under treatment he suffered only one very mild attack and this followed a degree of trauma which previously would have precipitated a most severe onset.

Summary

Although it is realized that with so few cases available and from observations covering so short a period of time one is hardly justified in drawing conclusions, yet the results attained from the use of the sun lamp are so striking that one cannot help but feel that certain definite benefits have been obtained.

A gain in weight and general feeling of well-being was noted among those taking the sun-lamp treatments.

A reduction in the number of attacks of acute respiratory infections was noted among the "cold susceptibles."

There was a marked reduction in the number of sick days, the "cold susceptibles" having an average of but 0.45 per man, as compared with 2.27 sick days per man among the supposedly nonsusceptibles who did not take the treatment.

A small group of seven men who did not begin the treatments with the main group had, before treatment, a total of twenty-four sick days, whereas after beginning the treatment there was not a single sick day among this entire group.

Several cases of alopecia were definitely benefited.

One case of varicose ulcer was promptly healed.

One obstinate case of pronounced angioneurotic edema was markedly benefited, there being but one mild attack during the course of treatment as compared with several severe attacks during a corresponding period the preceding year.

It is therefore our opinion that the carbon sun lamp is a valuable therapeutic measure and that it is an ideal means of applying treatment to large groups of patients where time and expense are factors to be considered.

A Clinical Lecture on Ophthalmoscopy

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Ophthalmoscopy is the art of viewing the interior of the eye with the instrument known as the ophthalmoscope. It regards especially the portion of the back of the eye that can be seen—the optic nerve, retina, and choroid—which is known as the fundus. It is employed to discover local lesions and to detect changes which may indicate a disease in another part of the body. Soon after its invention it was found to be of value in estimating refractive errors, but of late years this has almost been superseded by other and more accurate methods. While this instrument might have been devised earlier still, it has developed along with the kerosene lamp, gas illumination, and the electric light.

The bright yellow or greenish reflex seen in animals' eyes, especially the carnivora, when in a certain position in artificial light, has always been a common observation. This is due to a polished membrane in the choroid known as the tapetum, but as this is not present in the human eye the reflex is not so bright and can be seen only under more favorable conditions.

A beam of light thrown directly into the eye strikes the posterior coats and some of the rays are reflected back to the source. If an observer now attempts to look into the eye his head is in the way if he is in front of the light, and the light itself obstructs the view if he is behind it. By placing the light to one side and reflecting it into the eye with a piece of polished glass the observer's eye behind the glass receives some of the returning rays and the details of the fundus can be seen. This was the construction of the first ophthalmoscope and is still the basic principle of the instrument.

The history previous to the invention of the ophthalmoscope is meager, but the few published observations show a trend of thought toward the attainment of such a method of examination. Mery, in 1704, had seen the blood vessels and color of the fundus when he, accidentally, had held a cat under water. Behr, in 1830, noted the reflex in the eye of a girl without an iris, by looking nearly parallel with the rays of light. Cummings, in 1846, demonstrated that the reflex could be seen in a dark room by holding a candle about ten feet in front of the eye. Brucke, about 1847, saw the rays from the fundus by looking through a tube placed in a candle flame. After the invention of the ophthalmoscope, Wharton Jones announced that in 1847 Babbage had shown him an instrument consisting of a plane mirror with the silvering scraped off the middle; unfortunately, its importance was not recognized.

To Helmholtz must be given the credit for this epochal instrument; in 1851 he presented the first ophthalmoscope. It consisted of a polished glass plate set at an angle to receive the rays from a light set to one side. Later he made one with three plates, which gave more reflecting power. He submitted it to von Graefe who appreciated its value, and he and the contemporary ophthalmologists began the study of this hitherto inaccessible field.

Modern ophthalmology starts from this period. Conceptions of conditions that were vague now became plain, and those that were erroneous were corrected, and the chapters dealing with this part of the eye had to be rewritten. The prophecy of Helmholtz of the valuable information that would accrue was verified in a very short time.

An illustration showing the enthusiasm with which it was received was a dent in the ceiling of a clinic, pointed out to visitors, which had been made by an ophthalmoscope slipping from the hand of a practitioner when he threw up his arms in the excitement from having seen the fundus for the first time.

While the original principle has remained unchanged, many men have suggested alterations which have improved the practical working of the instrument. There has been some wonder that it did not occur to Helmholtz to use a mirror as a reflector, but this was proposed by Epkens a few months after its presentation. Ruetin, in 1852, introduced the concave mirror, which increased the illumination. If the patient or physician, or both, had refractive errors, it was necessary to place a correcting lens in a holder behind the aperture in the mirror. To facilitate this slow and tedious procedure, Rekoss, an instrument-maker, devised a revolving disc with small lenses set around the periphery which could be brought in turn before the sight-hole. The patterns increased to such a number that at a meeting held fifty years after its invention, in commemoration of the event, 140 different kinds were exhibited.

Loring, of New York, and Morton, of London, devised models which have retained their popularity in their respective countries. The Loring is convenient in size and easy to manipulate. The mirror is concave and oblong in shape, which allows it to be tilted toward the light for better illumination. The disc of lenses, by combination with an auxiliary, gives a series from .50 to 24 diopters. The marking of the lenses is a white plus sign for the convex and a red minus for the concave.

The self-luminous or electric ophthalmoscope was introduced by Dennett in 1884. It usually resembles the Loring in its construction, but the source of the light is from a small bulb in the handle, lighted by a dry-cell battery or by a wire from the house current, reduced by a rheostat. This instrument offers a number of advantages, especially to the student. It does not require a special dark room as it can be used in daylight. It is very convenient for a bed-side examination, as a very sick or comatose patient may remain recumbent.

There are two methods of making an ophthalmoscopic examination, known as the indirect and the direct. The student aiming to become an ophthalmologist must perfect himself with both, as each is better in certain conditions, but if preparing for general practice the direct method with the electric ophthalmoscope will suffice.

The indirect method requires a dark room with the walls painted black. The light mostly used now is an electric bulb with a spiral filament, or one very powerful and frosted. This must be on an adjustable bracket to bring it on a level with the patient's eye when seated. The reflecting instrument is used in this procedure. Also a large objective lens of about three-inch focus is necessary. To examine the right eye, the patient is seated and, with the light on the right side, it is adjusted on a level with the eye and far enough back so that it is in a shadow. The student sits facing the patient, a little less than an arm's length.

A convex 3-diopter lens is rotated before the sight-hole of the ophthalmoscope, which is held in the right hand close to the student's right eye, steadied against his brow. Looking through the aperture, the light is reflected into the pupil which now shows a red reflex. The objective lens, held in the left hand by the first finger and thumb and steadied by one or more fingers against the patient's forehead, is brought before the eye so that its center is in front of the pupil.

The patient is directed to look steadily in the distance, the gaze directed just past the top of the examiner's right ear. The details of the fundus should now be in view but, if not, the student moves backward and forward until the picture is in focus. A finer adjustment may now be made by moving the objective lens. Obstructions to a clear view may be caused by reflections of light on the objective lens, the patient's cornea, or the edge of the sight-hole in the mirror. A contracted pupil also adds to the difficulty. The reflections on the edge of the mirror are due to faulty construction. The hand lens may be tilted and the eye moved slightly to overcome the light reflections and the pupil can be dilated.

To obtain mydriasis cocaine 1 per cent, or euphthalmin 5 per cent, are dropped in the eye and the pupil dilates in about fifteen minutes. The effect passes off quickly; or pilocarpine 1 per cent may be instilled when finished. All mydriatics should be used cautiously in people over forty on account of the danger of precipitating glaucoma.

In the indirect method the picture of the fundus seems to be on the back of the eye but it is really an aerial image in front of the objective lens. It is inverted; a fact that the student must keep constantly in mind. The parts seen are magnified about four diameters. More of the fundus can be seen, which is an advantage in locating a lesion. A better view is also obtained in high myopia.

The left eye may be examined by shifting the left hand before the left eye, holding the hand so as not to obstruct the light and the patient's view with his right eye. The patient is instructed to look past the left ear. Another way is a complete reversal of the light to the left side and changing the observer's hands and using the left eye.

The direct method of examination is made with the reflecting ophthalmoscope in the same room and a similar position of the patient and light. The observer, holding the ophthalmoscope before the right eye, approaches as near the patient as possible and, by reflecting the light in the eye, is able to see the fundus. If both patient and student are emmetropic, and relax their accommodation, the details will be visible. The patient is instructed to look straight in the distance and the observer must imagine that he is looking at a distant object. If not seen, the proper lens must be rotated before the aperture, by keeping the finger on the disc.

The examiner shifts his position and changes to his left eye for the patient's other side. A better view is attained, of course, with a dilated pupil. If disturbing reflections are present they may be overcome by having the patient shift the eye slightly.

The image is erect and magnified about 14 diameters, but the extent of the field seen is smaller than with the indirect method.

Before the electric ophthalmoscope, the direct method, owing to the difficulty in reflecting the light, was mostly used by the expert; many habitually employed the indirect. With the illumination in the instrument the direct method is now more easily acquired by the novice than the indirect.

The student of ophthalmoscopy must know the structure of the normal eye to derive the greatest benefit in its application. He must also understand how the cornea and lens function as a dioptric system to focus the rays of light on the back of the eye, and the return of the reflected rays to the observer's eye.

The cornea, aqueous, lens, and vitreous are called the media, and are normally transparent. Pathologic changes in these structures may dim, or even prevent, a view of the fundus. The parts of the posterior segment that can be seen with the ophthalmoscope are the sclera, choroid, optic nerve head, and the retinal vessels. The sclera is a dense, white, connective tissue membrane, forming the outer coat of the eye. The choroid rests on the sclera and is a membrane of connective tissue with pigmented cells and filled with blood vessels. These vessels are arranged in three layers, the outer are large, the middle small, and the inner are capillaries. It is from the blood in this mass of vessels that the red hue of the fundus is reflected, modified by the density of the brown color in the pigment cells. The retina lies on the choroid and is transparent, with the exception of its vessels. The head of the optic nerve, known as the disc or papilla, is plainly seen where it penetrates the sclera, about 3 millimeters to the inner side of the posterior pole. The shape is round, or slightly oval, and it is about 1,5 millimeters in diameter. It is pink in color, the outer part being lighter. The border is well defined and may show a white scleral crescent or ring when the choroid is retracted. There may also be a dark choroidal ring or crescent from a deposit of pigment. There is usually a white, funnel-shaped depression in the center of the disc, the so-called physiologic excavation or cup. The retinal vessels enter the eye from this cup, from the center of the nerve. These are the central artery and vein and they may have divided before their emergence. If not, they do at once into a superior and inferior branch and, usually before leaving the disc, they separate into a nasal and temporal branch. Beyond this the ramifying twigs are not named. The course of the artery and vein may be almost parallel but the various loops, intertwinings, or tortuosities must not be considered abnormal.

The artery is easily distinguished from the vein as the former is smaller, lighter in color, and has a brighter and wider reflex along the axis. The vein is about a third larger than the adjacent artery. A pulsation of the vein at the disc is normal.

There are also some small vessels at the edge of the disc from the circle of Zinn, known as the cilioretinal arteries and veins.

An anomaly, not inimical to perfect vision, is a bright white patch at the disc—rarely some distance from it—where the medullary coat of the nerves have persisted for some distance into the retina. It is designated as opaque nerve fibers and its shape often resembles a flaring gas flame. The student often mistakes it for an exudation; especially an isolated area some distance from the disc.

The macula lutea, or yellow spot, is a small area about two disc-diameters from the optic nerve to the temporal side and in the axis of vision. In the center is a small depression, the fovea centralis.

The color of the fundus shows a marked variation according to the complexion of the individual, which it usually matches. The choroidal tint can be divided into four types—which conform to the pigmentation of the skin, hair, and iris—the albino, blond, brunette, and negroid. The albino lacking pigment exposes the choroidal vessels and sclera to view. A blond may at times reveal the outline of the vessels but there is usually enough pigment to conceal them, giving a uniform pink color. The brunette has a brownish tinge, but when quite dark the vessels may show with dark islands between, known as the tessellated fundus. This is apt to be mistaken for a pathologic condition. The negroid is the darkest and is of a brownish hue.

The posterior of the eye is a segment of a hollow sphere but viewed with the ophthalmoscope it appears like a flat picture. This comparison to a picture is very apt; the white firm coat of sclera is like the canvas, and on this nature has mixed and applied the colors of the choroid, and coated them with the thin, transparent retina like a varnish.

To reach the fundus, light must pass through the media, the cornea, aqueous, lens, and vitreous. Normally, all of these structures are transparent but any opacity present will impair or obstruct a view of the eye-ground. The iris is interposed like a diaphragm, with a central pupillary opening. If the pupil is contracted it may be necessary to dilate it to see the interior.

Before using the ophthalmoscope, the anterior media —the cornea, aqueous, iris, and anterior part of the lens—should be examined by lateral, or oblique illumination. This is best done in a darkened room, with a light about one foot in front of the patient's eye and a little to one side. The light is concentrated with a lens of three-inch focus and each of the structures noted in turn. Any departure from normal is shown by a haziness; gray, if thin, and white, if dense.

Transmitted light, or direct distant ophthalmoscopy, is the next step to discover any changes in the deeper media, the lens and vitreous, unless the electric has a strong light, best done with the reflecting ophthalmoscope. The light is adjusted behind and a little to one side, on a level with the eye, so that it is in a shadoow. The observer takes a position about fifteen inches in front and, looking through the aperture, reflects the light into the pupil. If normal, this now appears uniformly red. Any opacity present appears as a black spot, as it cuts off the returning rays. The way in which a white object appears black can be demonstrated by holding a piece of chalk between the eye and a light. If the spot moves on motion of the eye it is in the vitreous. When the lens is completely opaque it appears gray. Exudations in the vitreous are grayish if serous but darker when fibrinous, but if filled with blood the pupil appears black.

The location of an opacity may be ascertained by directing the patient to look upward. If the spot moves upward it is on the cornea; if it is stationary it is on the anterior surface of the lens; if it goes downward it lies on the posterior surface of the lens or in the vitreous.

Another method to examine opacities in the lens and vitreous with the electric ophthalmoscope is to rotate a plus 20-diopter lens in front of the aperture and approach as close to the eye as possible. If deeper in the vitreous, rotate a weaker lens before the sight-hole. The media being clear the examination of the fundus can then be made as follows with the electric ophthalmoscope.

With the electric ophthalmoscope it is usually best to start with a study of the disc, which, after a little practice, is easily located. If the nerve is not seen quickly, find a retinal vessel and follow it to the point where it emerges, which is always the place sought. Consider the vessels like little streams flowing to the disc and pursue a similar course that we taught a recruit in the army, if lost in the country. He was told to find a brook, if possible, and follow it to a river; then he would usually find a house or village.

Having found the disc, note the size, shape, color, and contour. The size is always about the same, but it must be kept in mind that it is magnified; actually the width is 1.5 millimeters but the 14-diameter enlargement gives it the apparent size of a ten-cent piece. The shape is round or slightly oval; it may seem more oval with astigmia. The color is pink and most always lighter than the surrounding fundus. The contour is fairly well marked but not always with a sharp line, as is often stated. If the choroid is not close to the disc the white scleral crescent or ring is prominent; usually quite wide in myopia. The pigmented crescent or ring is frequent on the choroidal border.

In or near the center of the disc is a white depression, usually funnel-shaped, known as the physiologic cup. The student may mistake this for an atrophic spot or a pathologic cupping. The retinal vessels emerge from the cup, dividing into their branches either before or after their appearance. The vein is larger, darker, and may pulsate. The artery is pink, and about one-third smaller. The course of each branch may be followed to near the equator by having the patient turn the eye in the different directions. Their course is straight, curving, or slightly tortuous. There is a streak of light on the axis, more marked on the arteries. The small vessels seen emerging from the border of the disc are from the short posterior ciliary arteries, known as the cilioretinal. One passing to the temporal side is fairly constant.

The surface of the fundus is smooth and quite evenly colored; varying from a pink to a brownish-red, the hue coinciding with the patient's complexion. The student should keep in mind that, save for the retinal vessels, that it is the choroid that is viewed. Movable shining streaks, compared to shot-silk are reflections of light.

The macula and its location are easily described but it is often difficult for the tyro to find and recognize it. Using the disc as a standard of measurement it is about two disc diameters templeward, which is the posterior pole of the eye. The difficulties in finding it quickly are due to its smallness; the movement of the eye to avoid the light; or a lack of cooperation in a nervous patient. Even the expert may have trouble when the pupil is small. Having the patient look a little to the right with the right eye, and to the left with the left, will help to bring it into view.

The macula is a small, dark area with a little white dot, the fovea, near its center. It may be circular, but the outline is often irregular. It might be compared to a small tee with a tiny white golf ball resting on it. The white dot is round when looking directly at it but when viewed in a slanting direction, it gives off a streak of light.

Examination with red-free light, by interposing a green glass over the light, is a newer method, but it requires a special instrument with a strong light and an expertness beyond the ability of the novice. It shows earlier changes in the retina and blood vessels.

The illustration of fundus conditions by means of drawings and colored plates has been extensively carried out since the invention of the ophthalmoscope, but many are not accurate. In more recent years photography has added a new means of reproducing accurately the changes of the interior of the eye; they are excellent, but without color. But neither the skill of the artist nor the product of the camera can equal the observing eye.

To reiterate the conditions which may be mistaken as pathologic remember the scleral and choroidal rings, the paleness of the disc to the outer side and redness to the inner, the normal cupping, some tortuosity of the vessels, shot-silk retinal reflexes, opaque nerve fibers, and the albinic and tessellated fundi.

Transplantation of Ureters into the Sigmoid for Exstrophy of the Bladder and Urethro-Vaginal Fistula*

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All congenital deformities are to be deplored but, relatively, exstrophy of the bladder is the worst because incontinence of urine and its disagreeable and objectionable features and the great difficulty or impossibility of its cure, make it the worst. Operations for exstrophy performed years ago were a failure; plastic operations to cover the exposed bladder surface (mucous membrane) now and then succeeded but incontinence persisted because it was impossible to construct a sphincter and establish a bladder cavity.

Life expectancy of cases of exstrophy is from five to ten years—not a very bright or encouraging outlook; a few years of misery, discomfort and wretchedness.

In 1906, Lord Moynihan transplanted the ureters with the trigone of the bladder into the wall of the sigmoid.

In 1911, R. C. Coffey advocated the submucous insertion of the ureters into the wall of the sigmoid in cases of exstrophy and reported forty-eight cases of this kind in a paper presented to the British Journal of Urology in December, 1931.

Evidently Coffey is deeply interested in this subject of transplantation of ureters and a questionnaire received from him has prompted this contribution from me.

The two cases to which I applied this principle were one of exstrophy of the bladder and one of rupture of the urethra, caused by childbirth. The operation was successful in both cases.

At the time I performed my transplantations, Coffey's submucous method had not been made public. There is no question about its superiority over older methods, and I am waiting for my next case, when I can employ it.

Case No. 1.—J. McC., aged twelve years, is in a miserable state of body and mind because of incontinence soaking his clothes day and night which naturally isolated him from his friends.

Operation—April, 1918.—The exposed bladder surface was three inches long transversely, and two inches broad, vertically. The ureteric orifices were in sight near the lower portion of the raw surface.

The ureteric openings were surrounded by an incision which included the trigone and divided the bladder wall. The abdomen was opened by a longitudinal incision, the ureters were mobilized along the pelvic floor, the sigmoid colon was brought into the wound, opened, and the ureters and bladder trigone implanted and sutured with linen. The abdominal wall was then closed.

One month later, the right ureter became detached from the sigmoid and discharged urine at the old site. I dissected this ureter free and again implanted it in the sigmoid, using catgut for suture material instead of linen. At this sitting, I also removed all of the mucous membrane of the exstrophied bladder and, by sliding skin flaps, I was able to close the entire raw surface. There was no more leakage or other complication. Now he urinates, in the sitting position, of course, every three or four hours during the day and once or twice at night. The boy had two mild attacks of ascending infection with chills and moderate fever during the year following his operation. All urine passes into the rectum but he has perfect control over it and now his comfort and happiness can be said to be one hundred per cent. Figs. 1 and 2.

I know nothing about this boy's sexual life. He was very modest, even diffident. At first he objected to be photographed and when I inquired about his sexual life, he refused point blank to answer questions.

Case No. 2.—Mrs. R. W., aged thirty years, was delivered of a "dead child" nine years ago. A craniotomy had to be performed and she was lacerated extensively. Ever since then she has been unable to hold her urine. Her life is miserable and she is socially ostracized. Her general health is good. Some operation for incontinence was performed upon her eight years ago, in Baltimore, without success.

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