

spherical bodies. No change took place in these after twelve hours, except that they became pale and distinct. The stroma of the corpuscle became quite colourless. On two other occasions a similar phenomenon was witnessed, but in one no trace could be seen of the extruded material. This is evidently a physical change, and I think these very pale hyaline bodies must be carefully distinguished from the pigmented forms, though possibly associated with their early development.

(c) In seven cases there were vacuoles in the red corpuscles containing solid-looking bodies of various sizes and shapes. Certain of these structures resembled micrococci very closely, and stained deeply in aniline dyes; but others, often in the same corpuscle, were larger, more irregular, and altogether different in appearance.

2. *The Free Forms.*—(a) *Pigmented crescents.* These bodies, which were found in eighteen cases, present remarkable features in appearance and structure. The form was usually that of a beautiful crescent, with rounded or gently tapering ends; but the degree of curvature was variable, and many forms were almost straight. The length is about double that of the width of a red corpuscle, sometimes more. They are not attached, and they never show any motion. Joining the ends of the crescents—or, more correctly, at a little distance from the points—a narrow line can often be seen on the concave margin. The body of the crescent appears made up of a structureless, homogeneous material, in the centre of which is a prominent collection of pigment granules.

Although the most careful examination fails to detect any movement in the hyaline substance of the crescent, yet the existence of such may be inferred from the very positive movement which the pigment granules undergo.

(b) *The Rosette Form.*—In six instances there were rounded bodies, a little larger than red corpuscles with a dimly granular protoplasm, and in the centre a rosette of pigment. Some of these appeared to be enclosed in a delicate membrane, others were free. In six cases remarkable changes were seen in these forms, of the nature of segmentation.

(c) *Flagellate Organisms.*—Flagellate bodies were seen in seven cases, never in great numbers, usually only one or two in a slide. They are smaller than red blood-corpuscles, often not more than

half the size. A specimen in one case was equal in one diameter to a red corpuscle lying near it. They are round, ovoid, or pear-shaped: the protoplasm finely granular, and in every instance contained pigment, usually central, which often displayed rapid Brownian movements. The flagella are variable in number; one, three and four were noted in different specimens. The length, as closely as could be estimated, was two or three times that of the body. They are exceedingly delicate, gently tapering, and, except in one instance, I could not determine the existence of a small terminal knob, figured by Laveran. The movement is exceedingly active, and the lashing of the long filaments may be sufficiently strong to drive away the corpuscles in the vicinity. The undulatory movement caused by the play of the filament over the surface of a group of corpuscles may attract the attention of the observer before he sees the cilia. The motion does not persist long; in none of the specimens which I examined, for more than half an hour. In one instance, the flagella disappeared in the short interval between two observations, but I could not determine what became of them. I have not seen the free-swimming cilia described by Laveran, but Dr. Councilman tells me that he has confirmed this observation.

(d) Small, round, pigmented bodies, from one-fourth to one-half the size of a red corpuscle, were not uncommon in some cases.

The red corpuscles showed no other notable alteration save that already described. The pigmented organism evidently destroys the vitality, and consumes the hæmoglobin, for the affected cells become pale, often spherical, and, finally, are reduced to the condition of mere shells; except in cases of pronounced anæmia, the variations of the corpuscles in size and outline were not great. The colourless corpuscles were in some cases increased in number, and in very many instances contained dark granules.

(To be continued.)

#### CASE OF NUMEROUS FRACTURES.

BY A. B. ATHERTON, M.D., F. R. C. P. AND S., EDIN., TORONTO.

D. B., male, *æt.* 28, has always been a strong, hardy, able person. While acting as conductor of a construction train on the Rivière du Loup railway, he was crossing for the first time a