henlea bisetosa*, were made to the list.

At Zouch Mills the Soar often overflows into the fields, casting up in the autumn and winter dead vegetable matter, which in due course finds work for an army of scavengers. Here *Dendrobaena mammalis, Allurus*, and other worms were found, as well as many species of Enchytraeids. The following were noteworthy. *Enchytraeus buchholzi* was perhaps the dominant form ; *Fridericia michaelseni* the largest, with *F. bulbosa* and *Henlea rhaetica* for supporters. Another form of Henlea occurred here, which, though differing in some particulars from *H. curiosa*, must for the present be referred to that species. It will be seen that a score or more of different species were collected, though they represented only two families, the Lumbricidae and the Enchytraeidae. As the latter are short lived, and give place from time to time to other species, it is not unreasonable to suppose that forty to fifty species would be found in this locality if the work were prosecuted during an entire year instead of being limited to one day.

Finally I found some rotten trunks of pollarded willows by the side of the canal bridge, and here some excellent work was done. The decaying wood yielded very fine specimens of Allurus, an immature Allolobophora and some specimens

of *D. subrubicunda*, but no true tree worms. There were, however, several Enchytraeids here, as in all the other localities, and among these mention may be made of *Henlea rhaetica* whose intestine was full of broken, undigested portions of woody fibre ; and a new species of Fridericia, which, on account of its habitat, I have named *Fr. arborea*. I found the same species in the ditch to which reference is made above, and discovered on turning up my notes that it had likewise been found near Overseal in Derbyshire three months before. One species, I find, is marked *Fridericia striata* ? This group is exceedingly perplexing, and I am devoting such brief leisure as I can command to the solution of some of the problems which their study suggests.

April 16th, 1913. The Rev. A. Thornley sent me a small collection made by Mr. Hillman in his garden at Woodborough Road, Nottingham, and so introduced me to a most valuable helper. Most of the specimens were immature, and are given in my notes as *Dendrobaena subrubicunda* ?, *Marionina sp., Enchytraeus sp.*, and *Fridericia valdensis* nearly mature. The material was set aside for further study and fuller data as to the conditions under which they were found. Further consignments followed from this and other localities.

April 21st, 1913. Mr. Hillman wrote—" Mr. Thornley has already sent you a packet of worms from my garden, and he tells me you have found them interesting. I am now sending you the contents of about a trowel full of soil taken from the base of a sycamore tree in the same garden. The tree is in a corner where the sun can never shine, and close to a brick wall partly covered with ivy. The soil is rather heavy clay, friable enough when half dry, but retentive of moisture. Nearly all the specimens were within an inch of the surface, as I found very little at a greater depth than that." Such data are invaluable, and on receipt of the letter with consignment I instantly perceived how useful an auxiliary had been introduced to me.

The list is as follows :—*Allolobophora longa, A. caliginosa* and *A. cholorotica, Lumbricus castaneus* and *Dendrobaena subrubicunda ; Fridericia michaelseni* two specimens, two specimens of a Fridericia belonging to the bisetose group, seven belonging to the bulbosa group, and three specimens of *Buchholzia appendiculata*, varying in certain particulars from the type. A total of nine species ; five Lumbricidae and four Enchytraeidae.

April 24th, 1913. " I am sending another collection (wrote Mr. Hillman), the genesis of which needs explaining.

I bought at a stall in the market a box of sweet pea plants. In planting them out I noticed a white worm as I fractured the soil, and on looking closer found it was teeming with them. I therefore kept what was not needed, and looked it over. . . I assume the gardener had used soft water, and he had certainly kept the box in a very wet state, for the surface was matted with algae. I do not know where he hailed from, but of course practically all the flower and plant stalls in the market are from the immediate neighbourhood, many in the City itself. Anyway, had I planted them in my garden, and afterwards found them you would have taken them as Nottingham records. Quite possibly some of those I have already sent had got into the garden in the same way, and become established there.'' After I had reported on the collection Mr. Hillman saw the gardener, who stated that the soil in which the peas were grown was all from Mapperley, and that the water used was not from a pond or stream, but rain water. So interesting was this consignment that I was led to write a special article on the subject which appeared in the '' Retford Times,'' of May 2nd, 1913. The interest for our readers will, I think, justify the reprinting of my paper.

LUMINOUS AND OTHER ANNELIDS.

A correspondent (Mr. Hillman, of Nottingham) recently sent me a small box containing some annelids which he took from the soil in which sweet peas had been grown by a neighbouring nurseryman. Although the soil would not weigh more than half an ounce, and was easily packed in a small match box, I found in it no fewer than 50 different specimens of annelids, belonging to 10 different species, and six different genera. This shows how numerous, varied, and important this group of animals is. And yet how little they are studied, and what ignorance prevails respecting them. One or two of the species are doubtless very injurious to growing plants, most are beneficial, some have never before been found in England, and one is of special interest because it has slipped in from some foreign land, and is probably luminous. Here, then is an interesting study.

That some oligochaets are luminous has long been known to students of this branch of science, and luminosity is not restricted to one genus or family. Many years ago a luminous worm was reported to have been found in Ireland, but no one has been able of recent years to confirm the discovery. A similar report came also from Liverpool, but this again has never been confirmed. Everything goes to prove that in

these cases either (1) the luminous creature was not an annelid, or (2) if a true annelid, was introduced from abroad, and perished. That we have a number of foreign annelids among us is now a matter of common knowledge. In all our botanical gardens such forms occur, and in certain cases they have become so acclimatised in our hot-houses and greenhouses that they live and propagate just as native species do. Further, in the museum at Worcester some small annelids are preserved which were found some years ago in the city, and were discovered by their luminosity.

Many years ago one of these creatures was described as *Microscolex phosphoreus*, and it was specimens of this interesting little creature, or a very near ally, that reached me on April 25th from Nottingham. The adult is about two inches long, has about 50 segments, and a girdle which extends over the 13th to the 17th. No British species has the girdle in such a forward position as that, neither has the genus Microscolex ever been regarded as a native of this country. Recent researches show the value and importance of trying to determine what animals and plants are really indigenous, as the study throws a flood of light on problems of great importance in the realms of natural science. The matter of moment now is to try and discover whether the nurserymen have ever noticed phosphorescence.

Along with this foreign annelid was another which has up to the present been found only in Ireland, on which account it was named *Henlea hibernica* by Southern, who discovered it. That it is a native of England is probably not to be doubted, although it is true that Ireland has several species which have not yet been found in England. Many years ago I discovered a new species in Ireland (*Lumbricus papillosus* Friend), which has been sought for in England during 20 years in vain, though it has since been found in the Alps and the Pyrenees. Moreover, during a recent visit to Ireland I discovered two or three other species which are quite unknown here, though one of them has been found in Norway. These are curious facts, and start a variety of problems which it will take a long time to solve. Now that the Irish species of Henlea has been discovered there is little doubt but that it will soon be met with again in other localities.

I have said that some of the annelids sent to me by Mr. Hillman are doubtless injurious to growing plants. This subject has occupied my attention for many years, and as the Government has just voted me a grant to investigate the problems of economics and bionomics, I am extremely anxious

to press on my researches in this direction. Since I described the little aster worm which was years ago found destroying our flowers and garden crops, many things have come to light. I was visiting Blenheim Palace Gardens the other day, and found that this tiny worm had wrought much havoc among carnations. Sometimes it gets into the kitchen garden and preys upon celery and other valuable crops. Now it is found in earth in which sweet peas are growing, and unless care is taken this favourite bloom will fall a prey to the insidious foe.

In view of these important facts I should like to repeat the request made by me more than once in these columns, that gardeners and nature-lovers would send me specimens of the worms, great and small, which they meet with during their work in the garden or as they are engaged in other observations. In such gardens as the Dukeries boast—Welbeck, Clumber, and the rest—there must be many species which have as yet been little studied, and probably some which would be new to science. They should be sent in tin boxes, with moss to keep them from being injured, and the sender would be duly credited with any new thing he might discover.

Here is the list of species, with the number of specimens by which each was represented :

1. *Microscolex phosphoreus*, 1 adult and 2 young.
2. *Dendrobaena arborea*, 1 adult, 2 young.
3. *Dendrobaena subrubicunda*, 1 immature.
4. *Enchytraeus albidus*, 20 specimens.
5. *Enchytraeus buchholzi*, 11 specimens.
6. *Enchytraeus parvulus* (=*argenteus*), 5 specimens.
7. *Henlea rhaetica*, one specimen.
8. *Henlea hibernica*, 2 specimens.
9. *Fridericia bretscheri* ?, 1 specimen.
10. *Buchholzia appendiculata*, 3 specimens.

Specially gratifying was the discovery of *H. hibernica*. It had previously been found only in Ireland, but Mr. Hillman has since forwarded it to me from Jersey. I have also collected it in Sussex.

April 28th, 1913. A fresh consignment from Thurgarton Priory and Hoveringham. Mr. Hillman writes : " I went provided with a tin which I filled with soil from the side and partly-dried bottom of a pond, as well as algae from the surface. . . . Included with these are the gleanings from a little soil beside a stream in Hoveringham itself, but all part of the same drainage system." Sixteen different species were found, the large proportion of which were, as usual, Enchytraeids. The numbers in brackets refer to the specimens received. *Fridericia michaelseni* (3) destitute of the large 4/5 glands, *F. valdensis* (1), *F. bulbosa* (1), *F. connata* (1), *F. perrieri* (2), *F. bulbifera* (2), *Buchholzia* (all immature, species consequently not determined, 8 specimens), *Henlea multispinosa* (1), *H. dicksoni* (1), *H. inusitata* (1), *H. rhaetica* (4), *H. bisetosa* (1). There were 3 specimens of *Allurus tetraedrus*, also a species of *Limnodrilus* and two of *Tubifex* or *Ilyodrilus*. It will readily be understood that where every individual has to be separately examined with great care under the microscope the task of working out such a collection is by no means light or easy. Yet the results more than compensate for the toil, and it would be a great pleasure to meet with other collectors who shewed similar zeal, interest and intelligence to that of Mr. Hillman.

May 1st, 1913. " The collection sent herewith (wrote Mr. Hillman) is from Trent side. Some from a wet depression in a field on an embankment in the City. Some from the grassy bank on the opposite side of the river. Some from alongside Trent Bridge, at what appears to be a sort of refuse dumping ground, and is very rich in worms." Upwards of three score specimens were examined, with the result that no fewer than ten species of Enchytraeids were identified. Some of these were rare, one seems to be new to science. *Henlea rhaetica* (1 specimen), *Buchholzia fallax* (4), *B. appendiculata* (13), *Fridericia reversa* (12), *F. bulbifera* (22 all adult), *F. bulbosa* (2), *F. inornata* (2), *F. valdensis* (1), *F. paroniana* (3), *Enchytraeus minimus* (7 all immature), with an immature Chamaedrilus or Enchytraeus which could not with certainty be determined.

May 8th, 1913. I visited some localities within the County limits, and spent a night with the Revd. A. Thornley, but the weather was unpropitious, and the results poor. On the Nottingham border near Stapleford I found *Lumbricus rubellus*, *Dendrobaena subrubicunda*, type and variety, *Eisenia rosea*, type and variety, *Allolobophora caliginosa*, *Bimastus eiseni*, and *Enchytraeus minimus*.

May 14th, 1913. Four consignments from Mr. Hillman with interesting data :

1. From moss taken from the base of the Church Tower at Rolleston. All the specimens were immature and were

referable to *Enchytraeus minimus* and *Buchholzia appendiculata*.

2. Pond in Vicarage grounds at the same place. Pond well shaded and stocked at the moment with tadpoles and newts with a slight growth of duckweed. *Allurus tetraedrus, Lumbricus castaneus, Henlea rhaetica var. multispinosa, Fridericia perrieri* typical, *F. bisetosa* typical, and a third species of Fridericia unnamed.

3. Farmyard on Mapperley Plains. A Tubificid, and two species of *Enchytraeus* (*minimus* and *buchholzi*).

4. A pond in the same locality, receiving the water from a manure heap, correspondingly foul, with no vegetation. *Fridericia michaelseni, F. bulbifera, F. pseudobulbifera,* a *Fridericia* which combined the characters of *perrieri* and *leydigi*, and another species unnamed.

May 19th, 1913. Three further collections as under from Mr. Hillman.

1. From a pond off Colwick Road, and the cattle trough which receives a spring that overflows into the same pond. Packed with nematodes, suggesting that the pond is certainly unfit for cattle. Also *Limnodrilus aurantiacus, Fridericia michaelseni, Enchytraeus pellucidus,* and *Chamaedrilus chlorophilus*, never before received from a collector, and found only by myself in Derbyshire and Sussex.

2. Collection from different places along the road from Nottingham to Rolleston, including a very stale manure heap and soil adjoining, the fractures in which were white with worms. Three different species, viz.: *Henlea rhaetica, Fridericia michaelseni* and *Enchytraeus pellucidus.*

3. *Allurus tetraedrus* from mill-dam near Lowdham, with many larvae, and *Limnodrilus aurantiacus* Friend.

May 21st, 1913. A packet from Mr. Hillman containing eight species of Enchytraeids collected on land by the hillside overlooking Wells Road, Nottingham. Many of the worms were entangled in the roots of grass. Others were scattered in the soil which was only slightly damp. Six of the species were represented by only one specimen each, and in four cases the identification was of a doubtful character. I indicate this by a note of interrogation, and give the number of specimens examined.

Fridericia michaelseni (3), with and without the large, characteristic gland. *Fridericia bretscheri* ? (1), *F. bisetosa* ? (1), *F. magnisetosa* ? (1), *Fridericia* sp. ? (1), *Henlea rhaetica* (1), *Achaeta bohemica* (2), and *Enchytraeus nigrinus* (1).

From Mr. Hillman's garden I also received *Lumbricillus verrucosus, Enchytraeus albidus* and *buchholzi, Fridericia perrieri, F. michaelseni,* and an immature *Buchholzia.*

May 26th, 1913. Three collections from Wells Road, Nottingham. Mr. Hillman's covering letter is full of interest, as supplying information of much value for bionomical purposes. Nine species at least were found in the three gleanings, six of which belonged to the genus Fridericia. Of these two are queried in my notes on account of their interesting peculiarities. The Fridericias would seem, with the Henleas, to be at present in a fluid condition, liable to great variation, on which account it is sometimes absolutely impossible to say to what species they belong. I note *F. diachœta* (as at present understood by me), *F. bulbosa typica, F. michaelseni, F. bulbifera, F. paroniana* ? and *F. bretscheri* ? Also *Buchholzia sp., Chamaedrilus chlorophilus,* and *Allurus tetraedrus.*

June 10th, 1913. A final collection from five different localities, containing some 15 species. I omit details respecting habitats, but may mention that Aslockton and Scarrington are the placed named. *Allurus tetraedrus, Lumbricus castaneus, Tubifex, Limnodrilus hoffmeisteri, L. udekemianus* ?, an immature Buchholzia, *Enchytraeus minimus, E. buchholzi, Fridericia diachaeta, F. bulbosa, F. bretscheri* (not *F. parva* Moore, or Bretscher), *F. connata* so called, and *F. michaelseni* or its ally, with *Achaeta bohemica,* only once previously received from Mr. Hillman. I also found a Henlea which is queried.

On the receipt of this remarkable collection I had notice from Mr. Hillman of an approaching visit to Jersey. I had not concluded my examination of the rich gleanings which I received from him there, when my work was abruptly brought to a close, and since June no further study of Nottingham annelids has been possible.

NEW HABITATS FOR SPECIES ALREADY RECORDED.

The numbers preceding the species are those for the two previous lists.

1. **Limnodrilus udekemianus** Clap. Scarrington, June 10th, 1913, with an element of doubt.
2. **Limnodrilus hoffmeisteri** Clap. Scarrington, June 10th, 1913.

3. **Limnodrilus papillosus** Friend. Canal in the City, September, 1912.

9. **Achaeta bohemica** Vejd. Wells Road, Nottingham, May, 21st, 1913 ; Scarrington, June 10th, 1913.

10. **Henlea dicksoni** Eisen. Canal side in the City, 1912. Identified February 12th, 1913, &c.

11. **Henlea variata** Friend. Canal in the City, December 16th, 1912. Also variety *polychaeta*.

14. **Enchytraeus pellucidus** Friend. Colwick Road, May 19th, 1913, and elsewhere.

15. **Enchytraeus minimus** Bret. Zouch Mills, April 2nd, 1913 ; Trent side, May 1st, 1913, &c.

16. **Enchytraeus nigrinus** Bret. Wells Road, Nottingham, May 21st, 1913.

18. **Lumbricillus verrucosus** Clap. Woodborough Road, Nottingham, May 21st, 1913.

19. **Fridericia agricola** Moore. Burton Joyce, December 16th, 1912.

20. **Fridericia bretscheri** Southern. Mapperley, April 24th, 1913, probably this species.

21. **Fridericia bulbosa** Rosa. Burton Joyce, December, 1912 ; Zouch Mills, April 2nd, 1913 ; Hoveringham, April 28th, 1913.

22. **Fridericia glandifera** Friend. Hoveringham, April 28th, 1913.

24. **Fridericia connata** Bret. Hoveringham, April 28th, 1913 ; Scarrington, June 10th, 1913.

25. **Fridericia diachaeta** Bret. Wells Road, Nottingham, May 26th, 1913.

26. **Fridericia galba** Hoffm. Zouch Mills, April 2nd, 1913.

27. **Fridericia michaelseni** Bret. Burton Joyce, December, 1912 ; Colwick Road, May 19th, 1913 ; Zouch Mills, April 2nd, 1913 ; Hoveringham, April 28th, 1913.

31. **Fridericia perrieri** Vejd. Zouch Mills, April 2nd, 1913 ; Hoveringham, April 28th, 1913 ; Rolleston, May 14th, 1913.

32. **Fridericia polychaeta** Bret. Burton Joyce, December, 1912 ; Zouch Mills, April 2nd, 1913.

33. **Fridericia reversa** Friend. Zouch Mills, April 2nd, 1913 ; Trent side, May 1st, 1913.

34. **Fridericia striata** Lev. Zouch Mills, April 2nd, 1913. With an element of doubt.

36. **Allurus tetraedrus** Sav. Zouch Mills, April 2nd, 1913 ; Thurgarton, April 28th, 1913 ; Rolleston, May 14th, 1913 ; Mill dam near Lowdham, May 19th, 1913 ; Scarrington, June 10th, 1913.

37. **Eisenia rosea** Sav. (= mucosa). At Zouch Mills, April 2nd, 1913 ; Stapleford, May 8th, 1913.

39. **Allolobophora caliginosa** Sav. Woodborough Rd., Nottingham, April 21st, 1913 ; Stapleford, May 8th, 1913.

40. **Allolobophora longa** Ude. Zouch Mills, April 2nd, 1913. Woodborough Road, Nottingham, April 21st, 1913.

41. **Allolobophora chlorotica** Sav. Zouch Mills, April 2nd, 1913 ; Woodborough Road, Nottingham, April 21st, 1913.

42. **Dendrobaena subrubicunda** Eisen. Zouch Mills, April 2nd, 1913 ; Woodborough Road, Nottingham, April 21st, 1913 ; Mapperley, April 24th, 1913 ; Staplefordl May 8th, 1913.

43. **Dendrobaena arborea** Eisen. Mapperley, April 24th, 1913.

44. **Dendrobaena mammalis** Sav. Zouch Mills, April 2nd, 1913.

45. **Bimastus eiseni** Sav. Stapleford, May 8th, 1913.

47. **Octolasium gracile** Oerley. Zouch Mills, April 2nd, 1913.

48. **Lumbricus rubellus** Hoffm. Zouch Mills, April 2nd, 1913 ; Stapleford, May 8th, 1913.

49. **Lumbricus castaneus** Sav. Zouch Mills, April 2nd, 1913 ; Woodborough Road, Nottingham, April 21st, 1913 ; Rolleston, May 14th, 1913.

52. **Limnodrilus aurantiacus** Friend. Colwick Road, Nottingham, May 19th, 1913.

54. **Henlea rhaetica** Bret. Zouch Mills, April 2nd, 1913 ; Mapperley, April 24th, 1913 ; Thurgarton, April 28th, 1913.

55. **Henlea lampas** Eisen. Canal side in the City ; identified February 12th, 1913.

58. **Henlea parva** Friend. Burton Joyce, December, 1912.

59. **Enchytraeus buchholzi** Vejd. Zouch Mills, April 2nd, 1913 ; Mapperley, April 24th, 1913 and May 14th, 1913.

64. **Fridericia bisetosa** Levinsen. Woodborough, December 17th, 1912 ; Zouch Mills, April 2nd, 1913.

70. **Helodrilus oculatus** Hoffm. In good numbers on the Nottingham border near Zouch Mills, collected April 2nd, 1913.

NEW ADDITIONS.

I am glad to say that we have been able to make a few new discoveries during the year. These will be arranged in the same order as that which has already been adopted in the two previous reports. With one exception all the new species are Enchytraeids.

72. **Henlea bisetosa** sp. n. First found by me in Dublin, March 11th, 1913. Then at Zouch Mills, April 2nd, 1913. The description has not yet been published. Very small; length 3—4 mm., segments 30, setae 2 throughout. Dorsal vessel begins in 7/8, bulb in 8. 3 pairs of septals of rather unusual type. Special glands in 5/6. Nephridia begin in segment 7 and have a long slender duct. Received from Hoveringham per Mr. Hillman, April 28th, 1913.

73. **Henlea curiosa** Friend. Zouch Mills, April 2nd, 1913. Differs slightly from the type as described in J.R.M.S., December, 1912.

74. **Henlea hibernica** Southern. Two specimens in soil from Mapperley, April 24th, 1913. First found by Southern in Ireland, it is now known from several localities, including Jersey whence I received it, as well as the Mapperley specimens from Mr. Hillman.

75. **Henlea inusitata** Friend. At first regarded as a variety of *H. Dicksoni*. The peculiar glands, however, between the septals are quite a striking characteristic. Thurgarton Priory, April 28th, 1913, through Mr. Hillman. I have found it at Caldwell in Derbyshire, and in the Botanic Garden, Oxford.

76. **Henlea multispinosa** Friend. Like the last this species was at first taken to be a variety of *H. Dicksoni* On revising the genus, however, it was found to be distinct. Thurgarton, April 28th, 1913.

77. **Buchholzia appendiculata** (Buch.), and

78. **Buchholzia fallax** Mich. have both been found in several localities during the past year. The genus is easy to distinguish, but when the specimens are immature it is not always easy to say to which species they belong. The distribution in Notts, so far as at present known, may be gathered from the chronological record already given.

79. **Enchytraeus argenteus** Mich (= **E. parvulus** Friend), has long had an evil reputation as a pest of growing plants. It is widely distributed, but so far has only been received from Mapperley, April 24th, 1913, so far as this county is concerned.

80. **Fridericia arborea** sp.n. This interesting species was found in the decaying stump of a stranded willow at Zouch Mills, April 2nd, 1913, and the description has not yet been published, as my discoveries have been so numerous during the year that it has been impossible to get them systematically arranged for the Journals. It is 8—10 mm. in length, with about 35 segments. Setae in front, 2 dorsal and 3—4 ventral, with usually 2 behind. Salivaries forked or branched. Dorsal vessel arising in 15/16. Duct of nephridium longer than the post-septal portion, from the middle of which it springs. Sperm-funnels rather large with strong ducts and large penes.

81. **Fridericia paroniana** Issel. In a collection made by Mr. Hillman in Nottingham, May 1st, 1913. Found in Ireland by Southern and by myself in Derbyshire and elsewhere.

82. **Fridericia bulbifera** sp.n. This new species belongs to the *bulbosa* group. It has not yet been described in the scientific Journals, but I have taken it at Blenheim Park, the Oxford Botanic Gardens, Portobello in Dublin and on the borders of Leicestershire and Derbyshire. The Notts. specimens came from Thurgarton, April 28th, Trent side, May 1st, Wells Road, May 21st, 1913, while the Mapperley collection of May 14th, contained the type and an interesting variety which I have referred to above as *pseudobulbifera*.

83. **Fridericia inornata** sp.n. Found by me early in the year at a village between Dublin and Malahide in Ireland, and received from Mr. Hillman on May 1st, 1913, in gleanings from Trent side. These new species will all be duly described from notes made during the study of living material.

84. **Fridericia valdensis** Issel. First received through the Revd. A. Thornley, M.A., from Mr. Hillman's garden. Woodborough Road, Nottingham, April 16th, 1913. Then from Hoveringham and Thurgarton, April 28th, and Trent side, May 1st.

85. **Chamaedrilus chlorophilus** Friend. This interesting annelid belongs to a new genus of the Enchytraeid family, and was first described by me in the J.R.M.S. for 1913 from specimens taken in Derbyshire and Leicestershire. The consignment of May 1st from Trent side contained a specimen which might have been referred to this genus, but owing to its immature condition it was doubtful. However, there could be no doubt about the species being a native of Notts. when I examined the Colwick Road collection made by Mr. Hillman, May 19th, 1913.

86. **Microscolex phosphoreus** Duges is the subject of a note on Luminous Worms on an earlier page. This is undoubtedly an importation, but one of great interest. I received it later from Jersey through the good offices of Mr. Hillman.

SYSTEMATIC LIST.

It will be helpful to future students if we now tabulate the species thus far recorded according to their families and genera. For convenience of reference the order adopted is that of Michaelsen in *Das Tierreich*. The first record and original number are given.

NAIDIDÆ.

1. **Nais elinguis** Muller. April 15th, 1912, Canal, Nottingham (No. 51).

TUBIFICIDÆ.

2. **Limnodrilus udekemianus** Clap. March 13th, 1912, runnel at Glapton (No. 1).
3. **Limnodrilus hoffmeisteri** Clap. October 13th, 1911, Newark (No. 2).
4. **Limnodrilus papillosus** Friend. October 13th, 1911, Newark (No. 3).
5. **Limnodrilus aurantiacus** Friend. April 17th, 1912, Canal, Nottingham (No. 52).
6. **Tubifex campanulatus** Eisen. October 13th, 1911, Newark (No. 4).
7. **Tubifex bonneti** Clap. October 13th, 1911, Newark (No. 5).
8. **Tubifex tubifex** O.F.M. November 8th, 1911. Gunthorpe (No. 6).

9. **Ilyodrilus glandulosus** Friend. October 13th, 1911, Newark (No. 7).

LUMBRICULIDÆ.

10. **Lumbriculus variegatus** O.F.M. May 8th, 1912, Mansfield (No. 8).

ENCHYTRAEIDÆ.

11. **Achaeta bohemica** Vejd. November 7th, 1911, Canal, Nottingham (No. 9).
12. **Achaeta incisa** Friend. May 8th, 1912, Mansfield (No. 53).
13. **Henlea dicksoni** Eisen. March 26th, 1912, Rolleston Junction (No. 10).
14. **Henlea variata** Friend. March 26th, 1912, Rolleston Junction (No. 11).
15. **Henlea attenuata** Friend. March 26th, 1912, Southwell (No. 12).
16. **Henlea rhaetica** Bret. May 8th, 1912, Mansfield (No. 54).
17. **Henlea lampas** Eisen. May 8th, 1912, Mansfield (No. 55).
18. **Henlea nasuta** Eisen. September 10th, 1912, Canal, Nottingham (No. 56).
19. **Henlea mariona** Friend. December 16th, 1912, Burton Joyce (No. 57).
20. **Henlea parva** Friend. September 10th, 1912, Canal, Nottingham (No. 58).
21. **Henlea bisetosa** sp.n. April 2nd, 1913, Zouch Mills (No. 72).
22. **Henlea curiosa** Friend. April 2nd, 1913, Zouch Mills (No. 73).
23. **Henlea hibernica** Southern. April 24th, 1913, Mapperley (No. 74).
24. **Henlea inusitata** Friend. April 28th, 1913, Thurgaton Priory (No. 75).
25. **Henlea multispinosa** Friend. April 28th, 1913, Thurgarton (No. 76).
26. **Buchholzia appendiculata** (Buch.) April 21st, 1913. Nottingham (No. 77).
27. **Buchholzia fallax** Mich. April 2nd, 1913, Zouch Mills (No. 78).

28. **Marionina crassa** Clap. December 17th, 1912, Woodborough (No. 61).
29. **Marionina (dubius).** December 16th, 1912, Burton Joyce (No. 62).
30. **Marionina georgiana** Mich. December 16th, 1912, Canal, Nottingham (No. 63).
31. **Lumbricillus subterraneus** Vejd. March 13th, 1912, Clifton (No. 17).
32. **Lumbricillus verrucosus** Clap. March 26th, 1912, Southwell (No. 18).
33. **Lumbricillus lineatus** O.F.M. April 15th, 1912, Canal, Nottingham (No. 60).
34. **Enchytraeus albidus** Henle. March 13th, 1912, Clifton (No. 13).
35. **Enchytraeus pellucidus** Friend. March 13th, 1912, Clifton (No. 14).
36. **Enchytraeus minimus** Bret. November 7th, 1912, Nottingham (No. 15).
37. **Enchytraeus nigrinus** Bret. March 26th, 1912, Southwell (No. 16).
38. **Enchytraeus buchholzi** Vejd. May 7th, 1912, Mansfield (No. 59).
39. **Enchytraeus argenteus** Mich. (= **E. parvulus** Friend). April 24th, 1913, Mapperley (No. 79).
40. **Fridericia agricola** Moore. May 3rd, 1911, Newark (No. 19).
41. **Fridericia bretscheri** Southern, March 26th, 1912, Rolleston Junction (No. 20).
42. **Fridericia bulbosa** Rosa. May 3d, 1911, Newark (No. 21)
43. **Fridericia glandifera** Friend. March 26th, 1912, Rolleston (No. 22).
44. **Fridericia leydigi** Vejd. May 3rd, 1911, Newark (No. 23).
45. **Fridericia connata** Bret. November 5th, 1911, Canal, Nottingham (No. 24).
46. **Fridericia diachaeta** Bret. March 13th, 1912, Clifton (No 25).
47. **Fridericia galba** Hoffm. May 8th, 1911, Newark (No. 26)
48. **Fridericia michaelseni** Bret. April 3rd, 1912, Aspley Woods (No. 27).
49. **Fridericia glandulosa** Southern. May 3rd, 1911, Newark (No. 28).

50. **Fridericia humilis** Friend. March 13th, 1912, Clifton Grove (No. 29).
51. **Fridericia lobifera** Vejd. March 13th, 1912, Clifton Grove (No. 30).
52. **Fridericia perrieri** Vejd. May 3rd, 1911, Newark (No. 31).
53. **Fridericia polychaeta** Bret. March 13th, 1912, Clifton Grove (No. 32).
54. **Fridericia reversa** Friend. November 7th, 1911, Canal, Nottingham (No. 33).
55. **Fridericia striata** Lev. March 13th, 1912, Clifton (No. 34).
56. **Fridericia variata** Bret. November 7th, 1911, Canal, Nottingham (No. 35).
57. **Fridericia bisetosa** Lev. May 8th, 1912, Mansfield (No. 64.)
58. **Fridericia obtusa** Friend. May 8th, 1912, Mansfield (No. 65).
59. **Fridericia densa** Friend (?) December 16th, 1912, Nottingham (No. 66).
60. **Fridericia callosa** Eisen. April 11th, 1912, Car-Colston (No. 67).
61. **Fridericia rotunda** Friend. December 17th, 1912, Woodborough Hall (No. 68).
62. **Fridericia arborea** sp.n. April 2nd, 1913, Zouch Mills (No. 80).
63. **Fridericia paroniana** Issel. May 1st, 1912, Nottingham (No 81).
64. **Fridericia bulbifera** sp.n. April 28th, 1913, Thurgarton (No. 82).
65. **Fridericia inornata** sp.n. May 1st, 1913, Trent side (No. 83).
66. **Fridericia valdensis** Issel. April 16th, 1913, Nottingham (No. 84).
67. **Chamaedrilus chlorophilus** Friend. May 19th, 1913, Nottingham (No. 85).

MEGASCOLICIDÆ.

68. **Microscolex phosphoreus** Duges. April 24th, 1913, Mapperley (No. 86).

LUMBRICIDÆ.

69. **Allurus (Eiseniella) tetraedrus** Sav. May 2nd, 1911, with var. *luteus* Friend, Kelham (No. 36).

70. **Allurus** (?) **mollis** Friend. December 16th, 1912, Burton Joyce (No. 71).
71. **Eisenia rosea** Sav. June 14th, 1892, Nottingham (No. 37).
72. **Eisenia foetida** Sav. May, 19th, 1891, Carburton (No. 38).
73. **Allolobophora caliginosa** Sav. May 19th, 1891, Worksop (No. 39 ; the year 1911 is an error for 1891).
74. **Allolobophora longa** Ude. May 2nd, 1912, Kelham (No. 40).
75. **Aporrectodea chlorotica** Sav. May 19th, 1891, Carburton (No. 21).
76. **Dendrobaena subrubicunda** Eisen. May 19th, 1891, Clumber (No. 42).
77. **Dendrobaena arborea** Eisen. March 13th, 1912, Clifton Grove (No. 43).
78. **Dendrobaena mammalis** Sav. March 13th, 1912, Clifton (No. 44).
79. **Helodrilus oculatus** Hoffm. December 16th, 1912, Beeston (No. 70. By a clerical error entered for Burton Joyce).
80. **Bimastus eiseni** Lev. April 3rd, 1912, Aspley Wood (No. 45. Sav. is a misprint for Lev.)
81. **Octolasium lacteum** Oerley. May 19th, 1891, Worksop (No. 46).
82. **Octolasium gracile** Oerley. May 19th, 1891, Carburton (No. 47).
83. **Octolasium cyaneum** Sav. December 17th, 1912, Woodborough Hall Gardens (No. 69).
84. **Lumbricus rubellus** Hoffm. May 19th, 1891, Clumber (No. 48).
85. **Lumbricus castaneus** Sav. May 19th, 1891, Clumber (No. 49).
86. **Lumbricus terrestris** Linn. May 19th, 1891, Clumber (No. 50).

POSTSCRIPT.—My notes on *Henlea hillmani* sp.n., and some other annelids, having been mislaid during removal, I am obliged to hold these over for next year's report. Already Mr. Hillman has sent me material containing two or three species not hitherto recorded for Notts.

Pocklington, York, January 17th, 1914.