Sir John Bland-Sutton also responded for the guests.

The President's health was proposed and thanks were expressed to the Prime Warden of the Fishmongers' Company whose splendid hall gave a dignified setting to such a memorable occasion.

The final event of the Congress was a visit to the Zoological Gardens, where Miss Mann demonstrated the slit-lamp appearances of the reptilian iris and the fundi of frogs and lizards. The visitors were entertained to tea in the Fellows' Pavilion.

H. B. Stallard.

ABSTRACTS

I.—UVEAL TRACT


(1) Heckel recognises two types of sympathetic ophthalmitis, the first consisting of anterior uveitis with more or less occlusion of the pupil, the second of neuro-retinitis, the pupil remaining quite clear. Two cases of each type are described in the text. The first was interesting in that sympathetic ophthalmitis developed although the exciting eye was removed within a fortnight of the injury, vision being reduced by neuro-retinitis to counting fingers at four feet. 3,000 units of diphtheria antitoxin were given and repeated four times with such improvement in vision, that 6 weeks after the appearance of the disease it came up to 20/20. Seven months later the vision was the same. The second case was also of the neuro-retinitic type with reduction of vision to 10/200. He was treated first with neo-salvarsan then with mercury, and vision became 20/30 going down again four years later to 5/200. Injection of diphtheria antitoxin and the administration of mercury resulted in improvement up to 20/200. The third case was given 5,000 units daily for 10 days with possibly some visual improvement and the fourth case 20,000 units daily for 7 days which resulted in an improvement of vision from 2/200 to 6/200.

F. A. W.-N.


(2) Brown advocates the subconjunctival injection of adrenalin and atropine in cases of iridocyclitis with unyielding synechiae.
The technique is as follows:—The eye is anaesthetised with five drops of 10 per cent. holocaine and an injection is made under the conjunctiva of the limbus at a point near the synechiae. The injection consists of m. iv of adrenalin (1:1,000) and m. i of 2 per cent. atropine solution. The adrenalin acts probably in two ways as an adjuvant to the atropine: (1) It diminishes vascular congestion and so prevents the atropine being carried away by the blood stream. (2) It acts as a direct stimulant of the dilator muscle of the iris.

F. A. W.-N.


(3) Two cases of the tuberculous type of leprosy, of which clinical notes are given, have furnished Cange with opportunities for careful examination of the minute white nodules found in the cornea and iris in leprosy, with the corneal microscope. These lesions under ordinary examination may escape notice; by the unaided eye, or even by the aid of a binocular loupe, the appearances may be indistinguishable from those met with in certain forms of diffuse interstitial keratitis and of plastic iritis with synechiae and exudation. But investigation by means of the corneal microscope discloses lesions of special character and significance. It is then possible to establish the presence in the parenchyma of the cornea, or on the surface of the iris of uniformly rounded brilliantly white granular formations, sometimes prominent, and "about the size of the head of a small pin." They are irregularly distributed and may be compared to minute drops of wax or small grains of raw tapioca. Cange believes that these "grains blancs" are pathognomonic of leprous keratitis and iritis.

Two illustrations of an ‘iris so affected are appended.

Morax, Gabriélidès and others have recorded cases of leprous keratitis in which numerous small, round white spots were visible in the cornea and iris by ordinary methods of examination: in both tissues the bacillus of Hansen was easily demonstrable, but Morax felt himself unable to affirm that the minute nodules on the surface of the iris represented encysted micbic colonies. Cange maintains that it may be considered as established:

(1) That there exists a close relationship between the large macroscopically visible white spots of leprous keratitis and the minute white nodules ("grains blancs") distinguishable only by the corneal microscope.

(2) That both are in definite relation to the bacillus of Hansen.

(3) That their characteristic appearance confers upon them a real diagnostic value.

J. B. Lawford.
Physiology

II.—Physiology


Duke-Elder's Mackenzie Memorial Lecture, delivered at the Glasgow Eye Infirmary, is published at full length in the Lancet, in which journal it will receive wide appreciation from medical men in general but more particularly, perhaps, from the author's own side of the profession. A lecture or article of which no single line appears to be superfluous and which gemlike emits rays of fact and suggestion from numerous facets can only be appreciated fully by those who read it—and read the whole of it—with inside knowledge of the importance of the investigations which are there, as it were, crystallised.

The author commences by dividing the history of ophthalmology (modern ophthalmology that is) into five periods commencing with the period of Mackenzie. This period he calls the age of clinical intuition. The second is the ophthalmoscopic age, associated with the name of Helmholtz. The third is the age associated with the microscope and Bowman. The fourth is the age of Gullstrand and the slit-lamp, while the fifth is the age of physiology and biochemistry with which doubtless the author's own name will be largely associated. Duke-Elder, who, rightly perhaps, does not look upon the tonometer as epochmaking, since he does not mention it at all, considers that while the ophthalmoscope and the microscope have told us most of their secrets and the slit-lamp has not created a new revolution, man is turning to physiology and biochemistry for the next stage of progress. The account of the author's numerous, and largely already published investigations made from this standpoint, is so condensed and full of facts ascertained that the reviewer, after many attempts, has given up the hope of making an abstract which would require, in order to be intelligible, at least half the space occupied by the original. He must perforce leave on one side the account of the laboratory work here presented in such condensed form and pass to the author's views as to its clinical applications. Even so, this abstract will be useless without an account in the author's words of what is described in a long paragraph as "A New Point of View." This paragraph will now be given practically textually.

"We all know of the clinical picture presented to us by Mackenzie; we have seen the eye through the ophthalmoscope of Helmholtz, the microscope of Bowman, and the slit-lamp of Gullstrand. I want to put before you a further picture; I am going to ask you to look at ophthalmology with the eyes of a chemist and physiologist. I shall ask you to look upon the eye, not as an
organ built up of a few component parts—of three outer tunics and three inner humours—but to look within and beyond this picture to something more fundamental, to lose your accustomed sense of magnitudes, and see an infinitude of molecules and atoms, each inordinately busy travelling in its own appointed path, each running within the limits of certain laws, and controlled by complex but unalterable forces: the whole assemblage partitioned off by membranes through which in certain circumstances they may pass, semi-isolated but co-ordinated, so that they all together comprise a teeming biochemical factory complete in itself, but at the same time working in harmony with the larger biochemical factory of the body of which it forms a part. The most fundamental thing which has occurred in biochemistry in recent times is the establishment by Prof. F. G. Donnan of the laws which govern the passage of dissolved substances through membranes. The whole body is divided up into cells, each separated by membranes from its neighbours, and even within the cell itself there is a complexity of potential membranes. All the active constituents of the body are dissolved in watery solution, and hence it follows that all the activity which takes place, and all the means of communication between the individual cell-units, must necessarily resolve itself into a question of the passage of dissolved substances through membranes. The matter, however, is not so simple as at first sight it may appear, for the membranes, as a rule, allow only the smaller molecules to pass through them and keep the larger ones behind. . . . Moreover, we know that each molecule of salt in solution is broken up into two ions, each of which carries an electric charge—the one a positive charge and the other a negative. Since, therefore, a free diffusion of all ions equally is precluded by the semi-permeability of the membranes, this rearrangement and difference in concentration at once involves the development of hydrostatic, osmotic, and electrostatic forces. Stability and equilibrium can only be reached when all these forces are made to balance, the one compensating for the other. It is the interaction and rearrangement of these forces which is necessary to prevent the occurrence of an explosion, as it were, that constitutes a thermodynamical equilibrium.

"We will see more clearly what is entailed by this conception when we take a specific instance; but I should like to divide the whole of the vegetative physiology of the eye into four such equilibria: (1) The equilibrium between the blood plasma in the capillaries and the intra-ocular fluid. (2) The equilibrium between the intra-ocular fluids and the vitreous body. (3) The equilibrium between the intra-ocular fluids and the lens. (4) The equilibrium between the blood plasma in the choriocapillaris and the sensory epithelium of the retina."

Coming now to the clinical applications, these in the present
lecture are confined to glaucoma, retinal detachment (idiopathic), vitreous opacities and cataract. Inflammatory conditions are not here considered: their pathology resembles that of similar conditions in other organs of the body. Apart from these almost all of the major diseases of the eye resolve themselves into exercises in physico-chemistry. Thus glaucoma in the author's view is not a condition primarily of raised tension. Raised tension, while it is the most frequent and obvious manifestation, is the result of "an upset of the entire internal economy of the eye, most usually of a physico-chemical nature," but it is to be regarded as a rule as the last link in a chain which determines mechanically the final crisis of the disease. "There are probably two main factors in the aetiology of this disease, two factors which perhaps determine two types of the disease. Pathologically these two types are evident: the one wherein the uveal vessels are dilated and are surrounded by an abundant exude (sic!) of fibrinous coagulum; the other where the uveal tract and all the tissues of the eye are compressed and flattened by a swollen vitreous body." The author elaborates this statement at some length and the argument must be studied in the original. But there is one point which must be given here, namely, that "the clinical picture in many cases of acute glaucoma and frequently of chronic glaucoma, strongly suggests that a swelling of the vitreous body is of primary importance. The shallow anterior chamber, the obvious pushing forwards of the lens and iris, the thinning of the choroid and compression of the retina, combined with the fact that in quite a fair percentage of cases the angle of the iris appears to be pathologically free, points to this conclusion. If a damming back of fluid at the filtration channels were the primary cause we would look for a deep anterior chamber owing to the retention of the aqueous humour."

The paragraph on idiopathic retinal detachment cannot adequately be dealt with in an abstract, beyond saying that the author regards it as resulting directly from changes of the opposite kind (i.e., from those in glaucoma), being probably preceded and accompanied in the great majority of cases by shrinkage and liquefaction of the vitreous gel. (Shrinkage of the vitreous is no new theory of retinal detachment but the author here follows out in detail what he considers to be the exact mechanism.—E.T.) It follows from the view here taken that the treatment is ideally by physico-chemical means; by bringing about "a solidification and returgescence of the gel which will push the retina by pressure from behind back into place and retain it there."

With regard to vitreous opacities the following is a synopsis mainly in the author's own words. Experimentally the vitreous in normal condition is a gel in a high state of turgescence and is extremely labile. It behaves similarly to a gel of gelatin when it is saturated beyond its solubility limit, under which circumstances
the gelatin turns into an opaque suspension. The vitreous can be transformed into a fluid solution by any slight interference. This "gel-sol" transformation is accompanied by the formation of a cloud of minute punctiform opacities and by the separation of the highly gelable residual protein into long films and strands. (For an explanation of "residual protein" see p. 6 of the article, under heading "Vitreous Body," at line 10.—E.T.) We have thus one form of vitreous opacities explained.

With regard to cataract the author had a good deal of interesting matter under the heading of the "third equilibrium," that between the ocular fluids and the lens. Dealing now with "clinical applications" he says, "Cataract as we have seen is another purely physico-chemical problem—the denaturation, hydrolysis, and coagulation of the proteins of the lens—and the essential opacities which occur in the cornea seem to be of the same nature."

The author in drawing to a close gives a warning to us not to expect too much from "a number of sign posts leading no one knows whither." We are mainly at the stage of work, and work largely in the dark, relieved only by hopes and aspirations. He is trying, he says, to suggest a new point of view. "Hitherto we have tended to make too much, I think, of the structural ruins which disease has left behind it, and we have failed to see the deeper and more subtle nature of the initial defect."

Ernest Thomson.

III.—BACTERIOLOGY

(1) Browning, S. H. (London).—Interpretation of reports on lesions of the eye. Lancet, February 1 and 8, 1930.

(1) This article is one of the current series, contributed to the Lancet by request, under the heading "Clinical Interpretation of Aids to Diagnosis." It is probable that never previously has the general medical public, including the ophthalmic portion, been presented with such a concise and definite statement of the relationship between the laboratory and the clinical sides of eye work. Of more importance even than the definiteness of the statements (incorrect statements may be definite enough) is the fact of the very long experience of Browning with the work at Moorfields. He has, as it were, grown up with eyes, so that, in very truth, no
greater authority on the subject of the relationship between bacteriology and ophthalmology is to be found in this country. Some of Browning’s statements may be quoted in order to show the helpful nature of the articles. “Organisms such as staphylococcus aureus, streptococci or pneumococci are pathogenic, and their presence forbids operation.” “I have never seen a panophthalmitis due to the Morax-Axenfeld bacillus or to the micrococcus catarrhalis and with the pneumo-bacillus only following gross infection. . . . I have never seen an intra-ocular infection due to the Morax-Axenfeld diplobacillus.” Browning refers to the value of the finding of the Koch-Weeks bacillus in cases which might excusably be suspected of being gonorrhoeal in origin, and has something of much interest to say about the pneumococcus. This organism has been found in all sorts of eye conditions with increasing frequency during the last 15 years, and is now almost the commonest organism found in diseased eyes. The fact that it is found in eyes which look perfectly healthy constitutes the danger of operation for cataract without bacteriological investigation. Further, “Now that gonorrhoeal ophthalmia in the new-born baby is comparatively a rare disease, the pneumococcus is the organism most frequently found in ophthalmia neonatorum and is often associated with many other organisms.” Here is a paragraph on the gonococcus which deserves quotation. “When the gonococcus is found in the conjunctiva of an adult it must be remembered that the infection is almost invariably carried from an already existing urethritis. . . . It is an interesting fact that I have never seen ophthalmia during an epidemic of vulvo-vaginitis in children’s wards.” Later on in the article when dealing with iritis there comes this statement “In women gonorrhoeal iritis is extremly rare. I have never seen a case.” The coincidence seems curious at the first glance and until one realises that the author perhaps implies that the vulvo-vaginitis in children is non-gonococcal, in which case there is no linkage at all between the facts; and even if the conjunctiva were infected with gonococcus from the vulva this would presumably be direct infection. But the immunity of women from gonorrhoeal iritis still seems to remain unexplained. The author does not enlarge, he merely records his experience. When dealing with the staphylococcus aureus and the postponement of operation it is indicated that oxycyanide of mercury 1 in 8,000 to 1 in 5,000 is the antiseptic lotion of choice. Fresh cultures should be made after a course of treatment and when the conjunctiva has been free from antiseptic for 24 to 48 hours. Vaccines are advised in the treatment of chronic staphylococcal infections, especially chronic styes and blepharitis. Speaking of the Klebs-Loeffer bacillus the author advises the local application of antidiphtheritic serum as well as its general administration. “When the decision is made to use
serum it should be given at once and in large doses." Bacillus pyocyaneus is almost always fatal to the eye. Especially in children it should be looked for in the discharge from chronic diseased ears. Contrary to previous opinions infection is rarely metastatic. Here is another valuable piece of advice. "A chronic conjunctivitis, with pus, which resists all ordinary treatment, and especially when more pus is present than the severity of the conjunctivitis seems to warrant, suggests the advisability of investigating the canaliculi for concretions" of streptothritic origin: Browning then compares syphilitic and vaccinal sores on the eyelids and relates his own first experience of confusing the latter with the former, an experience which all who deal with considerable numbers of eye cases must have had. The paragraph on tuberculous infection had better be given in full. "Tuberculous infection of the conjunctiva cannot, as a rule, be diagnosed with certainty without a guinea-pig inoculation, though the bacillus can sometimes be found in scrapings or fragments of the suspected lesion. These infections of the conjunctiva by the tubercle bacillus are almost invariably air-borne or derived directly from tuberculous material—e.g., spray infection from sputum or direct infection from tuberculous milk in milkers or cowmen. Prognosis in these cases is good if advantage is taken of the combined treatment by tuberculin, surgery and light treatment, but tuberculin should always be used for a period before the condition is dealt with surgically." As to spring catarrh it is considered that the presence of eosinophiles in the conjunctival secretion is pathognomonic.

The second and shorter article deals with the interpretation of tests such as the Wassermann and von Pirquet. The following remark is significant. "The modern tendency to rely more and more on laboratory tests, and less and less on clinical experience and knowledge imposes a responsibility on the bacteriologist which is unfair both to him and to the patient. It must be reiterated that laboratory tests, no matter how reliable, form only part of the data essential for correct diagnosis." The reports on cases with iritis are, says the author, particularly difficult. There are many possible causes and, granted that iritis and iridocyclitis are, as a rule, the result of toxic irritation due to some distant septic focus and that it is rare to examine a patient without finding some septic focus in tooth, nose, sinus, tonsil, or antrum, the difficulty with such cases is obvious. Earlier in this abstract the author's experience with regard to gonorrhoeal iritis in women was referred to, but in men it is otherwise. "The history of gonorrhoea, however, is not enough, and in my V.D. department all the other causes of iritis are gone into before the patient is examined for evidence of an old gonorrhoeal infection. Gonorrhoeal iritis seldom
occurs during the acute urethritis stage of the disease, and the average time after the acute attack of gonorrhoea at which the iritis appeared worked out at 9 years in one series of 250 cases, and 14 years in another. The paragraphs on the examination of the material obtained by prostatic and vesicular massage and on the relation between so-called rheumatic iritis and the gonococcus had better be read in the original. One more quotation may be given, namely the opening sentence on the tests for tubercle. "The tests for tuberculosis of the eye are few, and of little real value as proof tests," and the final sentence on this subject (the last sentence also of the article), "The presence of a positive von Pirquet test does not mean that the eye condition is a tuberculous one."

ERNEST THOMSON.

---

**CORRESPONDENCE**

**BEDS OCCUPIED IN OPHTHALMIC AND GENERAL HOSPITALS**

*To the Editor of The British Journal of Ophthalmology.*

Sir,—In order to get a true perspective of the ophthalmic work done in Great Britain it is useful from time to time to look up some statistics about the leading eye hospitals in that excellent publication Burdett’s "Hospitals and Charities."

Extracting a few figures dealing with the question of the size of the eye hospitals in the provinces and in London for the year 1929, they are as follows:

<table>
<thead>
<tr>
<th>Hospital</th>
<th>No. of beds</th>
<th>Average No of beds constantly full</th>
<th>No. of in-patients</th>
<th>No. of out-patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moorfields</td>
<td>138 (only 120 occupied)</td>
<td>113</td>
<td>2,581</td>
<td>45,116</td>
</tr>
<tr>
<td>Royal Westminster</td>
<td>86</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Ophthalmic Hospital</td>
<td>40</td>
<td>28</td>
<td>625</td>
<td>14,473</td>
</tr>
<tr>
<td>Central London Ophthalmic</td>
<td>46</td>
<td>33</td>
<td>666</td>
<td>22,803</td>
</tr>
<tr>
<td>Hospital</td>
<td>36</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Royal Eye Hospital</td>
<td>148</td>
<td>119</td>
<td>2,536</td>
<td>32,809</td>
</tr>
<tr>
<td>Manchester Royal Eye Hospital</td>
<td>115</td>
<td>73</td>
<td>1,871</td>
<td>43,648</td>
</tr>
<tr>
<td>Glasgow Eye Infirmary</td>
<td>110</td>
<td>92</td>
<td>1,901</td>
<td>32,053</td>
</tr>
</tbody>
</table>