from the same kidney, which does not exhibit any indication of fibrous tissue existing between the vessels and the tubes. Here and elsewhere, as I have shown, the stretched and crumpled capillaries produce an appearance resembling fibrous tissue or matrix of the kidney (*Archives of Medicine*, No. III, 1858).

This so-called matrix has been compared to the ultimate ramifications of Glisson's capsule; and it has been considered necessary as a support to the structures of which the gland is composed. I have never seen fibrous tissue in the situation described in health in either gland; and it is quite obvious that the structures do not require any supporting tissue, as they mutually support each other; and any matrix would tend to increase the distance between the secreting cells and the blood, while we certainly find in these organs every arrangement to reduce this as far as possible consistently with strength. If this matrix exists, it ought to be developed as a structure distinct from the tubes and vessels; but, as far as I know, it has not been demonstrated in the embryo at an early stage of development of the kidney, by any one; and, in a careful examination of embryonic structures, one cannot fail to be struck with the absence of this fibrous tissue, which is by some regarded as an essential part of every organ. The morbid changes are surely explained as well by supposing the effusion of a new material between the walls of the tubes and those of the vessels, and by a thickening or other change in one or both of these structures, as by attributing them to an alteration in the matrix or intertubular areolar or fibrous tissue (*Bindegewebe*).

Fig. 20.—Thin section of healthy human kidney slightly washed in water. *a*. Convoluted portion of uriniferous tube. *b*. A portion of a tube stripped of its epithelium. *c*. Outline of tube and crumpled capillaries, having a fibrous appearance—the so-called matrix. *d*. Malpighian body. *e*. Loops of vessels shrunk, showing cells in thin walls. X 215.

The conclusions to which I have arrived, from numerous investigations on this subject, may be summed up as follows:—

1. In the cortical portion of the kidney there is no evidence of the existence of a "fibro-cellular matrix".
2. The fibrous appearance observed in thin sections of the kidney which have been immersed in water is due to a crumpled, creased, and collapsed state of the membranous walls of the secreting tubes and capillary vessels.
3. A small quantity of a transparent and faintly granular material, with distinct nuclei, the nature of which has not yet been determined, is to be demonstrated between the walls of the tubes and the capillary vessels.
4. The changes met with in disease can be fully explained without supposing the existence of a fibrous matrix.

[To be continued.]

THE MILITARY MEDICAL PROFESSION IN FRANCE. By an imperial decree dated June 18th, the relative ranks of the medical officers of the French army are to be regulated as follows:—An inspector ranks with a general of brigade; a principal surgeon, first class, with a colonel; second class, with a lieutenant-colonel; a surgeon-major, first class, with a *chef de bataillon*; second class, with a captain; assistant-major, first class, with a lieutenant; second class, with a sub-lieutenant.

Lettsomian Lectures

ON

THE OPHTHALMOSCOPE AND ITS APPLICATION.

DELIVERED BEFORE THE MEDICAL SOCIETY OF LONDON.

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LECTURE I (concluded from page 453).

FOR the examination, the patient sits by the side of a table on which the lamp is placed close to his head, and the flame put to a level with the eye, from which it is screened by a little metal plate fixed to the burner; but his hand may be used as a screen. The observer takes his position directly in front, and sits slightly elevated, holds the ophthalmoscope close to his own eye, in an oblique position, to receive the light from the lamp, and at about eighteen or twenty inches from the patient's eye, on which he must throw the reflection. Looking through the central aperture, he moves the instrument forwards, and endeavours to get the focus. A diffused reddish glare shows that the interior of the eye is illuminated. With a little more adjusting backwards and forwards, the retinal vessels or the optic disc may be seen. The exact focus is now obtained. If, however, it should be desired to illuminate the eye still more, or to magnify the parts at the fundus for examination, the lens must be used. It should be held before the eye at its focal range, and the ophthalmoscope and it manœuvred till the desired definition is acquired.

Easy as all this appears in description, the majority of persons have difficulty in accomplishing it, and do not succeed till after many trials.

As might naturally be expected, ingenuity has not been asleep in endeavouring to devise an easier way of getting the focus, and of maintaining it when found, for in truth the method in ordinary use is like making a microscopic examination with the lenses held in our hands. I have seen and used many instruments devised for this purpose, yet I have met with but one that has answered, Leibreich's. It is of German invention. It consists of the mirror and the lens set in a tube, to each of which is attached an adjustment; the whole is clamped to a table. The patient's head is fixed, partly by resting on the end of the table, and partly by a chin support, which is screwed to the table.

Nothing can be more satisfactory than an examination in this way when the focus is got; it is just the thing for the uninitiated to look through, after an experienced observer has made the arrangement. Such an instrument greatly facilitates ophthalmoscopic drawings; but it possesses, as far as I know, no other practical use, and its machinery renders it inapplicable for ordinary application. The simple instrument, once learned, is enough for our purpose. All that we need in an inspection is a general idea of the interior of the eye; and, for the most part, we get at a glance all that can be of use to us. I suspect that it would avail us little, as regards treatment, if we could obtain a microscopic view of the morbid anatomy of the diseased tissues.

The optic disc is the first and chief object to be examined, and, as it is on the nasal side, may generally be readily found if the patient turn his eye inwards. I always desire him to look at the tip of my ear, on the side farthest from the eye examined. It is in early life a pinkish white disc, more or less circular, set as it were in a field of red. This disc is the termination of the optic nerve; there is a question about its prominence in life. A very slight shadow around parts of its circumference, when the light is thrown in certain positions, tends to support the affirmative. In death there is a slight perceptible rising at the margin, while the centre is rather depressed. As age advances, the circular figure is less certain, and even the size varies. Besides this, it may be white, and all of which differences are compatible with perfect sight. But the examiner must be prepared for apparent differences in size if he uses ophthalmoscopes and lenses of different foci; hence the prudence of keeping to the same.

The central artery of the retina and the vein perforate the

disc about the middle; sometimes in different parts. Their branches, which vary in number and arrangement generally from one to four pairs, may be traced anastomosing to the periphery of the retina; their capillaries, of course, are not singly visible, but impart general redness; they may be over each other, or interlace. In the young eye, the primary trunks pass away with but slight undulation. In the old eye, they are often very tortuous.

The artery is smaller than the vein, and is paler, because its coats are thicker, for which cause, too, it has a sharper outline, and generally a more direct course. For the most part, it enters as a single trunk, and at once ramifies, but may pierce the disc as branches.

The vein is redder, because its thinner coats enable the blood to be seen through it. Usually, the branches pass out through several apertures and unite in the optic nerve. It is only under very favourable circumstances that any distinction can be made out between these vessels. A beginner must not expect to see a difference, for it is only a very experienced eye that can detect it. The artery has a pulsation which is seen near the disc, more commonly however in diseased states of the eye than in health; slight pressure on the eyeball often makes it apparent. There is, too, a rhythmical venous pulsation to be seen under disease, and made more obvious under pressure. It is especially observable in tense eyeballs; I have never seen it in a normal eye. The retina, in health, is chiefly recognised by its vessels, for ordinarily its transparency prevents any other mode of detection. It is only when the pigment of the choroid is unusually deep that other indication of it is obtained in a faint bluish glaze over the dark surface.

The choroid more than the retina gives the red colour to the interior of the eye, and although the vessels, which are parallel rather than arborescent, are larger than those of the retina, they are not visible ordinarily.

When the pigment which intervenes between them and the retina is scanty, as in old persons among white people, they are more discernible. In the albino, where the pigment is absent they are still more visible. In certain states of disease, when the pigment is removed they are quite apparent. In the dark races, in whom the pigment abounds, there is no trace of them, and the light is but faintly reflected. In the negro it is so abundant, and its presence produces so marked an effect, that the fundus of the eye can scarcely be illuminated, certainly but feebly in those I have examined. Among Europeans, then, we trace the larger vessels by the irregular markings or mottlings of a dusky colour, which is in contrast to the vascular interspaces that contain more pigment, and are therefore darker.

The *punctum centrale retinæ*, or yellow spot of Sömmering, or *macula lutea*, or *limbus luteus*, almost peculiar to man, has been as great a puzzle to ophthalmoscopists as to anatomists; for I need hardly say that no two anatomists are agreed about its structure, and the best speak with reservation. Situated as it is directly in the axis of the eye, the tenth of an inch external to the optic nerve, and in the most sensitive part of the retina, it has been made the object of special search. I have never seen it—never been able to make it out, and no better result has attended the study of better investigators than myself. It does not then appear to be discernible under usual conditions, and practically need not be entertained. Its exact position may be noted, it is said, by the retinal vessels not passing over it, but above and below.

The student must be prepared to meet with different degrees of illumination, and different shades of light—reddish, orange-red, orange, yellow, or buff. It is no easy matter to get a tolerably practical knowledge of the healthy state, much investigation and abundant opportunities are needed, and withal remarkable patience. It is only by familiarity with the variations of the healthy or physiological states that we can even detect morbid changes, and especially slight structural alterations. Here is the chief difficulty of the process; it has been the stumbling block of many, and caused no few aspirants to depreciate the discovery.

The most learned ophthalmologist the world has ever seen, in writing to me but two or three years ago, says, "I have made but very little of the ophthalmoscope; it requires much time and pains to make the use of it profitable. The differences in the appearances of the retina, even in healthy eyes, must render its application to pathological inquiries still more difficult and uncertain." These remarks retarded me from taking up the instrument earlier than I did, and were therefore prejudicial to me. Now he employs it with great success.

Having mastered the use of the instrument so far, we are

puzzled by the existence of different kinds of impaired vision, and witness total loss of sight, without any appreciable textural change. But such a limit to our resources, such a barrier to the extension of knowledge, binds its parallel in all investigations of our elaborate organisation, and must be so while the essence of life, the vital principle, is a mystery. Let us remember that we cannot interpret, merely because we cannot read, and our deficiency at one point ought not to cause us to undervalue that which can be tolerably understood, and at least in some way be turned to account. It is marvellous what has been discovered, and what has been gained, for there has been more revealed in a few months than a century has given us. We have not equal means of examining any other organ, and there may be in store for future labourers revelations beyond conception.

The principle of the ophthalmoscope is not self-evident. If the question be asked why a reflector is necessary, and why the eye cannot be illuminated by the very lamp from which the eye is lightened, the answer may not be readily found. A stream of light thrown into the eye is reflected back by the retina and choroid, as before shown. This ensues whenever a light is looked at, or a lamp or a candle is held before the eye; but, except under the circumstances detailed, we see no reflection, and then only a partial one, and there is no definition. It is because our eye is not in the focus, the flame is in the direct line of reflection, and it cannot be seen through. This is overcome by using the mirror, which receives the light and represents the flame; and, by means of the hole, the eye can be placed in the focus.

Physical peculiarities, apart from any disease of individual eyes, renders the examination more or less easy. Sometimes the exploration is quickly made, at others it is tediously obtained; the unsteadiness, too, of a patient has its influence.

An examination should not be uselessly or unreasonably long. It would be unpleasant to any one, to say the least of it, to have a concentrated light on his retina for the greater part of an hour, and this persons seem to forget when they are learning to use the ophthalmoscope. We know that it is not very uncommon for the fundus of the eye to become preternaturally red during an ordinary inspection—a fact always to be remembered, and to be guarded against by avoiding a lengthened sitting, or by resting the eye for a few seconds when the process is necessarily prolonged. But what surgeon with any common sense would employ the ophthalmoscope when it would give pain or cause any uneasiness. Why it is just in such cases that the internal examination is not needed; there is enough indication to direct our treatment. The intolerance to light is a significant symptom; and, if it be associated with any surface-redness, there is evidence of inflammation of the eyeball.

On occasions where there is slight sensitiveness to light, so slight as to warrant a careful and brief examination, I reduce the lamp-flame, and illuminate less; toleration will then imbolden us to employ more light, should it be required. The examiner is likely to fatigue his own eye by the consecutive inspection of several subjects. I have known indistinctness of vision to be produced, and to last for days. The prevention is to avoid continuous examination, or to use the eyes alternately.

STEALING FROM A HOSPITAL MUSEUM. On Monday, John Rouse, the Subcurator of the Museum of St. Thomas's Hospital, and a porter named Charles Jenkins, employed at the same place, were charged at the Southwark Police-court with stealing a seal's skull, the property of the governors of the hospital. Mr. Hall, naturalist to the institution, said that, for the last week or so, the museum in the hospital had been in the course of cleaning; and the seal's skull, with other anatomical objects, was taken by him from the case, and put into a bath in another room for cleansing. The skull in question was the only one they had, and considerable value was attached to it. On Thursday afternoon, about five o'clock, witness missed the skull; and, the prisoners being seen to leave the building a little before, suspicion was attached to them, and, on making further inquiries, it was ascertained that the prisoners had sold the skull to Mr. Fisher of King's College Hospital. They were accordingly given into custody. Mr. S. Jones, Curator of St. Thomas's Hospital Museum, identified the skull. The prisoners pleaded guilty. Mr. Jones observed that Rouse had been many years in their service, and had hitherto borne an excellent character. He believed him to be the dupe of Jenkins. Rouse was committed for six weeks; and Jenkins for three months, with hard labour.