

FROTHINGHAM ~~FRONTINGHAM~~

(G. E.)

With Compliments of the Author.

REPORT  
ON  
OPHTHALMOLOGY

BY

*for* GEO. E. FROTHINGHAM, M. D.,

PROFESSOR OF OPHTHALMOLOGY, UNIVERSITY OF MICHIGAN, AND CHAIRMAN OF THE  
COMMITTEE ON OPHTHALMOLOGY IN THE MICHIGAN STATE MEDICAL SOCIETY.



ANN ARBOR:

Reprint from the Transactions of the Michigan State Medical Society for 1886.

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## REPORT ON OPHTHALMOLOGY.

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BY GEO. E. FROTHINGHAM, M. D.

(Professor Ophthalmology, University of Michigan.)

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MR. PRESIDENT, LADIES AND GENTLEMEN OF THE SOCIETY—

Following established custom, I shall, as chairman of the Committee on Ophthalmology, call your attention to some of the subjects that have engaged the attention of ophthalmologists during the past year, and the progress therein made. After this, I shall take the liberty to invite your consideration of this and other specialties in their relation to general practice.

Though the past year has not been marked by any brilliant discovery, like that of the preceding, it has been one of active investigation and labor in perfecting ophthalmic science and practice. "Prove all things, hold fast that which is good," is an injunction observed by the laborers in this department of medicine, and, in accordance with it, investigators have endeavored to solve many of the mooted questions that have vexed the profession.

First, I may say that in regard to the use of jequerity in the treatment of trachoma, the investigations of the past year have tended to consign it to its proper place, to be used chiefly in those cases of trachomatous pannus affecting both eyes and remaining as a permanent cause of blindness. In these cases it was formerly the custom to inoculate such eyes with matter from a mild form of pyorrhœa, preferably from a case of ophthalmia neonatorum. The resulting inflammation being carefully treated, and, so far as possible, controlled within safe limits, often subsided, leaving the cornea sufficiently transparent to permit useful vision. This was heroic treatment, and only justifica-

ble when other means, thoroughly tried, had failed, and both eyes were involved by the pannus. Jequerity is a good substitute for blenorrhœal matter in the treatment of such cases. It produces a croupous inflammation of the conjunctiva, and is regarded as less likely to lead to extensive ulceration of the cornea, or to corneal necrosis, than is an ordinary pyorrhœa. It is not, however, very free from this danger. For the treatment of trachoma it is too powerful in its action, as originally recommended and applied, and too uncontrollable in its results. Its use, we think, is generally abandoned by prudent practitioners. It remains to be seen whether the method of limiting its action to a small portion of the lid, by inspergation of the powder, is a safe and efficient mode of use. Dr. Alt and others have reported successful cases,\* but as yet the number is far too small to settle so important a question. In the early part of 1884, in a published clinical lecture on trachoma,† I gave somewhat at length the reasons that had deterred me from ever experimenting with it on the human subject, and the results of experiences, as subsequently published by several observers, showed that my fears were well grounded, and that the exercise of this caution has probably saved me the necessity of expressing similar regrets.‡

Many observations have been published, within the year, regarding the effects of cocaine when used as a local anæsthetic in ophthalmic practice. The general action of this drug on the system will not be reviewed by me, as it belongs to the domain of materia medica and therapeutics, and is foreign to this report. Since Dr. Carl Koller, of Vienna, called attention to the local anæsthetic effect of cocaine, by his paper on this subject read

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\* On the Inspergation of Powdered Jequerity in cases of Trachoma. Adolf Alt, *Am. Jour. Ophthalmology*, Nov., 1885.

† Physician and Surgeon, April, 1884, p. 156.

‡ See Inspergation of Jequerity, etc., by Adolf Alt, *Am. Jour. Ophthalmology*, Nov., 1885, p. 157. Jequerity and Effects, C. J. Lundy, *Am. Jour. Ophthalmology*, Oct. 15, 1884, p. 210. Clinical Observations on Jequerity, by H. Knapp, *Archives of Ophthalmology*, Vol. 13, pp. 155 and 156.

before the Medical Society of Vienna on the 16th of October, 1884, so much has been written on the subject that it would be impossible, without exceeding the limits to which I must confine this report, to give even a brief summary of the experiences and views of the various writers. Nor will this be necessary, since he set forth so completely and so accurately the anæsthetic action of cocaine on the cornea and conjunctiva, and also its action to produce paresis of accommodation, dilatation of the pupil, and constriction of the blood vessels, that much of the literature on this subject with which the journals since then have teemed, might have been spared, except for their use in confirming and establishing the statements he then made. Yet, as most of our practical knowledge concerning the action of this important drug has been acquired within the past year, it would be improper to pass the subject by without a brief presentation of the important facts observed in its use and attributed to its effects.

The exact physiological actions of cocaine Koller did not attempt to give, and these, with its toxic effects, have afforded the best field for original observation and research. He made known its anæsthetic property and demonstrated that certain operations might be performed under its influence without pain. It required the crucial test of extensive experience to demonstrate its *true* value, and discover the dangers of its use if any existed. Most of that experience has been furnished during the past year, and is a legitimate subject for our consideration.

As a mydriatic cocaine has proved very convenient for use when we wish to dilate the pupil for ophthalmoscopic examination, as the mydriasis is moderate in extent, lasts but a few hours when left to itself, and is generally permanently relieved by a single instillation of a solution of eserine. When used in eyes predisposed to glaucoma it has been shown to be liable to the same dangers that attends the instillation of atropine under similar circumstances, but, as Javal has demonstrated, the glaucomatous symptoms thus excited are more surely and quickly controlled by the action of eserine than they are when they have

been similarly excited or aggravated by the use of atropine.\* This is a sufficient reason for its substitution for atropia in any case where there is any suspicion of such a predisposition. Cocaine is probably an active adjuvant to the mydriatic property of atropia when used in cases of iritis attended with posterior synechia, or in other cases where the iris does not respond sufficiently to the action of atropine when used alone. Weber observed that though the mydriasis of cocaine is less in degree than that produced by atropine when each is used alone, that when atropine mydriasis was fully obtained, a still further dilatation could be produced by the instillation of a solution of cocaine. Later, Snell published the fact that cocaine mydriasis disappears under the anæsthetic effect of chloroform, and returned again when the effect of the chloroform passed off. Atropine mydriasis was unaffected by the action of chloroform. These observations seem to indicate that cocaine mydriasis is due to muscular stimulation, and act upon the radiating fibres of the iris, while atropine mydriasis is due to paralysis affecting its circular fibres. If this is so, then certainly a more powerful mydriatic effect can be expected from the combined effects of the two drugs. This combination is worthy of further trial when the most powerful mydriatic effect is desired.

The beneficial effects of cocaine have not alone been set forth in recent literature, but numerous cases in which it has seemed to exert an injurious action have also been reported, and constitute a valuable part of the year's contributions. Upon the general toxic action of the drug much has been observed, but we shall not attempt to review this, and shall only refer to such systemic effects as have been observed to follow its use as a local anæsthetic in ophthalmic practice. Knapp has reported two cases where the instillation of from 0.3 to 0.36 grammes of a four per cent. solution of cocaine into the conjunctival sac caused symptoms of prostration, with pallor, cold perspiration, and

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\* See Paris letter, Jour. Am. Med. Association, May 29, 1886.

thirst. Similar cases have been observed by Bellyarminoff, Peck, and others. In the cases of children of ten or twelve years of age, fifteen drops of a two per cent. solution have been observed, by both Mayerhausen and Reich, to cause pallor, faintness, nausea, and vomiting. In the case of a woman of sixty, Reich observed similar symptoms to follow the instillation of ten drops of a two per cent. solution. Prof. Dobrowolski, of St. Petersburg, reports five cases of aged, or feeble persons, who were profoundly affected by the instillation of a four per cent. solution of cocaine used in the extraction of cataract, and not used in excess of the amount necessary for anæsthesia. It caused prolonged prostration and vomiting, which continued in most of the cases all night, and were not relieved by treatment. In these cases there was delayed union of the wound. There was also traumatic keratitis. Ultimately the wounds healed, and fair vision was obtained. He substituted in such cases a two per cent. solution, and carefully regulated the number of drops used while making the operation, and thus effectually guarded against a recurrence of such unpleasant symptoms. He was confident that the symptoms were produced by the cocaine, and he calls attention to the fact that in all the cases the symptoms were the same, namely, prostration, perspiration, vertigo, vomiting, and meteorism. These symptoms came on in from an hour and a half to two hours after the operation. In some of the cases they were accompanied by pains in different parts of the body, and tremor of the limbs. From this experience it would appear that two of the dreaded accidents following upon a cataract extraction, great prostration and prolonged nausea and vomiting, are not wholly guarded against by the use of cocaine as the anæsthetic, and they may occur quite frequently if care is not exercised to avoid a concentrated solution, or a too lavish use of even a two per cent. solution. Indeed, Pflüger, in an article on "The Various Properties of Cocaine," declares that, in his experience, even a two per cent. solution is not at all times safe, and may abolish the sensibility for a much longer period than desirable, and thus pro-

duce serious impairment of nutrition. He cites a case of a feeble patient of sixty-seven, in which a typical neuro-paralytic keratitis followed a simple operation under cocaine. He attributes it to the action of the cocaine, though he admits that the continued pressure of the bandage may have been partly to blame for the unfavorable symptoms.

Whether the anæsthetic action of cocaine is due, as Pflüger believes, to the direct action of the drug upon the terminal filaments of the fifth nerve, or, as Everbusch and some others think, to the capillary anæmia resulting from the contraction of the arterioles, the nutritive activity of the cornea will be, for the time being, depressed, and in the case of aged or debilitated persons, where the corneal nutrition is already feeble, it may greatly retard the healing process of ulcers or wounds. In other cases it may lead to inflammatory destruction of tissue. Hence, Pflüger's warning against giving solutions of cocaine to old and feeble persons for home use, where they cannot be under the direct observation of the physician, is worthy of heed, though only very frequent instillations would be likely to do harm in this way. In the clinic of Graefe, at Halle, cocaine was thought to be the cause of producing serious affections of the cornea. These were destruction of the corneal epithelium, production of vesicular eruption, and parenchymatous changes with opacity. These changes were of a serious character in six cases out of one hundred and fifty cases operated on for cataract, in some of them rendering the operation a failure. Graefe had no doubt that the above bad results were due to the cocaine.

Cocaine has also been suspected of exciting numerous cases of panophthalmitis in eyes operated upon for extraction of cataract under its influence. Browne, Nettleship, and others, have reported results that led them to believe this, and which would seem to indicate it. It is difficult to explain, however, why so many cases of this kind should have fallen to the lot of a few operators, while others of extensive experience have never observed it. I have analyzed my own cases of cataract extraction during the past

year with reference to these ill effects with which cocaine has been charged, and in fifty cases of extraction in which cocaine was the anæsthetic used, none of these bad results have been manifested. The cases were remarkably free from complications occurring either during the operative procedure or healing process. During a period of eleven months there has not been a failure to secure a good visual result. In one case the patient died of diabetic coma, on the seventh day after the operation, but the eye had healed perfectly, there were no inflammatory complications, the usual test on opening the eye first, at the end of the fourth day, showed usually clear vision, and a good result was assured unless unusual complications should arise, and these could not be charged to the action of cocaine after that period of time. A series of 39 of these cases reported by me to the ophthalmological section of the American Medical Association, at its last meeting, elicited a discussion of this subject, and all present declared their experience as tending to disprove these charges. The subject is of sufficient importance to call for extensive statistical reports bearing upon it. It has been reasonably suspected that the use of stale solutions, or gelatine discs containing cocaine, since cocaine is hygroscopic, by affording a breeding ground for pathogenic organisms, may be dangerous to use by reason of a tendency to excite panophthalmitis. Nettleship, who reported so serious a run of these cases in his practice in St. Thomas Hospital, used these discs, while at Moorfield, where the cases at the same period did well, solutions of cocaine made up in saturated solutions of boracic acid were in use. From what has been observed concerning this danger, it would seem a wise precaution to use only fresh solutions. McHardy, who at one time had a run of panophthalmitis following the use of stale solutions, had no bad cases after observing the precaution of using only fresh solutions, and he thinks fifteen days the longest time such a solution should be kept for use.\*

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\* *Ophthalmic Rev.*, Dec., 1885, p. 371.

The refraction of the eye is still a subject of interest, and many investigations have been made during the past year concerning it. Among the more important I may mention German's investigation of the refraction of the eyes in infancy. He examined the refraction of one hundred and ten nursing children from just after birth to the age of three months. He found the refraction at birth was strongly hypermetropic, but that the hypermetropia diminished with advancing age, the eyes having a tendency to advance from a deficient to a normal refraction, or even to myopia. He considers the physiological refractive condition of very young children being that of hypermetropia. If Donder's theory of convergent strabismus is correct, these investigations of German serve to explain how some children affected with periodic convergent strabismus recover after awhile without operation, or correcting glasses. In such cases, even, no care is exercised in avoiding use of the eyes at close work. Such cases are more often seen by the general practitioner than by the specialist, and probably led to the too frequent advice given by the family physician to let the child go without treatment, as it would probably outgrow the affection. The specialist, since he generally resorted to treatment at once, had little opportunity to judge of the frequency of spontaneous cures. At the last meeting of the American Ophthalmological Society, Dr. Seely, of Cincinnati, in a paper condemning early operations, practically indorsed this advice formerly so often given by the family doctor, but which in later years has been so severely condemned.\*

Fuchs has made some interesting observations to determine the action of the external muscles upon the *venæ verticosæ*. He found that in myopic eyes, in a large proportion of the cases, the oblique muscles would exercise, during continuous use of the eyes at near work, a constant pressure on one vein of each pair. They would thus obstruct the circulation and tend to increase the congestion of the interior of the eye, and as a consequence augment the myopia. In emmetropia and hypermetropia he did

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\*Transactions Am. Ophthalmological Soc., 1885, p. 126.

not find this relation between the position of the muscles and the veins to exist except in a few cases, not more than 23 per cent., while in myopia it existed in about 73 per cent.

The study of strabismus and its treatment still affords an ample field for original investigation. Since Dieffenbach, on the 16th of October, 1839, made the first operation for the cure of convergent squint, this subject has been a prominent one for study and practice in this specialty. From defective operative procedures, with their consequent failures and aggravated deformities, the operation had fallen into disrepute, when it was rescued by Donder and Von Graefe from threatened oblivion and placed upon a more scientific basis. But a failure on the part of operators to report their cases in sufficient number, and the consequent lack of statistics for the settlement of the principles of treatment, has left this subject, which seemingly should be one of the most settled, really one of the more unsettled subjects of ophthalmology. During the past year, Dr. Roosa, of New York, in attempts to investigate it, could, after a diligent search, find scarcely three hundred recorded cases of the treatment of squint. He justly complains of this neglect on the part of operators, and says that one operator, who has performed three thousand tenotomies, has not reported a single case so far as he could find, while the same operator has furnished abundant and most valuable statistical reports of his cataract operations and iridectomies. To this lack of statistics, which alone will enable us to test the correctness or incorrectness of theories, Dr. Roosa ascribes the diversity of opinions he found to be held by prominent oculists in a discussion of this subject at the last meeting of the American Ophthalmological Society. This difference he found existed upon all the important principles, such as: Whether or not there existed such a thing as *amblyopia ex anopsia*; whether early operations should be performed; whether the vision of the squinting eye is improved by an operation; whether it is possible to cure convergent squint by use of atropia and properly fitting glasses. Some claimed that the

operation for strabismus was too commonly performed, and that it should often be postponed or not performed at all. Others claimed that if there was anything they did know *certainly*, it was how to cure strabismus by an operation. These are examples of the diversity of opinions existing among the members of this Society on this important subject. Such diversity of opinion must necessarily exist on any similar subject upon which statistical reports can not be found in sufficient abundance to allow of an appeal to them for the purpose of settling disputed points. Dr. Roosa adds to the statistics of this subject one hundred cases of his own and eleven cases furnished him by another operator. From an analysis of these one hundred and eleven cases he draws the following conclusions upon important questions connected with the treatment of this affection: "First, the operation for convergent strabismus is successful in removing the deformity in from seventy to eighty per cent. of the cases operated upon; Second, when complete control of the patient may be obtained, and as many tenotomies as are necessary are performed, this percentage may easily be raised to more than 95 per cent.; Third, no essential improvement of the vision of the squinting eye arises as a result of the operation; Fourth, after parallelism of the optic axes has been secured, glasses may be worn that in some cases give an increased vision in the formerly squinting eye; Fifth, the loss of sight in the squinting eye is probably congenital amblyopia, the nature of which is not exactly, if at all, known, and which is as yet incurable; Sixth, no substitute has as yet been found for the division of the recti muscles for the cure of squint."

Many will take issue with Dr. Roosa in these conclusions, but his contribution to the published statistics of the subject constitutes a large proportion of all to which they can appeal in support of their views. That contributions to these statistics may become, in the near future, more abundant, is very desirable, and if this report helps to stimulate these contributions, the time devoted in calling attention to their necessity will not be wasted.

The nature and treatment of sympathetic ophthalmia are subjects still unsettled, and have during the year engaged the earnest attention of ophthalmologists. Active investigations have been going on with a view of arriving at some definite conclusions that may settle the disputed points, but it will not be possible to fully review and discuss even the more important of them without extending this report beyond its proper limit. The results of late investigation, I think, have not been such as to strengthen, materially, the germ theory of the pathogeny of this disease. The theory that the sympathetic affection arises through the agency of the ciliary nerves still stands as the most rational explanation of its production. There are too many clinical facts opposed to the theory of direct extension of the inflammation from the eye first affected to the one secondarily involved, to leave it probable that the theories advocated by Leber, Snellen, and others, will ever be established. At any rate the year's evidence in their support is quite meager. Among the investigations resulting in information of value bearing upon this disease, I will mention that of the committee appointed by the Ophthalmological Society of the United Kingdom, and which reported through Mr. Nettleship to that body on the eleventh of March last. This report was based upon an analysis of two hundred cases, and while principally tending to confirm views already accepted, it emphasized especially the facts that mercury has little or no influence on the progress of the disease, and that in those cases in which the disease arose after the excision of the exciting eye, which in some cases arose as late as eight weeks after the excision, the exciting eye had in all cases been wounded, and had been left in long enough to undergo changes capable of setting up the disease. The conclusion was drawn that in all the cases the sympathetic attack was due to the influence of the wounded eye, and not to the operation for its removal. The prognosis in such cases was shown to be better than in ordinary cases. More than 50 per cent. recovered entirely. In these two hundred cases upon which

the report was based, the longest interval between the injury and the sympathetic disease of the other eye was twenty years. The shortest time was nine days. Those cases that occurred after the longest interval seemed to be more severe than those cases in which the second eye became involved early.

Among the improvements to be observed in the methods of treatment of this disease, is the growing tendency of surgeons to depart from the dictum of Von Graefe, which forbade the excision of the exciting eye during panophthalmitis, for fear of giving rise to meningitis. In 1876, in a paper on Sympathetic Ophthalmia, which I read before this Society, I stated briefly my reasons for dissenting from this doctrine, and they may be found in the transactions of that year. I wish to add here, that ten years more of quite extensive experience with cases similar to those there related in illustration, and treated on the same principle, has furnished not an accident to lessen my faith in the correctness of the views I then advocated, while the relief to the patient in every case has been immediate. Still enucleation seems to be dreaded by many ophthalmic surgeons, and especially when the diseased or injured eye is affected with acute inflammation.

In September, 1884, Prof. Alfred Graefe, of Halle, in an address delivered by him before the Society of German Naturalists and Physicians, in Magdeburg, described an operation for evisceration of the eyeball, which he proposed as a substitute for its enucleation. This operation was intended for all cases except those in which malignant growths within the eye so involve the tunics as to prevent complete removal. Graefe was moved to substitute this operation for enucleation, hoping thereby to avoid the danger of exciting meningitis, which in a few cases has proved fatal following upon enucleation. A diligent search of the literature of the subject, which he made, showed only ten cases of meningitis following enucleation for the whole of Europe, and including a period of twenty years. Of these, only

seven were fatal.\* He stated in his reply to Prof. Manz that during his professional life he had made the operation of enucleation approximately 600 times, and had lost two cases from meningitis following the operation, equal to one-third of one per cent. His must be regarded as an exceptionally unfortunate experience. His investigations of the literature of the subject, admitting that some unreported cases may have occurred, serve to prove this operation as among the most safe that are made. I have myself enucleated several hundred eyes, and have never yet seen meningitis follow the operation. Even in extirpation for malignant growths in the orbit it has followed but once in my practice, and then the orbital plate of the frontal bone had become absorbed and the tumor for a small space was found to lie in direct contact with the duramater. This case proved fatal. On one occasion, in the case of a malignant growth, I was compelled to destroy nearly the whole orbital plate of the frontal bone by the application of chloride of zinc paste. This was successfully done, and the cerebrum protruded, as a large hernial tumor, into the orbital cavity, and yet no severe symptoms followed. This has several times been done by other operators, with similar experience. In my own cases, a considerable proportion of the enucleations have been done while the eye was affected with panophthalmitis, as I have never considered this condition as a bar to immediate enucleation when otherwise it was indicated.

Still all admit that some slight degree of danger exists from this, as, indeed, it does from every operation, however trivial. Death may occur from the simple removal of a pterygium, or extraction of a tooth. But to remove or even diminish the slightest dangers attending treatment must be regarded as among the glorious achievements of our profession, and has always engaged the earnest attention of progressive men. Optico-ciliary neurotomy was, a few years ago, proposed for this and other

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\*Graefe's Reply to Prof. Manz, Zehender's *Klinische Monatsblätter f. Angenheil Kunde*, Jan., 1885, p. 49.

purposes, as a substitute for enucleation. It was, however, found to be unreliable as a preventive to sympathetic disease in the other eye, and is now generally abandoned.

The experience of the past year with evisceration, I believe, is not such as to commend it as a substitute for enucleation. While it may, possibly, be a more complete safeguard against sympathetic disease than the simple division of the optic and ciliary nerves, it leads too frequently to severe inflammatory reactions, has commonly a tedious convalescence, and often fails to leave as good a stump for the application of an artificial eye as enucleation does. A better resulting stump for the application of an artificial eye was one of the advantages claimed for this operation by Graefe. The disadvantages above named, as attending evisceration, were acknowledged by all who had experience with the operation and took part in the discussion of the subject at the late meeting of the American Medical Association at St. Louis.

There are many observed facts connected with the history of sympathetic ophthalmia that forbid us to expect that this operation will prove to be as reliable a safeguard against this disease as enucleation has been demonstrated to be. Compared with this a slight difference as regards danger, if it exists, may be ignored. There is little prospect that this operation will ever establish its claim as a substitute for enucleation, or that an appeal to experience would demonstrate its greater safety so far as life is concerned. Experience has already proved that its substitution prolongs the patient's sufferings, and also the period of inability to work, and this often means privation and worry, and, as a result, impaired health and other dangers to life as great, if not greater, than that which results from enucleation.

Unsatisfied with anything short of absolute perfection and unflinching success, operators have sought to still further perfect the methods of extracting cataract, though already carried to a high degree of perfection. The suggestions that promise the most, and will likely give a gain in the percentage of successes,

are to make always a preliminary iridectomy, and after recovery, to extract by making the usual modified Graefe's incision and a peripheral incision in the capsule. If a wrinkled or opaque capsule remains to obstruct vision, an operation on it is to be made subsequently. These changes would require two operations in all cases, and a third operation in a large proportion (about 60 per cent). The gain in per cent. of ultimate good results, I believe, would be sufficient to warrant these extra operations, especially now that we have cocaine, and can perform them with less suffering, and with freedom from danger to the life of the patient. Antiseptic precautions, such as the use of solutions of bichloride of mercury (1 part to 5,000), dropped into the eye before operation, are in my opinion useless, and if incautiously used may do harm. If carelessly made, and too strong, they would add to the irritation produced by the operation, and consequently increase the danger. Graefe, who uses such a solution, had six cases of opaque cornea result from a total of one hundred and fifty cases operated upon.\* These bad results were attributed to the effects of cocaine. I believe they may have been more likely caused by some mistake in the strength of the antiseptic solutions used, as cocaine has shown no such action in my practice, or that of any operator of whom I have personally inquired. As the communication between the nasal cavity and conjunctiva by means of the tear passages would afford a continuous source of infection, it is not to be expected that such antiseptic precautions will avail anything, and must be a useless complication.

Time will not allow even a brief mention of all the labors in this department of medicine during the past year. Forty-six pages of closely printed matter are occupied in the March number of the Archives of Ophthalmology for 1886, in making the briefest possible mention of the more valuable contributions to the subject during the second quarter of the year 1885. Even

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\*Ophthalmic Review, Nov., 1885, p 338.

a superficial review of the whole year's work would fill a considerable volume. It has not only been a year of creditable progress in adding to our knowledge of the anatomy and physiology of the eye, together with the pathology and therapeutics of the various ocular affections, but it has made many rich additions in the way of text books and other literary contributions, and also in the invention of valuable instruments and appliances necessary in the practice and development of Ophthalmology. These I pass by without mention, reserving the time for a few general considerations concerning specialties, and this specialty in particular, in relation to general practice, which I think are called for by reason of their neglect, and a presentation of which are appropriate to this report.

It is not sufficient for the purpose of humanity, or the objects and aims of the medical profession, that here and there earnest workers are delving in the various fields of medical science, and perfecting our knowledge therein, but they are only fully served when the number of laborers are as numerous as possible, and are so scattered as to secure the widest range of observation, and diffuse as extensively as possible the benefits of the knowledge and skill obtained. It would be a poor comfort to tell the victim of disease, living, perhaps, in some remote portion of the Western Hemisphere, that a physician of Berlin, or Paris, had the skill to save him, but that no one to whom he could be taken in season, or who could be brought to him in time, had cultivated the knowledge, or acquired the skill requisite for the successful management of his case. It is not every disease that can be anticipated, and is sufficiently tardy in its development to allow a voyage across the Atlantic as was taken by those threatened with rabies, to be treated by the celebrated Pasteur.

Most diseases, especially those of the eye, require prompt diagnosis and treatment. The ravages of disease soon lead to destruction of the delicate tissues of the visual organ, and unless the remedies are used with promptness and efficiency, permanent blindness is the fate of the patient. And yet I feel compelled to

say that there are few branches more generally neglected in the college course, or which so many general practitioners are willing to ignore, as ophthalmology. Many are found who are willing to proclaim their ignorance of affections of the eye, who would blush to confess any deficiency of knowledge in other branches of medicine, and who would resent as an injustice and insult any imputation of ignorance concerning the diagnosis and treatment of fractures or dislocations. Yet many patients would prefer to suffer from the results of bad practice in the treatment of fractures or dislocations of their limbs than suffer from the loss of sight that may result from incorrect diagnosis or improper treatment of disease of the eye. All the acute and destructive diseases of the eye should be studied by the general practitioner, and he should seek to be as proficient in managing this class of cases as any other. In chronic or more difficult cases he may consult with those having special knowledge and skill as he would in other affections, for it is a fact growing more apparent every year, that medical science is so broad, and so difficult to master thoroughly, that no one can excel or even become very proficient in all its departments. Even in special fields, so extensive has become the range of observation and study that the highest skill and attainment can only be reached by devoting attention chiefly to some subdivision, even, of the specialty. It is at the present time almost impossible for one engaged in the practice of some specialties to read, even, all the literature pertaining to the different subdivisions of that specialty, much less prove experimentally or otherwise the truth or error of the various theories advanced, or acquire the operative skill necessary to put into the most successful execution all of the approved operations. The greatest progress, however, is secured by a division of labor, and the knowledge which the busy practitioner must have in a form that is most easy of acquirement and application must be perfected and simplified as the result of long and patient toil by those who are willing to confine their investigations within very narrow limits. If we take the more modern study

of the heart for an example, we find our knowledge, used in general practice, the result of such division of labor. With patient toil, Pettigrew and others investigated its structure and evolution; Thurry, Von Besold Ludwig, and Rutherford, its innervation; Peacock, its malformations; Quain, its pathological changes; Richardson, the clinical significance of its objective symptoms; Brunton, the action of remedies upon it; Geo. Johnson, the changes that occur in the arterioles in Bright's disease, and the changes in the heart and its action associated therewith. These are only a few, either, of the investigators of this organ, its structure, diseases, and their treatment, as at present understood. It is often objected that if specialism is encouraged, and the lungs are given to one class, the heart to another, etc., etc., nothing is left to the general practitioner; that the Goods, the Gregorys, the Rushes, the Jacksons, and men of their class, by whom all bodily ailments were treated with supposed highest skill, will no longer be found. We need have no fears in this direction. The result of specialism has been to render the modern general practitioner more accomplished than his predecessors were, and the Gregorys, Rushes and Jacksons of to-day treat more diseases successfully than did those of the past. Nor should the general practitioner covet everything, but he should yield something to the specialists who have helped him to his superior skill.

On the principle of "giving to Cæsar the things that are Cæsar's," there is not a part of the body upon which the specialist has not medically a claim, for by his patient labors our knowledge of its diseases have been chiefly perfected. Remembering those unpalatable but essentially true lines of Pope's:

"One science only will one genius fit,  
So vast is art, so narrow human wit;"

the specialist may pursue his intense and circumscribed work with the conviction that his mode of study is the most productive of scientific results, and the shortest way of solving the mystery of life and disease. We do not mean that pursuit of a narrow

specialism which sees nothing but the one part of the body under investigation, but a broad and liberal specialism, pursued by those who, having acquired a general knowledge of the *whole system* by a period of general study and practice, concentrate their chief efforts upon the investigation of some special diseases. Such a specialism was the investigation of hernia, which gave to Cooper his chief reputation and was his crowning work; the investigation of diseases of the joints, by which Sir Benjamin Brodie will be remembered chiefly in fame; the skill by which Liston became more noted as a lithotomist than by his attainments in general surgery; and the masterly treatise on fractures and dislocations by which Hamilton has placed our profession under obligation. These men were properly specialists, and have taught us that in medicine we may borrow wisdom from the miner, who is not content with superficially raking over the whole field where gold is to be found. The miner knows that by such a course only now and then a nugget can be obtained. He knows that if he would obtain a quantity, he must, after studying first the surface indications, mark out a promising claim and work it until he exhausts it. So it is with science. Now and then discovery flashes, unsought, upon those who wander listlessly over her vast territory, but he who would more surely grasp her truths must delve for them in narrow fields. In every other department of labor and science has this passed into an axiom. Only in medicine is it grudgingly admitted and acted upon. Even in the medical schools this is so, and we commonly find teachers called upon to give instruction in more branches than they can properly learn.

I have referred to the neglect of ophthalmology on the part of general practitioners. The fault rests largely with the schools. They do not sufficiently provide for its instruction, and often do not require any knowledge of this branch as a condition of graduation.

In the fall of 1859 the Minister of Public Instruction of France addressed a note to the Paris Faculty of Medicine, asking the following question: "Are the various branches of medical

science sufficiently represented in the teaching of the Faculty?" The faculty took three months to deliberate, and then replied with the following resolution: "Resolved, that the creation of chairs for specialties would be a very disastrous measure, which would alter the proper character of education, and would prove of no utility for the practical instruction of the student."

At the present time, out of the twenty-two medical schools of France, fourteen have made no provision for the study of diseases of the eye, and the University of Paris appointed its first Professor of Ophthalmology in 1879. Paris, deaf to the calls of progressive medicine, has seen her supremacy depart, while Vienna, putting her ear to the ground listening for the footsteps of approaching progress, and preparing for her reception by making due provisions for specialties, has become the Mecca for those advanced medical students from all parts of the world who once made their pilgrimages to the French capital.

Austria appointed Joseph Barth Professor of Ophthalmology in the University of Vienna in 1773, and at the present time every university in that country has its independent eye clinic, with its professor at the head, aided by competent assistants. Attendance at the lectures and clinics is obligatory on students, and occupies ten hours a week. Strange to say, the Universities of Edinburgh and London have declared themselves opposed to demanding a knowledge of Ophthalmology from their graduates, and both in England and America little attention is paid to this subject in the schools. From most of them a student may graduate without any instruction in, or knowledge of, this important branch.

Ernst Fuchs, in a recent book, entitled "The Causes and Prevention of Blindness," estimates that there are in Europe at the present time more than 300,000 blind persons. He estimates that at least one-third of this might have been prevented, and that the cost of maintaining this one hundred thousand of unnecessarily blind is not less than five million of dollars yearly. He urges as a matter of economy, leaving out the larger question

of humanity, a greater expenditure for preventive measures. Among other means of prevention, he urges it as the duty of the state to divide its territory into a suitable number of districts, and the establishment, for the poor, of an eye clinic in each, with a suitable hospital for such as cannot be treated as out patients. At these clinics medical services, medicines, and spectacles, when needed, should be furnished gratuitously to those who were actually unable to pay for them. He recommends that the appointments of attending physicians at such clinics for each district should be made after thorough examination from among those who present evidence of special competency and of previous training as an assistant at an eye hospital. That the appointee should be paid by the state when the private practice of the district, thus ensured to the appointee, would not be sufficient inducement to lead competent men to accept. In this country it may not be practicable to carry out such a scheme, and especially would there be danger that the services of the attendant would be claimed by the stingy rich on the ground that they paid taxes for the support of the institution. Such dispensatories should only be for the actually poor, and they should not be crowded out by the class referred to, as has often been done in places where such charities have been attempted. Rigid precautionary measures would prevent this abuse of medical charity. If state aid in this country is not likely to be invoked for such dissemination of ophthalmic science, would it not be well for the profession to carry out some such scheme as Fuchs proposes. Can they not, by proper management, lead some to take up this specialty in connection with general practice after spending the time needed for preparation in some ophthalmic hospital. Nor should the profession, in my opinion, stop here. Other specialties should be encouraged, until every general practitioner has some branch of practice in which he has risen above the average in knowledge and skill.

In this way, from out of the ranks of general practitioners, there would be developed the most accomplished specialists, so

scattered as to aid each other most effectually, and distribute most widely and generally the benefits of their knowledge, while in the great cities, as now, would be found the *leaders*, who, after years of training and demonstrated ability, would find it necessary, in order to meet the demands made for their skill, to limit their practice to their peculiar specialties.

But I must bring my already tedious paper to a close.

In conclusion, I will say to those who may be inclined to develop in this department of medicine that, considering the time required for a proper preparation for the work, and the tedious attention to detail necessary for success in practice, the pecuniary emoluments will be less than in general practice, or most other specialties. No one who is too indolent to succeed in general practice should seek this as an easier mode of getting a living. But for one who takes delight in the pursuit of a knowledge, interesting in itself, and made still more enjoyable by the constant demonstration of the blessing it enables him to confer upon his race, it is one of the most satisfactory branches of medical study and practice. It deals with the most interesting organ and function of the human body. It affords the widest scope of study of physics, anatomy, histology, physiology, pathology and therapeutics, and also in the cultivation of manual dexterity and operative skill of any of the specialties. The blessings it enables the physician to bestow upon his patients can hardly be estimated, for of all the senses by which man obtains a knowledge of his surroundings, sight is pre-eminent, whether we consider the extent of its range, or the accuracy and value of the lessons derived from its exercise. It extends our acquaintance to the most distant nebulae in the heavens; it enables us to peer into the minutest cell, and to become acquainted with the delicate tissues of which our bodies are constructed.

Beer, who was so long studying and teaching this subject at the University of Vienna, became so impressed with this fact that he commenced one of his books with this saying :

“As man, in relation to the universe, must be regarded as a little world (microcosmus), so must we consider the eye, in relation to the individual man, as a microcosmus, in which his soul and body are reflected.”

And true it is, within the narrow compass of the visual orbit we find a greater variety of tissue than in any other portion of the body. There are the bony walls, the integument of the lids, the cilia, muscles, cartilages, blood-vessels, and nerves of all kinds; there are the lymphatic glands, and mucous membrane; the beautifully transparent cornea, aqueous and vitreous humors and crystalline lens, and other peculiar structures, each presenting its physiology and diseases for contemplation, to name all of which would require more time than we can here allow. Truly did Beer say this organ may be regarded as a microcosmus, in which the body of man is reflected. And when we contemplate the function of the eye, and try to consider its influence upon the destiny of man, and what he would have been, intellectually, without the educating power of sight, we can but indorse the saying of Beer, and consider the soul of man also reflected in that organ which enables him to gather up the scattered rays of light and convert them into immortal thought.









