ration of excision, to which I would probably have consented, had I not about this time received a letter from a young surgeon, who had just finished his studies at Edinburgh; he urged me strongly to delay any further operation, relating the success which attended Professor Syme’s operations, and advising me on my return to Scotland to put myself into his hands. I did so, and have now the greatest pleasure in stating, that, by an almost painless operation, and after three weeks’ partial confinement, I am completely cured.—T. C.

“Edinburgh, 12th December 1849.”

Part Fourth.

PERISCOPE.

MORBID ANATOMY AND PATHOLOGY.

OPTICAL TEST FOR ALBUMEN IN PATHOLOGICAL FLUIDS.

Biot was the first to discover the property possessed by albumen, of rotating the plane of polarization of a ray of light transmitted through its solutions, and to ascertain that the degree of angular deviation was proportionate to the concentration of the solution. Bouchardat, after a few experiments upon the albumen of the egg, and one trial of human serum, calculated the molecular rotatory power of albumen at 27° 42’. He was prevented from extending his researches by the imperfection of the polariscope which he used, as it did not permit a polarized ray of the requisite colour, or of sufficient intensity, to be passed through a thick stratum of serum.

M. Becquerel has made many observations upon serum, and other albuminous fluids, by means of a modification of the apparatus recommended by Biot and Mitscherlich.

A ray of light, polarized by means of a Nicol’s prism, is transmitted through the axis of a tube, of nearly eight inches (twenty centimetres) in length, terminated at each end by a flat plate of glass, and capable of holding the fluid under examination. Between the tube and the observer’s eye is interposed a prism of Iceland spar, cut, however, so as to transmit a single image. This prism is situated in the axis of a graduated circle, round which it can be rotated, and from which the degree of rotation may be read off with great exactness. These are the essential parts of the polariscope. In using it, the analysing prism must first be rotated till no trace of the polarized beam is transmitted to the eye. If now the tube be filled with an albuminous fluid, it will be found that light is transmitted, and that, in order to obscure the image, the analysing prism must be further rotated to the right or left. The angle described by the additional rotation of the prism is then read off upon the scale.

In examining serum, and other organic fluids, M. Becquerel has, by direct chemical analysis, confirmed the indications of the optical test, and has constructed a table, indicating, for each minute of deviation, the corresponding amount of albumen.

He concludes—1. That the albumen held in solution by serum and other organic fluids causes the plane of polarization of a transmitted ray to deviate to the left.

2. That the degree of deviation is proportionate to the amount of albumen.

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contained in each liquid, and that, by means of the angle, the amount of albumen may be directly calculated.

3. That the "molecular rotative power" for albumen is about 27° 36'; and that, in examining a fluid, each minute of rotation may be held equivalent to 18 parts of albumen per 1000.

4. The possible error of observation does not exceed four or five minutes, and hence cannot affect the calculated result by more than 0.1 per 100—a degree of accuracy which can be attained by no known mode of analysing albuminous fluids.

Becquerel, who has applied this new optical test to more than 150 specimens of serum from the blood, and to 50 pathological fluids, has never met with an instance in which it contradicted the results of direct chemical analysis. We need hardly say, that a test of such delicacy would be a most welcome addition to our present rather imperfect means of examining morbid fluids for albumen, were we assured that no other substance could interfere with its indications. In the progress of Bright’s disease, it is of great importance to watch, from time to time, the amount of albumen contained in the urine. Hitherto we are not aware that any more accurate test has been applied, than that commonly employed by Dr Christison—viz., to estimate the amount of albumen by the depth which it occupies in the tube in which it is heated. The test proposed by Becquerel would be quite as easily applied, and, if other substances met with in urine do not possess optical properties analogous to those of albumen, would afford far more satisfactory results. The apparatus requisite for the repetition of Becquerel’s experiments is difficult of construction, and, consequently, expensive. Those who may chance to possess it, and wish to investigate the subject, will do well to study the mode of manipulation described in the Gazette Médicale. We would, in the meantime, suggest, that the simultaneous presence of sugar, or of certain other substances which have the property of circular polarization, may impair the value of the new test for albumen. As examples of the results obtained by Becquerel, we append the following:

1. Healthy Serum.

Chemistry shows that its albuminous constituents range between 75 and 85 per 1000. The polariscope indicates a rotation angle of 7° 30' on an average—i.e., equivalent to 81 parts of albumen per 1000.

2. Serum in Granular Disease of Kidney.

The serum, it is well known, is impoverished from loss of albumen. The polariscope, in four cases, indicated an average deviation of 5° 21'—i.e., 57.78 per 1000.—Becquerel in Gazette Médicale, 1849, p. 929.

CHEMICAL OBSERVATIONS ON THE EVACUATIONS AND BLOOD OF CHOLERA PATIENTS.

BY BECQUEREL.

In six analyses of matters vomited by patients, to whom no drink had been given, except water and "eau de selz," Becquerel obtained the following results:—In four cases the fluid had an acid reaction; in two it was neutral. Its density varied from 1006.03 to 1021.40. The flocculent matter, separated by filtration, was regarded by M. B. as coagulated albumen, and varied in amount from 1.94 to 11.24 per 1000. The filtered liquid likewise contained albumen in every case. In two the quantity was exceedingly small, in the other four it varied from 5.11 to 31.50 per 1000. In the last case there was an admixture of the principle termed albuminose, which is incoagulable by heat, but coagulable on the addition of alcohol. The amount of albumen in the filtered fluid was, in every case, directly proportionate to the specific gravity of the fluid vomited, and to the amount of albuminous flocculi which it held in suspension. The proportion of albumen was greatest in matters vomited early in the disease. The amount of chloride of sodium varied from 2.35 to 8.24, in
1000 parts, which, if we contrast it with the other solids held in solution, and probably derived from the serum of the blood, is unexpectedly large.

Four analyses of the dejections were also made. In all, the reaction was alkaline, from the presence of a small proportion of ammoniacal salts. The density varied from 1004·20 to 1011·04. In every case albumen was detected, both in solution and in the coagulated form, and the relative proportion between the chloride of sodium and solid residuum, obtained on evaporating the stools, was the same as that observed in operating on the matters vomited. The amount of flocculent insoluble matter varied from 2·05 to 7·14 per 1000. The quantity of albumen in solution, was in two cases so trifling that it could not be weighed; in the other two cases it was represented by the small numbers 3·22, and 4·51.

The serum of the blood was analysed in four cases, bled at the very commencement of the period of reaction. Its density varied between 1035·1 and 1044·2; and the solid constituents of 1000 parts averaged about 107·4, of which from 63·1 to 84·66, consisted of pure albumen. The chloride of sodium existed in large proportion in the serum; instead of the normal quantities, 5 or 6, M. Becquerel found 12·2, 7·38, and 8·82, in three cases which he examined. The amount of fatty matters was double the average—the numbers in two cases being 4·7 and 4·23. The extractive matters, in which Becquerel includes all the salts, except the chloride of sodium, were prodigious in quantity—their proportions in three cases being 31·7, 32·68, 38·48, per 1000. The author likewise gives the following complete analyses of the blood, drawn from two adult male patients, shortly before their death:

| Case 1.                      | Case 2.                        |
|------------------------------|-------------------------------|
| Specific gravity, - 1074·1    | Specific gravity, - 1075·     |
| Fibrine,                     | Fibrine,                      |
| -                            | -                             |
| -                            | -                             |
| -                            | -                             |
| 1·88                         | 6·50                          |
| Alburnem,                    | Alburnem,                     |
| -                            | -                             |
| -                            | -                             |
| 51·80                        | 69·35                         |
| Globules,                    | Globules,                     |
| -                            | -                             |
| -                            | -                             |
| 179·60                       | 160·20                        |
| Chloride of Sodium,          | Fat, Extractive, and Salts,   |
| -                            | -                             |
| 6·61                         | 20·                           |
| Fat, Extractive, and Salts,  | Total Solids, * - 256·05      |
| -                            | Water, -                      |
| 27·59                        | 743·95                        |

| Total Solids,                | 267·43                        |
| Water,                       | 732·52                        |

The most striking peculiarities in these analyses are, the high density of the blood, the great diminution of its watery constituent, the high proportion of globules, of chloride of sodium, and of other salts included, with the extractive and fat, the variable proportion of fibrine, and the decided diminution of the albumen.—Archives Générales de Médecine, Oct. 1849.

M. Becquerel’s analyses confirm, in many important particulars, the observations made in this country during the recent epidemic. The existence of salts in cholera blood, in a proportion equalling or exceeding, that observed in health, was clearly proved in the analyses of Dr Garrod and of Dr Robertson. The increased proportion of globules, first announced by Lecanu, has been recognised by every chemist who has investigated the subject. The variable proportion of fibrine is also an old observation. But to M. Becquerel is fairly due the merit of having pointed out the considerable increase of fatty and extractive matter,—of having shown, that this is the true cause of the inspissation of the serum, and not an increase in its albuminous constituents, which, on the contrary, M. B. always found diminished. Most observers have, we are convinced, believed, that the dry residue of cholera serum, evaporated at 212°, consisted of salts and of organic matter, which they assumed to be almost exclusively albumen; hence, in calculating the amount of this principle, they contented themselves with burning a known weight of dried serum, and then subtracting the weight of ashes left. It is now tolerably clear, that during an attack of cholera, a portion of serum leaves the circulating system, and is poured into the alimentary canal in the form of rice-water evacuations. The
flocculi suspended, and the albumen contained in these evacuations, are organic solids, abstracted from the serum during the morbid process. "The notable diminution of the albumen of the serum is explained by its presence in the intestinal secretions." "As to the augmentation of the fatty matters, whose proportion is nearly tripled, may it not be due to the absorption of fat which takes place with such rapidity in cholera cases? I cannot explain the occurrence of the large proportion of chloride of sodium in the evacuations." The water, withdrawn from the circulation, is found in the intestines; and, in proportion to the amount of fluid thus abstracted from the blood, M. Becquerel has found a relative concentration of the globules, of the chloride of sodium, of the extractive matter and different salts which do not quit the vessels.

Becquerel has also made a few observations upon the urine of cholera, with a view to determining the proportion of cases in which albumen appears in the first urine passed. His cases were too few to warrant general conclusions. Of 100 first urines tested in the Cholera Hospital in Edinburgh, at least 81 contained albumen.

CASE OF SPASM OF THE OESOPHAGUS, AND OF THE LARYNX, TERMINATING FATALLY.
BY DR VIGLA.

A man, aged 27 years, a gilder on metals, was seized, on Monday, the 13th September 1847, with cephalalgia, cough, and difficulty of deglutition. On the following day, when first seen, he had no fever, and the tongue was slightly furred. An emetic was ordered. On the 16th he complained of bad taste in the mouth, and of difficulty in swallowing. An examination of the pharynx, however, revealed no obstacle, and he drank without any apparent constraint. The tongue was covered with a dense white coat; the respiration was free; the pulse 84. On the 17th he was seized with extreme dyspnoea, and asphyxia had already commenced; but the voice was clear, and the speech articulate. On auscultation the pulmonary vesicular murmur had almost disappeared, especially on the right side, and was replaced by a suppressed and deep snoring sound. He expectorated a viscous mucous matter, resembling that of phthisical patients. He could not swallow. Every mouthful of liquid was arrested in the pharynx, and followed by considerable efforts at vomiting, and the excretion of the spueta just spoken of. He also felt a sense of constriction at the superior part of the sternum, and lower parts of the neck. No appreciable alteration in the throat could be discovered. The skin was hot—pulse 135 to 140, strong and regular. He was now bled to 325 grammes. The blood flowed in a large stream, and the clot, when afterwards examined, was darker than usual, and not buffed. In the evening there was the same dysphagia, some vomiting, respiration forty in the minute, pulsations 144. A purgative was ordered, which produced four or five evacuations in the night; and a blister over the upper part of the chest. During the night he became comparatively calm, but did not sleep. On the morning of the 18th the symptoms returned with increased violence. There was dorsal decubitus, in which position he respired more easily—pulse 128, regular; skin warm; thirty-six respirations in the minute, irregular; face contracted, and of violet colour. Pharynx easily examined, and observed together with the isthmus of the fauces, to present its natural appearance. Slight cephalalgia; intelligence perfect; strength good, and he possessed great moral courage. On percussion, the sound was obscure, but equal over the whole of the chest. On auscultation the vesicular pulmonary murmur almost completely absent on the right side, behind; very feeble in the corresponding part on the left side, but more audible in front and at the two sides. Everywhere over the chest there was a snoring murmur, most intense over the upper part of the sternum. In the evening M. Barth also saw the patient, when all the symptoms and physical signs were found to be the same as