Artillery: 1st Kent Volunteer Artillery (Eastern Division, Royal Artillery): Surgeon-Lieutenant-Colonel Robert Ross Brown. **Home District: Rifle:** 3rd Middlesex Volunteer Rifle Corps: Surgeon-Lieutenant-Colonel Frederick Orton. 22nd Middlesex (Central London Rangers) Volunteer Rifle Corps: Surgeon-Major Robert Cuff, retired. 3rd London Volunteer Rifle Corps: Surgeon-Major George Hastings. **Scottish District: Rifle:** 3rd (Dumfries) Volunteer Battalion the King's Own Scottish Borderers: Surgeon-Lieutenant-Colonel Andrew Dall MacDonald, M.D.

THE HEALTH OF THE BRITISH ARMY IN INDIA.

We are glad to notice that this subject continues to attract attention and is not being lost sight of amid the variety of political and other topics of public interest at the present time. A communication from "Sanitas" in the *Times* of the 16th inst., in reply to one from Mr. Gregory, publishes some facts and figures derived from blue-books which put the question of contagious disease in a very different light to that represented by the opponents of all protective legislation. The figures show, says "Sanitas," that this class of disease rose in India from 371 per 1000 in 1888 to 482 in 1889 and 504 in 1890. "For the years 1889 and 1890 the Army was practically 'unprotected,' but towards the end of 1890 (Parliamentary Return No. 318 of 1895, page 29) new cantonment rules, affording a modified measure of 'protection,' came into force. In 1891 the admission-rate for these diseases fell to 401, and it was only 410 in 1892. In 1893 the new cantonment rules were condemned by a committee (Mr. G. Russell's) at home. The figures of 'contagious disease' for the years 1893, 1894, and 1895 have been 466, 511, and 537 per 1000. (For the last year see Army Medical Department Report for 1895.)."

MEASLES AT DEVONPORT.

Measles in a mild form has broken out on board the *Impregnable* training ship for boys at Devonport. The disease, which is very prevalent in the district, has attacked five boys in the ship, and they have been removed to the Naval Hospital.

Surgeon-Colonel J. Lane Notter, Professor of Hygiene in the Army Medical School, Netley, proceeds to Venice to attend the International Congress on the Plague.

The transport *Dunera* arrived at Southampton on the 12th inst. She brought home thirty-four invalids for the Royal Victoria Hospital, Netley.

Correspondence.

"Audi alteram partem."

SURGEON-CAPTAIN HEHIR AND THE PARASITE OF MALARIA.

To the Editors of THE LANCET.

SIRS,—In connexion with a long paper by Surgeon-Captain Hehir, given in THE LANCET of Nov. 28th and Dec. 5th, 1896, and entitled "The Hæmatozoon of Malaria and its Discovery in Water and Soil," I feel it my duty to make the following remarks. The paper in question implies not only that the writer has discovered a hæmatozoon in cholera and syphilis, but that he has found new forms of the parasite of malaria and has discovered its existence in water and soil. These discoveries have already been mooted by him in several papers—for example, one on Microscopical Observations on the Hæmatozoon of Malaria, published in 1891, and another on his Cholera Organism, published as a special supplement to the April number of the *Indian Medical Gazette*, 1892. In June, 1893, I called on Surgeon-Captain Hehir with two specimens of malarial blood and persuaded him to give me a demonstration of his malaria parasite. He showed me some examples of his small hyaline bodies; they were the exudation bubbles which escape from blood plates in blood kept for an hour or so. He showed me also examples of his hæmatomonas malarie stellatum; they were ordinary stellate arrangements of fibrin such as are figured in some text-books of physiology. These facts were publicly referred to and Surgeon-Captain Hehir's conclusions challenged in a paper published by me in the *Indian Medical Gazette*, 1893, page 329; but Surgeon-Captain

Hehir has then and since ignored my remarks, though in the same number of the *Gazette* there was an editorial inviting his attention to them. In the same periodical for January, 1894, I gave further a long paper describing various appearances produced by the "third element of the blood" (blood plates) and detailing some of the errors made by Surgeon-Captain Hehir, and in the December number of the same year, as well as in a paper read before the Budapest Conference held at the time, I furnished a list of "pseudo-parasites" which had, I thought, deceived many observers, among them Surgeon-Captain Hehir and myself. But Surgeon-Captain Hehir has never that I know of thought fit to refer to any of these strictures. Now, with respect to the hæmatozoon of cholera. In Secunderabad in 1895, having some cases of cholera, I wrote and telegraphed to Surgeon-Captain Hehir inviting him to demonstrate his organism to me (since he was living a few miles away). He replied that he had not time to do so. I wrote again, pointing out that since Mr. Hankin had published a letter (*Indian Medical Gazette*, May, 1895) suggesting that one of Surgeon-Captain Hehir's forms "is nothing but crystals of common salt, others resemble kinds of precipitates, fragments of fibrin, and altered red or white corpuscles," it was incumbent on him to demonstrate his organism to some one, such as myself, familiar with the ordinary appearances of blood. To this letter I received no reply.

Surgeon-Captain Hehir is, of course, not obliged to instruct others; but personally I think that he should have felt himself bound to take a little trouble to demonstrate such very startling discoveries to anyone, even to a person like myself, whom he may have deemed not sufficiently well-informed to understand them. Since he did not do so he cannot complain if I give my opinion of his work very freely, and my opinion is briefly as follows. Surgeon-Captain Hehir's *brochures* on these hæmatozoa of his are so confused that it is almost impossible to understand what he means. For instance, in the article lately published in THE LANCET there are no less than 134 numbered paragraphs, which are generally jumbled together without sequence and in such a manner that paragraphs on staining are abruptly interposed between descriptive paragraphs, while references to future explanations which are never given, and to "larger bodies" and "smaller bodies" and "long and broad varieties" which are never described, leave the intellect of the reader in a state of collapse. At the same time the whole paper is full of learned terms and suggests difficulties of investigations so enormous that I fear no one will be able to confirm Surgeon-Captain Hehir's observations. Nowhere is a plain object plainly described; dimensions are not given; the numbers to be found in a field are not specified; and amount of movement is left indeterminate. Really, those interested in the parasite cannot accept this sort of thing.

When, however, by dint of hard application, we begin to resolve the nebulae we find only that Surgeon-Captain Hehir still remains a victim of the blood-plate. He says (paragraph 104) that he has discovered "invisible forms of the parasite"; the masses of blood-plates are almost invisible. He says (paragraph 58): "In every instance the more developed the parasite the less distinct and the more transparent and invisible it is." "Where the hæmoglobin is largely dissolved in the plasmotic fluid it gives the appearance of the parasite having been stained." This is an excellent description of a cluster of blood-plates, which accordingly I take to be "in every instance" Surgeon-Captain Hehir's more developed parasites. Again (paragraph 78) he says: "There are also considerable numbers of ciliated spherical bodies, the cilia being long, firm, and pass (ing?) out at right angles abruptly, leaving spaces between each other, in which spaces arise a considerable number of varying sized cyst-like bodies which are set free and become the hyaline spherical body mentioned above." This is a correct description of a unique object which was described by me in "The Third Element of the Blood," being a cluster of invisible blood-plates, or microcytes as I called them, surrounded by long filaments of fibrin (Surgeon-Captain Hehir's cilia) and giving rise to exudation bubbles (Surgeon-Captain Hehir's hyaline bodies) between the fibrin filaments. The description confirms Surgeon-Captain Hehir's demonstration to me of his hyaline bodies, which were the exudation bubbles aforesaid, and renders it unnecessary to criticise further his work (either on malaria, cholera, or syphilis). He has evidently mistaken for a parasite a very ordinary object, but one which is not

generally described in text-books on the blood. In a similar manner he has made mistake after mistake. Blood-plates, fibrin-filaments, clusters of blood-plates (paragraphs 77 to 81) are magnified by his imagination into spores, cilia and flagella, and chlamydospores respectively. Echinoid or hairy corpuscles, so well known, become flagellated red-corpuscles (paragraph 88). There are flagella like silk fibres (paragraph 85). Perinuclear granules of leucocytes have "a nucleus and nucleolus, develop flagella, free themselves, and wander about the field" (paragraph 97). Every part of a parasite, even the framework, is reproductive (paragraph 87). Red corpuscles pair off, fuse their nuclei, and commence sporulation (paragraphs 88 to 91). Flagella disintegrate into micrococcus-like spores (paragraph 105). Fibrin forming a few minutes after the specimen is made becomes "fine flagella appearing in the field in places where nothing had previously been seen" (paragraph 107).

If I have misinterpreted Surgeon-Captain Hehir's descriptions it is entirely owing to the bad manner in which they are written. But I do not think that such misinterpretation is possible, because no other bodies and appearances which in any way resemble those descriptions exist in the blood. Of the large number of able observers who have studied malarial blood not one has even hinted at the existence of such forms. Surgeon-Captain Hehir insists upon the use of high powers and special methods of staining; but other observers have used these without arriving at his results. On the other hand, I really doubt whether he has ever seen the true parasite at all. For example (paragraph 38), he says that "it is often difficult to distinguish red cells from spherical bodies of different kinds, including the spherules which have developed from the unfolding of crescents"; a child could distinguish them. Again (paragraph 76), he says that the red cells (occupied?) are smaller than the average in the tertian parasite, which is just the opposite of truth, as every beginner knows by this time. He must have been looking at something quite different from what most of us hold to be the parasite of malaria. That a beginner should be misled in this way is credible, but that Surgeon-Captain Hehir should persist in ventilating such matters years after the true nature of his bodies has been exposed (not only by myself, but by Mr. Hankin, and, I think, by others), while at the same time he refuses or omits to answer satisfactorily reasonable criticisms, is becoming a kind of nuisance in medical literature. If he still believes in his discoveries his course is (a) to demonstrate to capable persons; (b) to publish photographs; and (c) to send specimens to impartial experts in Europe. Until his observations are confirmed by others we are, I think, justified in holding that he has been misled by "pseudo-parasites," and that the parasites of malaria and cholera described by him are zoologically impossible and exist only in his imagination. If he pleads that similar things have been said of other discoverers we must reply that they have at least endeavoured to convince others by visual demonstrations and exact descriptions.

I am, Sirs, yours faithfully,
RALPH ROSS, Surgeon-Major, I.M.S.
(Parkes' Memorial Gold Medalist on Malaria).

* * Surgeon-Captain Hehir referred in his paper to illustrations which were to reach us later.—ED. L.

"HAS THE FISH A MEMORY?"

To the Editors of THE LANCET.

SIRS,—I have to thank you for quite a number of most interesting letters which were addressed to me in consequence of your article containing my question—Have fish a memory? I see that such studies in comparative psychology interest more people than I believed. Perhaps your readers might take an interest in an address made at the Association of German Physicians and Naturalists, 1896. This address, which was made at the request of the Scientific Committee of the Congress, contains the very essence of my views and forms, as I should say, the prelude to the question you lately were kind enough to insert in your paper.

I am, Sirs, yours truly,
Frankfort-on-the-Main, Jan. 28th, 1897. LUDWIG EDINGER.

To the Editors of THE LANCET.

SIRS,—In a book published by Messrs. Cassell in the early seventies, called "The World of Wonders," occurs the following story:—

"When the late Dr. Warwick resided at Durham (*sic*), the seat of the Earl of Stamford and Warrington, he was walking one evening in the park, and came to a pond where fish intended for the table were temporarily kept. He took particular notice of a fine pike, of about six pounds weight, which, when it observed him, darted hastily away. In so doing it struck its head against a tenter-hook in a post (of which there were several in the pond, placed to prevent poaching), and as it afterwards appeared, fractured its skull and turned the optic nerve on one side. The anguish evinced by the animal appeared most horrible. It rushed to the bottom, and boring its head into the mud, whirled itself round with such velocity, that it was almost lost to sight for a short interval. It then plunged about the pond, and at length threw itself completely out of the water on to the bank. The doctor went and examined it, and found that a very small portion of the brain was protruding from the fracture in the skull. He carefully replaced this, and with a small silver toothpick, raised the indented portion of the skull. The fish remained still for a short time, and he then put it again into the pond. It appeared at first a good deal relieved, but in a few minutes it again darted and plunged about until it threw itself out of the water a second time. A second time Dr. Warwick did what he could to relieve it, and again put it into the water. It continued for several times to throw itself out of the pond, and with the assistance of the keeper, the doctor at length made a kind of pillow for the fish, which was then left in the pond to its fate. Upon making his appearance at the pond on the following morning, the pike came towards him to the edge of the water and actually laid its head upon his foot. The doctor thought this most extraordinary; but he examined the fish's skull and found it going on all right. He then walked backwards and forwards along the edge of the pond for some time, and the fish continued to swim up and down, turning whenever he turned; but being blind on the wounded side of its skull, it always appeared agitated when it had that side towards the bank, as it could not then see its benefactor. On the next day he took some young friends down to see the fish, which came to him as before, and at length he actually taught the pike to come to him at his whistle and feed out of his hands. With other persons it continued as shy as fish usually are. Dr. Warwick thought this a most remarkable instance of gratitude in a fish for a benefit received; and as it always came to his whistle it also proved what he had previously disbelieved, that fishes are sensible to sound."

Perhaps this story may interest Professor Edinger.

I am, Sirs, yours faithfully,
CREDAT JUDAEUS.

To the Editors of THE LANCET.

SIRS,—From a paragraph in the *Standard* I learn that you are asking for any observations that may have been made having reference to the question as to whether a fish has a memory. I beg to submit the following. A few years ago I kept a small tench in a fish-globe alone and gave it from time to time various articles of food—worms, flies, &c.,—but among all these there was but one thing that raised any excitement in the fish's "mind," and that was the sight of a small worm. This being held at a considerable distance—even so much as six feet—caused a manifest excitement. We used to think it incredible at first that the fish recognised so small an object, but we found upon observation, many times repeated, that the fish was quite well aware of the dainty in store. He would take it greedily from our hand. I cannot conceive but that memory played an important part here. I should have said that the worm was brought from a distance gradually and *not* shown to the fish at first.

I am, Sirs, yours obediently,
Felstead, Jan. 24th, 1897. J. FRENCH.

* * We cannot receive any more communications on this subject. Correspondents are requested to send any facts they may have at their disposal to Professor Edinger. 30, Gärtnerweg, Frankfurt-on-Main.—ED. L.

THE MIDWIVES BILL, 1897.

To the Editors of THE LANCET.

SIRS,—The above Bill was read a first time in the Commons on Feb. 9th and was down for second reading on Friday, 12th. Fortunately, its second reading was not reached. It is truly lamentable that a Bill such as this, which proposes