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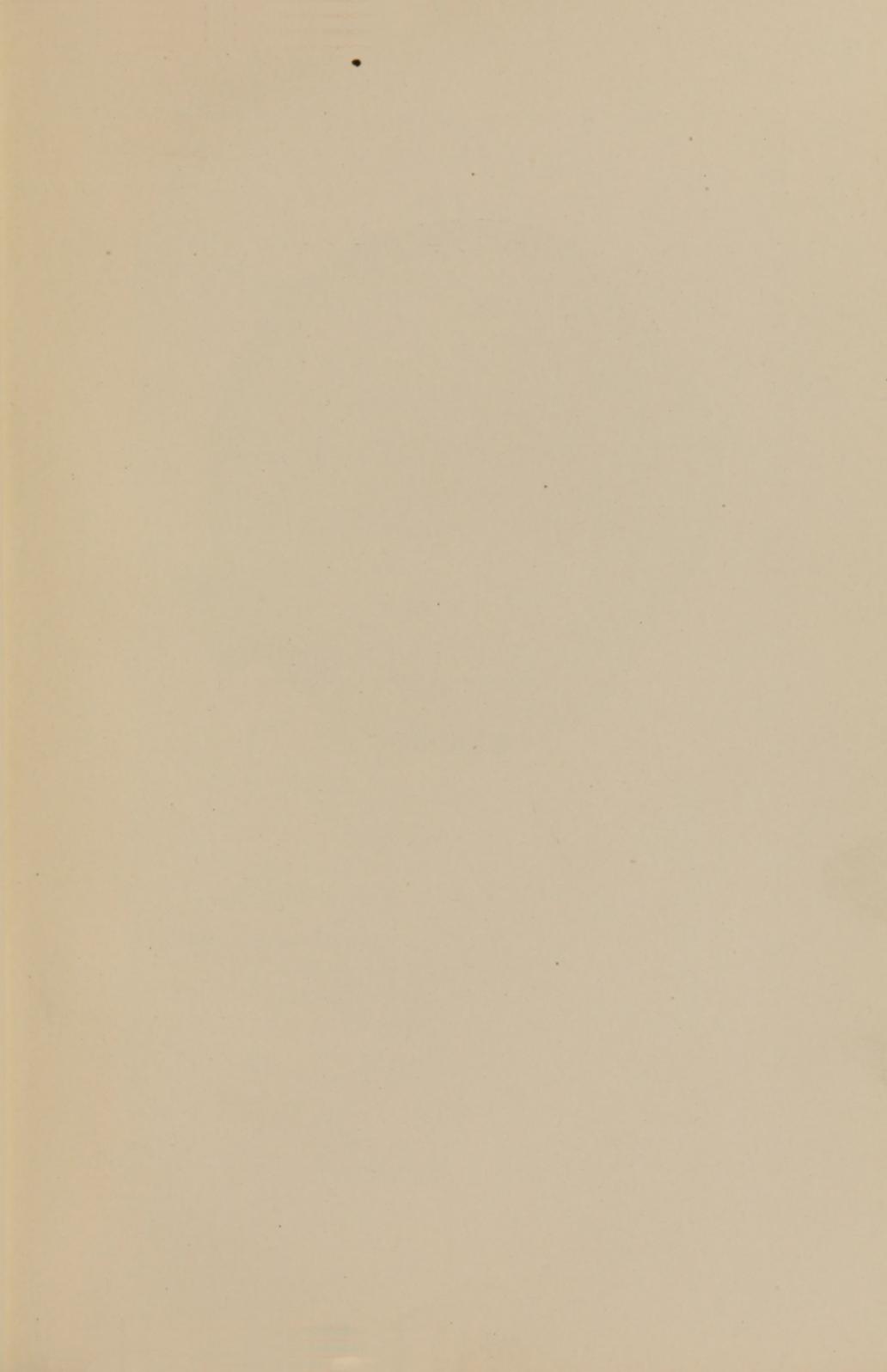
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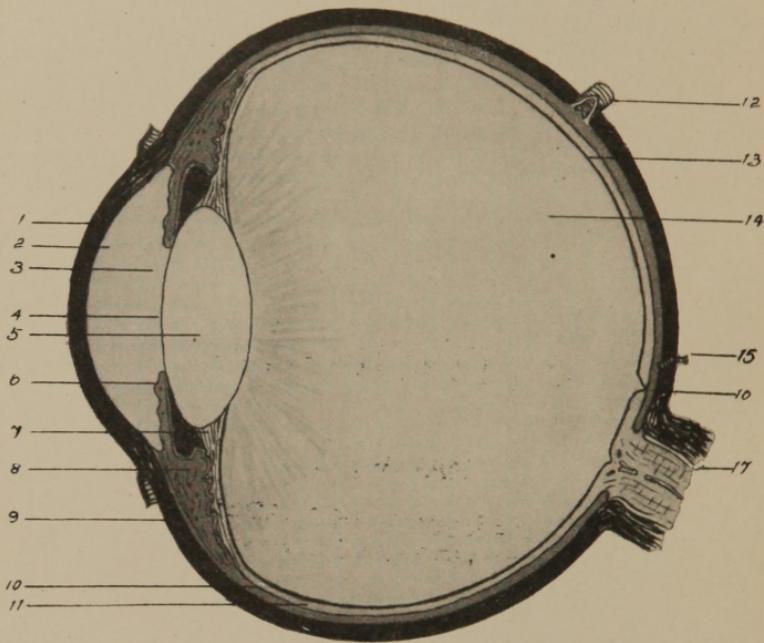
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Longitudinal section of the eyeball.

- | | |
|----------------------|---------------------------------|
| 1. Cornea. | 10. Choroid. |
| 2. Anterior chamber. | 11. Retina. |
| 3. Pupil. | 12. Vena vorticosa. |
| 4. Lens capsule. | 13. Hyaline membrane. |
| 5. Lens. | 14. Vitreous. |
| 6. Iris. | 15. Posterior ciliary arteries. |
| 7. Ciliary ligament. | 16. Macula lutea. |
| 8. Ciliary process. | 17. Optic nerve. |
| 9. Sclera. | |

The Ophthalmic Nurse

By

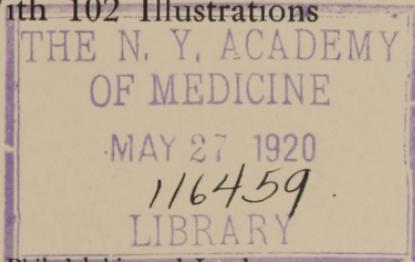
G. Griffin Lewis, M. D., F. A. C. S.

Syracuse, N. Y.

WITHDRAWN
Transferred to Gross- Irving Hospital
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PREFACE

THIS little volume is the outcome of a course of instruction given to the nurses at the Crouse-Irving Hospital.

It is not intended for medical students or practitioners, but is written to serve as a practical guide for nurses who lack special training in the management of ophthalmic cases.

Care has been taken to avoid scientific terms and expressions, and to present the subject in a complete but condensed form and in a manner that may be readily understood by all. It is in no way a treatise on diseases of the eye, but has to do only with those facts which are necessary for a nurse to know if she expects to render intelligent assistance to the oculist and efficient care to the patient.

A unique and valuable feature is the catechism in the latter part of the book. Here the questions asked cover everything of any importance pertaining to the subject. After a thorough perusal of the preceding chapters, and perhaps a review of the same, the nurse is to write down on paper the answer to each question, numbering it accordingly. When all of these questions have been answered in this way, she may refer to the page and line indicated by the numbers after each question to see how correctly she has answered it. She may mark the questions which were not satisfactorily answered, again review the subject-matter pertaining thereto, and, after the lapse of a few days, repeat the examining process as described above. In this way any intelligent nurse will, in a remarkably short

time, acquire a degree of proficiency which will enable her to meet any requirement of the ordinary case.

The author trusts that his effort may prove a useful assistant in the formation of correct ideas regarding the anatomy, physiology, and hygiene of the eye, and begs the kind indulgence of the readers for any manifest shortcomings.

G. GRIFFIN LEWIS.

SYRACUSE, N. Y.,
April, 1920.

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THE OPHTHALMIC NURSE

CHAPTER I

THE REQUISITES OF A SUCCESSFUL NURSE

It would not only be difficult but tiresome to depict all the attributes that might enter into the composite picture of a model nurse, so we will but briefly refer to some of the more essential ones.

The ideal nurse should have something more than the mere technical skill in doing things which are required by the sick. First of all, she should be a good woman, with sound health and the right personal qualifications, both mental and physical. She should have a love for work, sacrifice, and humanity with all that this quality implies. Her value will depend much more upon her personal qualities, her conduct, and experience than upon her knowledge of anatomy and materia medica.

The demand for her service will also depend largely upon her personal appearance, attractive manner, and cheerful spirit. She should be properly attired in correct uniform with no rustling of silk skirts, scent of perfumery, or glitter of jewelry.

She must be cheerful and optimistic. This is often difficult, especially after long hours of sleepless vigilance and lack of proper exercise, when the patient is feverish and fretful, and the family anxious and may be even distrustful and unreasonable, but just imagine the effect upon a nervous, impressionable patient of a gloomy and grouchy nurse.

Optimism on her countenance, hope in her heart, sympathy in her touch, and kindness in her speech are of more



Fig. 1.—The uniformed nurse.

value to the patient's eyes than is the ability to take the temperature or give a hypodermic injection.

She should be charitable, and she will get from the patient and his family a sincere gratitude which will go far toward making life worth while. She should not go forth as a mere wage earner, but as a dispenser of a greater bounty, as a devoted helper in the great field of human need. In other words, she should show how much she can put into her pro-

fession, not how much she can get out of it. I have little respect for the nurse who will consider her own comfort paramount to that of her patient.

The capable nurse is practical, observing, and resourceful, traits which are best acquired by being pressed into service under superior guidance, coming into direct contact with the case, and watching its different phases until able to attend to the same upon her own responsibility. To do this she must study the patient clinically, observe his mental and physical changes, the action upon him of medicines and treatments of any kind, the benefits of diet, the changes of pulse, respiration, etc.; in fact, she must have every detail of her work under close actual observation.

Accuracy is also an essential element of a nurse's education. The attending physician always appreciates accurate data relative to the patient's personal and family history, occupation, habits, mode of living, diseases of childhood and previous eye affections, as well as to the pulse, temperature, respiration, and urinalysis, as a knowledge of all of these conditions is of inestimable value to him and enables him to oversee the progress of the case in all its details.

Presence of mind in the affairs of life is of benefit to all, but particularly is it valuable in the professions that have to do with the lives of individuals, and the nurse who can think and act quickly and wisely has a most valuable asset.

Nurses are likely to see many family skeletons drawn from their closets. Matters of mind as well as those of the body, matters that effect the honor and peace as well as those that

effect the health of individuals and families are laid bare to the nurse; therefore, she should guard the sanctity of the home and see to it that no one's character or reputation suffer because of any knowledge that has come to her in this way.

While pursuing her course in the training-school the pupil nurse is under the direct supervision and guidance of those whose friendly responsibility is to aid and instruct her, but after graduation she loses this friendly assistance and becomes dependent upon her own capabilities. It is then that she must see at a glance the situation, and must either do or neglect to do the thing that may mean life or death to her patient. There are many attributes that are essential to her success that she must gather from experience and training after she goes out from her Alma Mater; therefore, she should best inform herself more exactly regarding the many facts that suggest themselves as she goes along by means of suitable reading and intelligent interrogation of those more proficient in the art.

In family nursing the surroundings are entirely different from those she has been accustomed to, and so it frequently happens that many nurses who did excellent work in the hospital utterly fail in family practice. She should remember that the family routine should not be disturbed except when absolutely necessary; she should avoid loud or whispered conversation, but should speak in a low, quiet tone; she should never sit on the edge of a bed; she should become acquainted with the location of everything which she may need; she should leave nothing in the patient's sight which

would continually impress him with thoughts of sickness, such, for instance, as bottles, surgical dressings, etc.

While nursing in families with plenty of servants she is entitled to liberal service herself, but when nursing in families of limited means she should be resourceful and helpful. She should teach all the members of the family the laws of health pertaining to fresh air, cleanliness, light, exercise, etc.

THE RELATION OF THE NURSE TO THE PHYSICIAN

The relationship of the nurse to the physician has no special code of ethics except that of the Golden Rule. The nurse should not forget that she is the employee of the doctor, though paid by the patient, and that she has no authority in the case further than that relegated to her by the doctor, who in recommending her assumes a responsibility in her skill, her behavior, and, I might add, her moral character; therefore, she should do her work promptly, quietly, and faithfully in accordance with his instructions, thereby adding materially to his comfort and success.

The nurse should have no favorite doctor, or ever allow a patient to know that she values the skill of one physician above that of another. She should not think that because two surgeons manage their cases differently that one is wrong; in fact, she should always uphold the medical attendant and neither say nor do anything to impair the confidence reposed in him by the patient. A shrug of the shoulder or an elevated eyebrow may make an irremediably unfavorable impression upon the patient or his friends.

CHAPTER II

ANATOMY OF THE EYE

A CLEAR understanding of the gross anatomy and physiology of the eye is quite necessary for one to have who expects to intelligently care for that organ when diseased, injured, or operated upon.

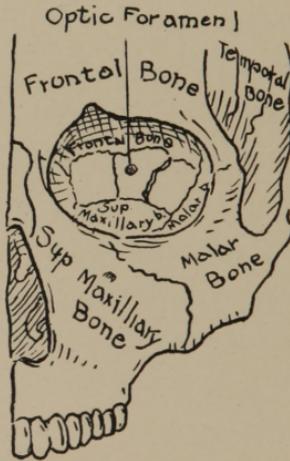


Fig. 2.—The orbit. (Manhattan Hospital.)

5 First, we will consider the anatomy, beginning with that of the **orbits**, the bony, cone-shaped cavities in which the eyeballs are situated, and the walls of which are formed by the union of seven different bones, viz.: the frontal, the superior maxillary, the malar, the sphenoid, the ethmoid, 10 the lacrimal, and the palate.

At the apex of the orbit is an opening called the optic foramen, through which passes the optic nerve and the ophthalmic artery. The apex is also filled with an adipose tissue called the orbital fat, upon which the back part of the eyeball rests and which acts as a cushion in protecting it 5 from blows, etc.

The **eyeball** (see frontispiece) is about 1 inch in diameter and is composed of three tunics or coats. The anterior one-fifth of the first coat is composed of the cornea, and the posterior four-fifths, of the sclera. The **cornea** projects from the 10 general contour of the eyeball like a watch crystal from the face of the watch. It is thicker at its edge than at its center. Being non-vascular it receives its nutrition from the anterior ciliary vessels, which form a network of loops around the margin of the cornea. Minute nerve branches pass 15 freely to the epithelial layer, which act as a protection to that membrane by giving it extreme sensibility to all external injurious influences.

Injuries and inflammations of the cornea are fraught with much danger, and if its integrity is impaired correct vision 20 will be impossible.

The **sclera** is a firm white fibrous membrane varying in different parts from $\frac{1}{2}$ to 1 mm. in thickness. It maintains the shape of the eyeball and to it are attached the muscles which move it. Posteriorly and about 10 degrees to the 25 nasal side of the center the sclera has an opening, about 2 mm. in diameter, for the entrance of the optic nerve. It is also perforated at various places by veins (*venæ vorticosæ*)

and by the posterior and anterior ciliary arteries and nerves.

The second or middle coat of the eyeball is composed of the iris, the ciliary body, and the choroid, all three of which
5 are sometimes classified under the general name of "uveal tract." The first of these three, the **iris**, gives color to the eye and imparts expression to the face. It derives its name

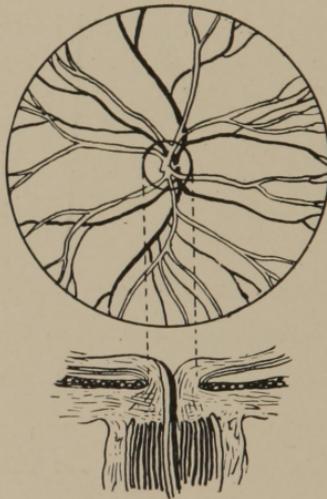


Fig. 3.—The optic nerve.

from its varied hue, black, brown, gray or blue, according to the amount of pigment it contains. In that of the albino
10 there is no pigment, and the blood-vessels, shining through its walls, give the eye a pink color. Those of you who have never seen an albino have no doubt noticed the pink eyes of a white rabbit.

All eyes are blue at birth, the commencement of perma-

ment coloration taking place about the sixth week. Dark colored eyes are usually stronger than light ones, inasmuch as they are better protected against excessive light.

The iris divides the aqueous humor into two parts, known as the anterior and posterior chambers, which communicate with each other through the pupil. The iris is composed of two sets of muscular fibers, the circular, which cause contraction of the pupil, and the radiating, which cause dilation of the pupil. 5

The **ciliary body** is a muscular apparatus composed of 10 processes, about seventy in number, which are called the ciliary processes. They surround the iris like radii around the sun, and as they pass forward they become thicker and more muscular in nature until they merge into what is known as the ciliary muscle, a most important tissue both 15 from the physiologic and pathologic standpoint, as you will see later.

The **choroid** is made up of five layers and is composed chiefly of blood-vessels. Its function, by virtue of its great vascularity, is to nourish the retina, vitreous, and lens, to 20 furnish the visual purple, and, by its pigmentation, to make the interior of the eye a dark chamber or camera.

The third or inner coat of the eyeball is composed of the **retina**, a very delicate, transparent membrane which is a continuance of the brain substance into the eyeball, and 25 which, like the sensitive plate of the photographer's camera, receives the impression of external objects. The retina is held in contact with the choroid by the vitreous humor. The

optic nerve-fibers spread out in all directions from the disk and pass through the layers of the retina. The part of the retina corresponding to the optic nerve entrance is known as the disk, nerve head, or papilla.

- 5 The retina is not equally sensitive in all of its parts to visual impressions. A small area called the "fovea," which is situated directly in the axis of vision, is the most sensitive portion, and, in order to secure a clear and accurate view of

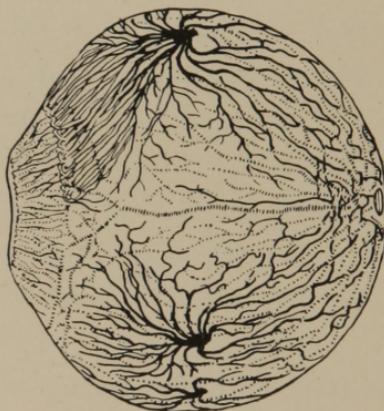


Fig. 4.—The choroid.

any object it is necessary to focus rays from that object
10 simultaneously upon the "fovea" of each eye. When this
is not accomplished double vision results. That portion
immediately around the fovea is called the "macula," and it
is the most vascular part of the retina, while the fovea itself
has no vessels.

- 15 Within the eye are three humors: first, the aqueous,
about 10 drops in all, which occupies the space between the

cornea and the lens. It is a clear, transparent, salty fluid, and, as its name implies, is of a watery consistency. It is secreted by the vessels of the iris and ciliary body, and, as its function is to maintain the proper tension of the eye and allow free movements of the iris, it is fortunate that when it is partially or wholly lost by puncture of the cornea it is rapidly reproduced. 5

The second humor is the **crystalline lens**, a semisolid, double convex body situated just back of the aqueous. It

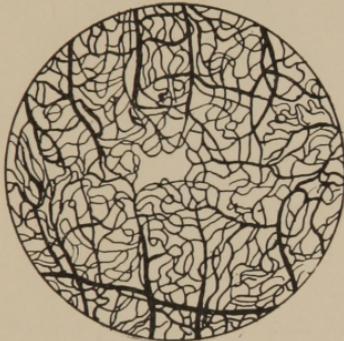


Fig. 5.—The fovea centralis.

is enclosed in a transparent elastic capsule which is sus- 10
pended at all portions of its circumference by a circular liga-
ment, the ciliary ligament, which, in its turn, is attached to
the ciliary muscle, and, having no blood-vessels, is depend-
ent for its nutrition upon the lymph thrown out from the
blood-vessels of the iris and ciliary body. The lens is cap- 15
able by its elasticity and by contraction and relaxation of
the ciliary muscle of becoming more or less convex, thus

changing the focus of the eye as it looks from one object to another.

The third humor is the **vitreous**, a large globular body of the consistency of jelly, which is enclosed in a delicate envelope called the hyaline membrane. It occupies about
5 two-thirds of the interior of the eyeball, and is the chief factor in maintaining its form. It also has no blood-vessels and gets its nutrition from those of the adjacent structures.



Fig. 6.—The crystalline lens.

The **pupil** is the opening in the center of the iris, which is
10 enlarged or contracted by the muscles of the iris. In the dark it dilates in order to enhance intra-ocular illumination, and in the light it contracts to prevent too much light from striking the delicate retina. When the iris is at rest the
15 pupil has an average diameter of about $\frac{1}{8}$ inch. Variations, however, are met with in different persons and in the same person at different times, thus people of a sanguine tem-

perament generally have small pupils, while those of sluggish habits generally have large pupils.

It varies in size at different ages, growing smaller as age advances. It is larger in near-sightedness than it is in far-sightedness. Local affections within the eye, as well as diseased conditions elsewhere in the body, affect its size, as do also various drugs.

When consciousness is lost, as under the influence of an anesthetic, the pupil becomes dilated and does not respond

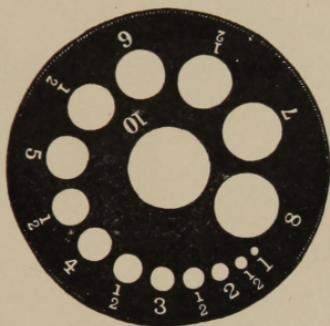


Fig. 7.—Pupillometer for measuring size of pupil.

to light. When the eye looks at objects nearby the pupil is smaller than when looking at distant objects. In the healthy and strong it is smaller and more active than it is in those who are depressed and exhausted by long illness.

The Muscles.—Each eye has seven muscles which perform all the movements necessary in the function of vision, and it is only when the adjustment of these muscles is perfect that accurate binocular vision can be maintained. Every movement of the eye requires an instantaneous con-

traction or relaxation of one or more of these muscles, thus it is evident that sight is not a passive function, but an active one, and, although we see apparently without any effort, every movement costs its adequate amount of vital
 5 energy, and especially in defective eyes does the effort on the part of the ciliary and external ocular muscles to maintain accurate binocular vision spur the oversensitive nerve-centers to extraordinary exertion.

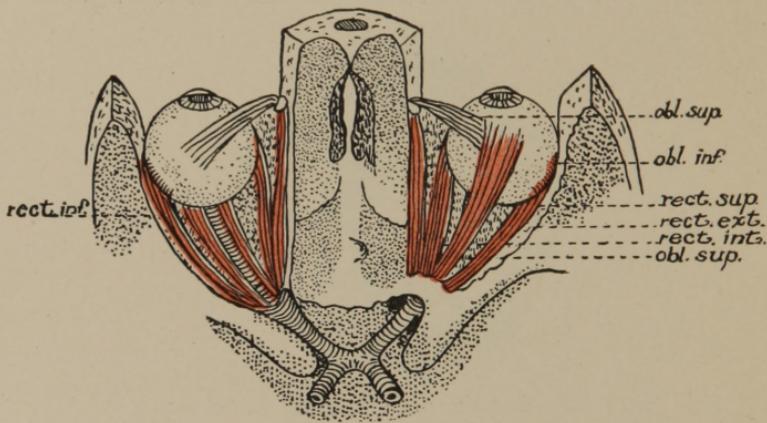


Fig. 8.—The extra-ocular muscles. (Landolt.)

Of the external ocular muscles there are four recti and
 10 two obliques. The **internal rectus** arises from the inner side of the optic foramen, is attached to the sclerotic coat on the nasal side of the eyeball, and serves to turn the eye toward the nose. The **external rectus** arises from the outer margin of the optic foramen, is attached to the sclera on the
 15 outer surface of the eyeball, and serves to turn it out. The **inferior rectus** arises from the inferior surface of the optic

foramen, is attached to the sclera on the under side of the eyeball, and serves to turn it down. The **superior rectus** arises from the upper margin of the optic foramen, is attached to the sclera on the upper surface of the eyeball, and serves to turn it up. The **superior oblique** arises near the optic foramen, passes forward through a pulley on the upper and inner side of the orbit, and then deflects back beneath the superior rectus muscle to become attached to the posterior outer surface of the eyeball, and it serves to rotate it outward. The **inferior oblique** arises from near the inner anterior angle of the orbit, passes outward and backward beneath the eyeball, and is attached to the sclerotic at the posterior outer surface of the ball, and serves to rotate it inward.

Appendages of the Eye.—The **eyebrows** impart expression and beauty to the face and protect the eyes from the perspiration as it trickles down the forehead.

The **eyelids** are two movable curtains which, when closed, cover the front of the orbit, and serve as a protection to the eyeball. Each lid contains a thin plate of dense fibrous tissue which very much resembles cartilage and serves to maintain the shape of the lid. In sleep the muscles of the upper lids relax and allow them to fall down over the globes, thus protecting them from the light and air. The inner side of the lid is lined with a thin colorless membrane extending from the edge of the lid to its extreme inner surface, whence it is reflected on to the eyeball, being attached around the circumference of the cornea. The portion lining the eyelids

is called the *palpebral conjunctiva*, while that on the eyeball is called the *bulbar conjunctiva*, the epithelial or outer layer of which is transparent and extends entirely across the cornea, forming the anterior or epithelial layer of that structure. The conjunctiva is so well supplied with nerve filaments that if any foreign body gets into the eye it acts reflexly upon the lacrimal gland and causes an increased flow of tears which usually wash the foreign substance out. The conjunctival blood-vessels are invisible in health, but when

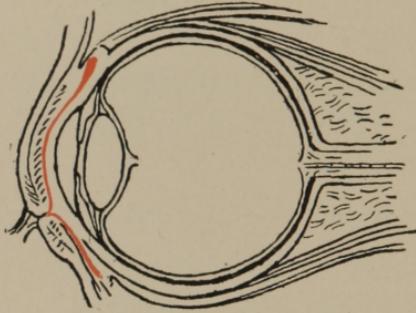


Fig. 9.—The conjunctiva.

the eye becomes inflamed the vessels become enlarged and hide from view the shining white sclera beneath.

On the edge of each lid is a row of cilia, the so-called *lashes*. The slightest touch of any object to these cilia will cause an instant and involuntary closure of the lids, thus frequently preventing substances from entering the eye.

Lying just to the inner side of the cilia on each lid is a row of little glands called the *Meibomian glands*, which secrete an oily fluid, the principal function of which seems to be to prevent the overflow of tears.

The **lacrimal apparatus** consists of the lacrimal gland, the lacrimal punctæ, the lacrimal sac, and the lacrimal duct.

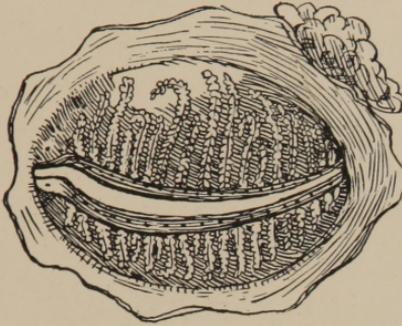


Fig. 10.—The Meibomian glands.

The gland is a small almond-shaped body lying in a fossa at the upper outer angle of the orbit, just under the supra-

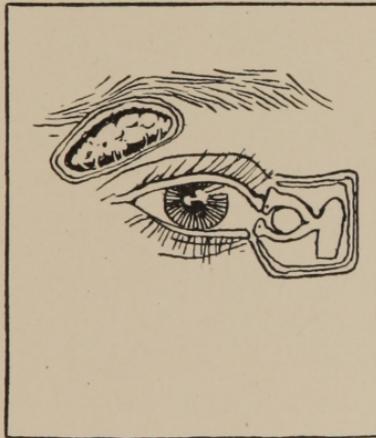


Fig. 11.—The lacrimal apparatus.

orbital ridge. It secretes tears through a dozen or more 5
small ducts, which flow over the eyeball to the punctæ situ-

ated in the inner angle of the eye, one on each lid. Through the punctæ the tears run into the lacrimal sac, and from there through the lacrimal duct into the nose. The lacrimal secretion is a salty fluid which flows constantly, thus keeping
5 the eye moist and enabling the lids to glide easily upon the eyeball. When one cries this secretion forms more rapidly than the punctae will accommodate, consequently it flows over the lower lids on to the cheeks.

CHAPTER III

PHYSIOLOGY OF THE EYE

RAYs of light from any point pass through the cornea, the aqueous humor, and the pupil, to be focused by the crystalline lens through the vitreous body upon the retina.

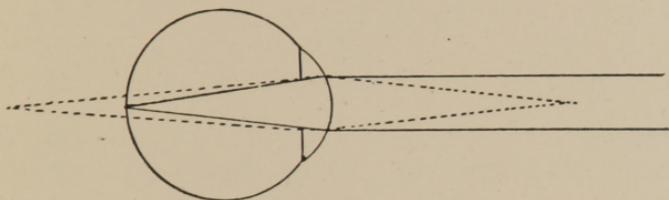


Fig. 12.—Emmetropic eye.

The eye which is of **normal refraction** (emmetropia) is one the lens of which, when perfectly at rest, will bring 5 parallel rays of light to a focus exactly upon the retina.

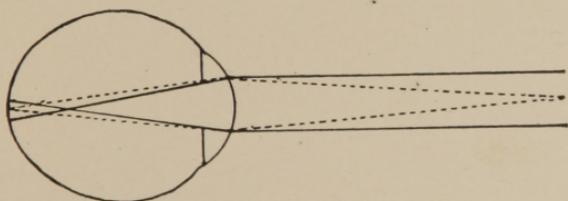


Fig. 13.—Myopic eye.

The **near-sighted eye** (myopia) is one the lens of which, when perfectly at rest, will bring parallel rays to a focus before they strike the retina. In the **far-sighted eye** (hyperopia),

when the lens is perfectly at rest, parallel rays will strike the retina before they are brought to a focus. These conditions can be readily understood by those who may be familiar with

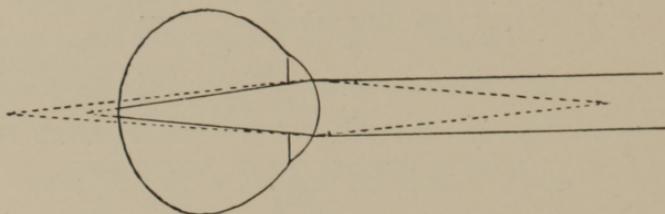


Fig. 14.—Hyperopic eye.

the workings of a camera and realize the necessity of properly focusing the rays upon the sensitive plate in order to get a clear, distinct picture. In the camera the focusing is

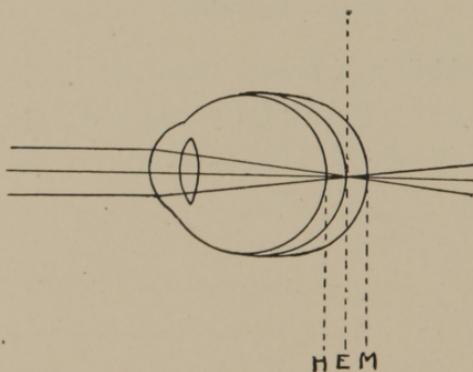


Fig. 15.—Showing length of eyeball in different refractive conditions.

done by moving the lens toward and from the sensitive plate, while in the eye the focusing is done by a change in the focal distance of the lens, brought about by its elasticity and regulated by the ciliary muscle or *muscle of accommo-*

dation, as it is sometimes called. A contraction of the latter muscle relaxes the lens capsule and the lens substance, through its elasticity, assumes a greater convexity, and thereby becomes stronger in its refractive power so that it is enabled to focus rays upon the retina. In other words, 5 the **accommodation** is the power the eye possesses of adapting itself to see objects at different distances distinctly. In looking at distant objects one relaxes his accommodation;

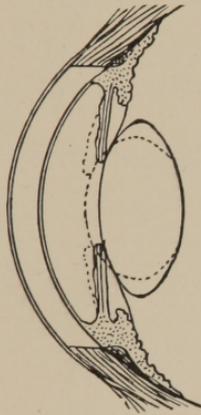


Fig. 16.—Illustrating the act of accommodation.

in looking at near objects he exerts his accommodation, and the rapidity with which the lens successively focuses dif- 10 ferent objects at varying distances is one of the marvels of nature. It can, therefore, be readily seen how the normal or the near-sighted eye, in receiving parallel rays or in looking at distant objects, will require no action on the part of the muscle of accommodation, but in the far-sighted eye 15 this muscle is called into almost constant action. Rays of

light from any object within 18 or 20 feet are more or less divergent, therefore the normal eye is only required to accommodate when looking at objects within that distance, while the far-sighted eye, in order to see distinctly, must
 5 accommodate for all distance. These refractive errors can

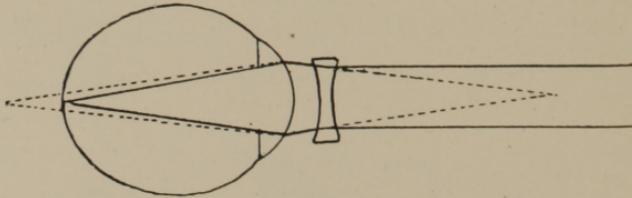


Fig. 17.—Myopic eye with concave lens.

be readily overcome by the adjustment of proper glasses. The kind and strength of glass to be used depends upon the kind and amount of error present; thus, in a near-sighted eye, where the rays are brought to a focus before they reach

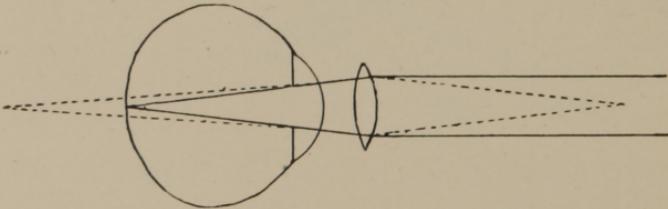


Fig. 18.—Hyperopic eye with convex lens.

10 the retina, a concave glass is used to lengthen their focal distance. For the far-sighted eye, where the rays strike the retina before they are brought to a focus, a convex lens is used to shorten this focal distance, and the strength of the lens necessary in either case depends upon the amount of

shortening or lengthening required to bring the focus upon the retina.

In the early years of life the ciliary muscle, ciliary ligament, lenticular capsule, and crystalline lens respond with alacrity to the slightest need or wish of the individual, but, as the meridian of life is passed, the ciliary muscle and ciliary ligament become less active, the capsule of the lens becomes less elastic, and the lens itself becomes harder, more compact, and less capable of changing its shape to one of greater

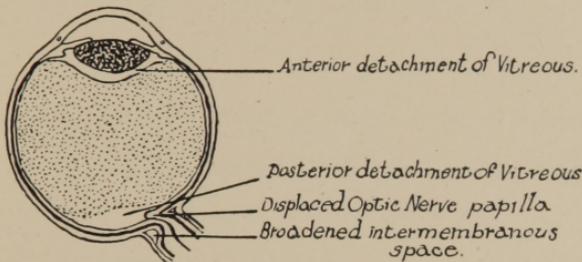


Fig. 19.—Detachment of the retina.

convexity when small and near objects are brought into view, consequently one is compelled to hold the book further away in order to see more distinctly. This condition, which is familiarly known as **old-sight** (presbyopia), comes on very gradually and the use of suitable glasses should not be neglected after the early symptoms of old-sight are noticed. The eye, which is normal in youth, will begin to show old-sight at forty-two to forty-five years of age, and frequently ill health, nervous debility, or constant use of the vision for fine work will hasten it.

Near-sightedness, as a rule, causes very little eye-strain and therefore people with a little or a moderate degree of near-sightedness are apt to go without correcting lenses, but near-sightedness left uncorrected is apt to set up a dis-

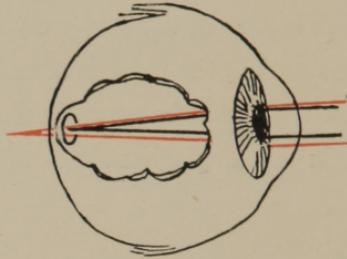


Fig. 20.—Simple hyperopic astigmatism. (Fox.)

5 ease in the interior of the eyeball which is dangerous and sometimes leads to total blindness. The eyeball being elongated unduly, the vitreous is no longer adequate to fill the space it occupies under normal conditions, consequently

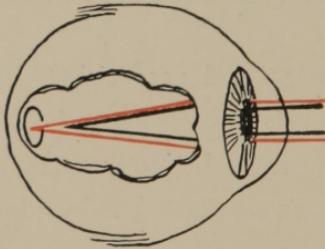


Fig. 21.—Simple myopic astigmatism. (Fox.)

the retina, lacking the support of the vitreous, floats loose
10 from its attachments.

A most peculiar and disturbing defect of the eye is the condition known as **astigmatism**, where there is an inability

of that organ to see vertical and horizontal lines equally well. This curious defect is due to an uneven curvature of the cornea. Instead of being spheric, it is in shape more like

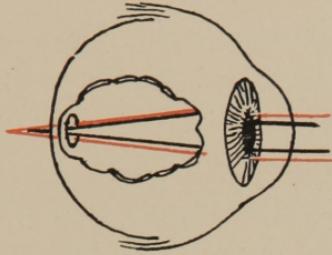


Fig. 22.—Compound hyperopic astigmatism. (Fox.)

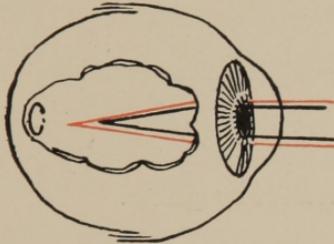


Fig. 23.—Compound myopic astigmatism. (Fox.)

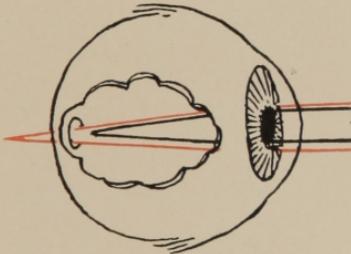


Fig. 24.—Mixed astigmatism. (Fox.)

the bowl of a spoon, thus giving the eye two foci instead of one focus. Astigmatism usually dates from birth, although 5
in some eyes the muscle of accommodation is able, up to a

certain age, to overcome it, and such eyes may not require glasses until the muscle becomes weakened with age or abuse. There are six kinds of astigmatism: first, simple far-sighted astigmatism, in which one meridian of the
5 cornea is of normal curvature, while the one at right angles to it is far-sighted (less curved); second, simple near-sighted astigmatism, in which one meridian is normal and the other is near-sighted (more curved); third, compound far-sighted astigmatism, in which both meridians are
10 far-sighted, but one more so than the other; fourth, compound near-sighted astigmatism, in which both meridians are near-sighted, but one more so than the other; fifth, mixed astigmatism, in which one meridian is near-sighted and the other is far-sighted, and sixth, irregular astigmatism, in
15 which the corneal surface is unevenly curved. This latter form is not correctable by glasses.

CHAPTER IV

HYGIENE OF THE EYE

It is one of the duties of the nurse to help educate the public in matters of ocular hygiene. The proper care of the eye during infancy is of the utmost importance as regards useful vision in after years. Proper cleansing of the maternal passages before the birth of the child and of the child's face and eyes just after birth with antiseptic solutions should not be neglected. An excellent and perfectly safe plan to follow is to first cleanse the outside of the eye with a lukewarm solution of boric acid (gr. 15 ad. oz. j), then drop in a few drops of a 15 or 20 per cent. solution of argyrol, several minutes later cleansing them again with the boric acid. This procedure should be repeated twice a day for two or three days. If, in spite of this precaution, the eyes should become red and inflamed, a physician should be consulted at once, as the child, in all probability, has ophthalmia neonatorum, which disease is responsible for fully two-thirds of the inmates of our blind institutions.

Infants should never be exposed, even in sleep, to the glare of strong light, artificial or natural, and this is particularly imperative when the child is taken out in a carriage with its face looking up toward the heavens. The eyes should then be protected by a parasol lined with some

dark material which will not reflect the sun's rays upon the face. At other times a projecting bonnet or hat will protect them from bright sunshine, and, as soon as artificial light becomes necessary, the child should be put to bed.

5 Never keep a bright light in a room with a sleeping infant, as the sudden exposure of the sensitive retina to the light upon awakening may do irreparable harm. No doubt we would all be amazed and horrified if we were able to estimate accurately the large percentage of unfortunates
10 with defective vision who were made so by the carelessness of incompetent nurses in exposing the eyes of the newborn to too bright a light.

The attention of an infant should not be directed to objects held close to its face, as the development of near-sight-
15 edness or "crossed eyes" may be thereby encouraged.

During the period of teething eye trouble, such as conjunctivitis and phlyctenulæ, frequently occurs by reflex irritation through the dental nerves. Convulsions at this time are a common cause of cataract.

20 The use of the eyes for close work at a tender age, when the tissues of that organ are soft and yielding, is exceedingly hazardous, and for this reason it is not prudent for children to enter school before eight or nine years of age unless their general health is sufficient to endure the strain. Further-
25 more, every child should undergo a thorough examination of the eyes and have all necessary refractive corrections made before entering upon his school duties, for during the critical period of growth eyes which are already defective

are pretty sure to become more so unless the defect is corrected before school life is begun and proper care taken of them during that period. Near-sightedness may be produced by improper or insufficient light, poor print, and the stooping posture while reading or studying. It is astounding how many children develop progressive near-sightedness from this latter cause alone. With the head bent forward and the eyes looking almost straight down instead of ahead, too much blood is forced into the globes and a congestive condition ensues which is prone to cause near-sightedness. 5 10

Half an hour at a time is as long as a child of six or seven should devote his mind to any object, and he should then be allowed to rest. It is also wrong to require any mental work of a child on an empty stomach or immediately after a meal. The act of digestion requires a large supply of blood, 15 and so long as that act is in progress, the rest of the system, the brain in particular, must be comparatively bloodless, and if it be brought into play it diverts a certain quantity of blood from its proper destination and interferes with the due assimilation of the food. 20

The books that are placed in the hands of young children should not be large and heavy, the paper should be white, but not shiny, the letters large, well formed and clearly printed, the spaces between the letters and between the lines relatively wide, and the lines not too long. 25

If the print is small or the light is dim, the book is necessarily brought within a few inches of the eye and the strain of that organ is very great.

While we are considering ocular hygiene, there is one point pertaining to your every-day work which I wish to emphasize in particular, and that is, never allow a patient to read while lying down or while convalescing from disease. At
5 such a time, when their ocular muscles are below par, the same as in their general muscular system, refractive and muscular anomalies of the eye are very easily developed.

CHAPTER V

PRACTICAL OPHTHALMIC NURSING

Eye Drops.—It would seem to be an easy matter to apply drops to an eye, and yet there is a right and a wrong way to proceed. There are various methods employed, depending upon the purpose for which the drops are intended. If a boric acid or a bichlorid of mercury solution is used for 5



Fig. 25.—Instilling cleansing solution.

cleansing, the head should be inclined so that the inner angle of the eye may be filled with the solution, and the patient is instructed to roll his eye in various directions so as to bring all parts in contact with it. The eye is then closed and the solution is absorbed with a pledget of cotton. 10

By having the patient look down and then pulling down the lower lid, a cul-de-sac is formed. This can be filled with a solution which then lies in contact with the whole anterior part of the eyeball. If it is intended that the solution should flow over the cornea the upper lid should be drawn up and away from the eye, while the patient with his head thrown back, looks downward, the cornea being exposed so that the drops may be made to fall directly upon it.

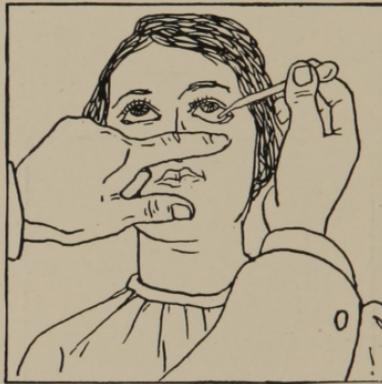


Fig. 26.—Instilling poisonous solution.

When poisonous medicines are used, such as atropin or cocaine, the head should be inclined so that the solution will run away from the tear duct; the patient is requested to look up while the lower lid is pulled down and the required number of drops are instilled near the outer canthus. One or two drops at the most is quite sufficient, as anything in excess of that is wasted, because, as the lid is released, the excess is either forced down the tear duct or over the cheek. These precautions are necessary as the poisonous solutions

may pass down the tear duct into the nose and throat, producing systemic effects.

It frequently happens that a patient is ordered to use both eye drops and lotions. When this is so, it is needless to say that the lotions must not immediately succeed the use of the drops, otherwise there would be a risk of destroying their efficacy. There should be at least an interval of half an hour between the two.



Fig. 27.—Instilling drops in a child's eye.

Sometimes considerable difficulty is experienced in instilling drops into the eyes of children. If requested to open the mouth, the closed lids will be more easily managed. With very small children or babies an assistant is required to hold the child's arms and body, while, with its head in your lap between your knees, the lids can be easily manipulated. The best way, however, in the majority of cases, is to have the child lie flat on its back on the bed, and, while the eyes are closed, the required number of drops are placed into the inner angle of the eye so that the fluid will run into it when

opened. Should the child be too young or refuse to open the eye, the nurse should gently separate the lids with her fingers. Never use violence, for, if the cornea is ulcerated, undue pressure may rupture the eyeball and do irreparable
5 harm. The bottles which contain the medicine may be kept in a warm place or the pipet may be dipped in warm water for a few seconds after filling.

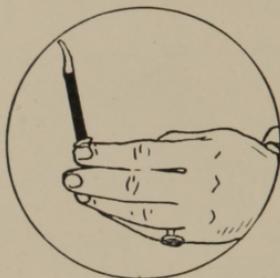


Fig. 28.—Holding the pipet. Improper way. (Theobald.)

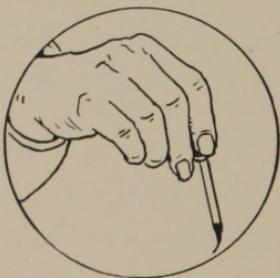


Fig. 29.—Holding the pipet. Proper way. (Theobald.)

The pipet should be sterile and great care should be taken in holding it. It should not at any time, when filled, be
10 turned upside down so that the solution runs into the rubber part, as in that way, especially if the pipet is a new one, many small particles of rubber may be introduced into the

eye. It should not be allowed to come in contact with the patient's lid or eyeball, as it would be possible in that way to transfer infectious material to the solution bottle or from one eye to another. Patients frequently "start" when drops are instilled, therefore it is well to hold the dropper far 5 enough from the eye so that no harm can be done at such a time.

In contagious diseases, such as gonorrhoeal conjunctivitis, a special dropper should be set apart for each case. Another very important point to remember is that a dropper which 10 has been used for a mydriatic, such as atropin, should not

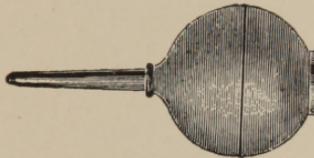


Fig. 30.—The bulb syringe.

be used for the instillation of other medicines, as neglect of this precaution may result in a dilation of the pupil and a blurring of the vision which will cause the patient much needless inconvenience. 15

In some cases where there is a tenacious discharge of mucus or pus, a small rubber bulb syringe may be found more serviceable than the pipet, but in using it great care should be taken not to hold it directly against the cornea or to use too much force. In some cases the so-called eye-cup 20 or eye-bath is desirable, especially where the patient prefers to apply the solution himself. After filling it about a third

full of the solution the head is thrown forward, the cup applied firmly over the closed lids, then the head is thrown back and the eye opened and closed several times, after which the head is once more thrown forward and the cup removed.

- 5 Camel's-hair brushes should never be used to apply liquids to the eye, as they are difficult to keep clean and the danger of infection being transmitted is too great.

Poisonous Solutions.—Children and infants upon whom strong solutions or moderately strong solutions of poisonous
10 drugs are being used should be carefully watched. Some of



Fig. 31.—The eye-cup.

the fluid may pass through the lacrimal passages into the nose, and thence down the throat into the stomach, and set up grave symptoms, the cause of which may be entirely overlooked by anyone unaccustomed to recognize them. This
15 is especially likely to happen with atropin.

Atropism.—If the infant becomes restless and feverish, appears thirsty, and has a dry tongue, be suspicious that it is becoming atropinized. If you continue the drops a red rash will probably appear, and this is sometimes mistaken for
20 scarlet fever. In adults there is less fear of severe constitutional symptoms. They generally notice the dryness

of the throat which it produces and complain of it sufficiently early to prevent a continuance of its use.

Sometimes atropin produces an inflammation of the lids which may even extend more or less over the face, resembling, in many respects, erysipelas.

5

When applications are to be made directly to the lids it becomes necessary to evert them. This little feat is quite difficult in some cases where the lids are swollen and the

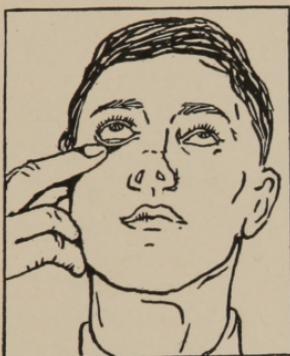


Fig. 32.—Inverting the lower lid.

lashes are nearly or all gone, and yet it is something that every nurse ought to know how to do. To evert the lower 10 lid is simple enough. All you have to do is to stand behind the patient, draw down his lower lid, and have him look up. To evert the upper lid, stand behind the patient and have him look down, at the same time seizing the lashes of the upper lid, drawing it downward and outward, depressing the 15 cartilage with the finger or pencil. During the maneuver care should be taken not to exert pressure upon the eyeball.

Compresses.—Either hot or cold compresses are generally used some time during the course of most eye diseases, and



Fig. 33.—Inverting upper lid with fingers. First step.

the one which is the more agreeable to the patient is, as a rule, the one which does the most good. This rule cannot,



Fig. 34.—Inverting upper lid with fingers. Second step.

5 however, be always relied upon. Both heat and cold exert a favorable germicidal influence. Cold causes contraction of the capillaries, thereby checking the amount of secretion

and exudation, also relieving pain and retarding the formation of pus at the beginning of acute inflammatory conditions. It is especially useful in diseases of the conjunctiva and after slight injuries or operations, but if used too continuously it may interfere with the nutrition of the cornea and cause ulceration of that membrane. In traumatism ice-cold applications overcome inflammatory reaction, and it is a good practice to apply antiseptic iced compresses to every injured eye which enters the hospital and keep it up until the arrival of the surgeon.

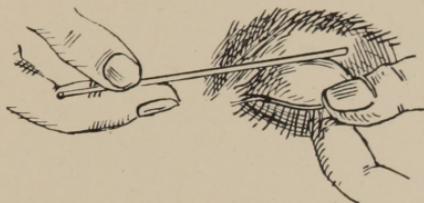


Fig. 35.—Inverting the upper lid with a pencil. (Allport.)

Heat stimulates the circulation, promotes absorption, relieves pain and reduces tension, therefore it is especially beneficial in deep-seated inflammations of the eyeball, such as iritis, cyclitis, and acute glaucoma. Hot packs are of special value in all forms of keratitis. The effect of heat upon the cornea will be readily understood if we but remember that that membrane is non-vascular and is dependent upon the surrounding tissues for its nourishment. The quantity of a drug absorbed and the rapidity with which the absorption takes place is greatly increased by the previous application of moist heat.

Either heat or cold may be applied in the dry or in the moist form, but in the majority of cases better results follow the moist applications, for they possess more intensity of action and penetrate deeper. If dry heat is required, the compress
5 is held in contact with the outside of a can of boiling water for a few minutes, then placed over the closed lids. Moist heat is best applied by soaking pads consisting of seven or eight thicknesses of gauze or flannel, just large enough to

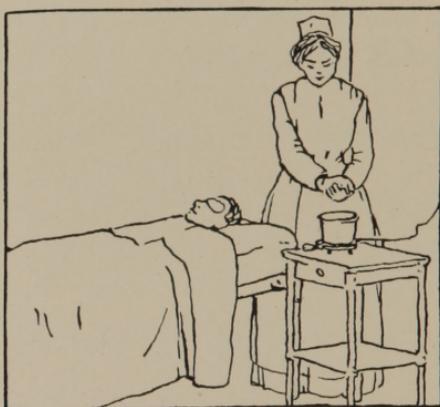


Fig. 36.—Applying hot packs.

cover the eye, in water of the desired temperature, usually as
10 hot as can comfortably be born (115° to 125° F.), and, after testing same on the back of the hand, place it over the closed lids and cover it with a piece of oiled silk or muslin. The pad should be changed quickly and frequently, usually every two minutes. Hot packs are generally used every two
15 or three hours for from ten minutes to half an hour. Sometimes in severe cases they are applied constantly for several hours or more.

In using cold packs several of the gauze or flannel pads are first wrung out in a 1 : 8000 bichlorid of mercury solution and then laid on a cake of clean ice. The change from the ice to the eye is made frequently enough to prevent the packs from getting lukewarm, as the intermittent action of cold 5 is harmful to the eye. Iced packs should not be used as long or as frequently as hot packs; from five minutes to a

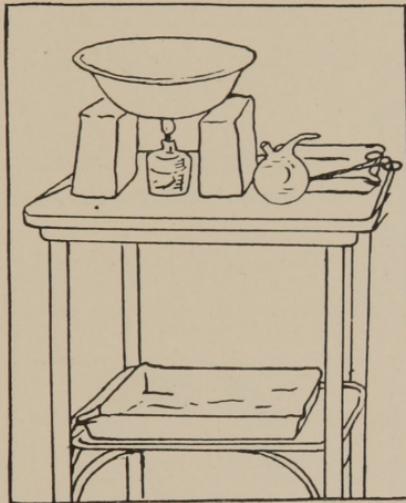


Fig. 37.—Simple method of heating hot packs. (Friedenberg.)

half hour at a time and occasionally for several hours, according to the severity of the case. They should be discontinued if the cornea becomes cloudy. Cold interferes 10 with the nutrition of the cornea, and for that reason cold packs are never used when the cornea is affected. Ice should never be applied to the eye.

In using either hot or cold packs the lids and face around

the eye should be freely anointed with steriline, cold cream, or almond oil to prevent unnecessary irritation of the skin.

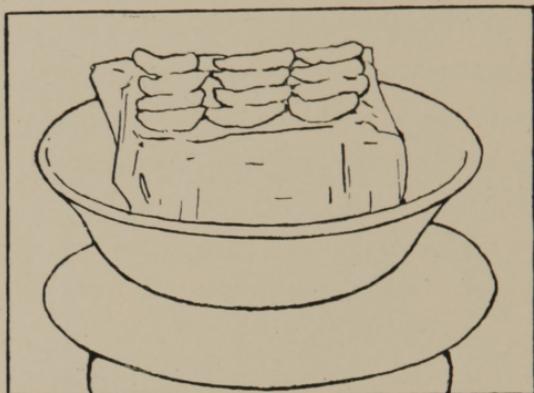


Fig. 38.—Iced packs. (Manhattan Hospital.)

Ointments.—Many eye medicines are used in the form of salve made of vaselin or lanolin. In applying such oint-



Fig. 39.—Applying ointment to the eye.

5 ments to the interior of the eye the best way is to take a wooden toothpick, wind a little absorbent cotton tightly

around one end, so that there are no loose fibers, dip it into the ointment, have the patient look up, at the same time pull down the lower lid, and roll the ointment off the cotton on to the conjunctival surface. After the introduction of the ointment the lids should be vigorously massaged, taking 5 care that the fingers do not enter between them and injure the eye. All superfluous ointment should then be wiped away.

Powders, such as iodoform, calomel, and orthoform, are sometimes dusted into the eye. This is best done by dipping 10 a wooden toothpick, which is armed with loose absorbent cotton, into the powder, and, while separating the lids, shake it off the cotton into the eye by striking the toothpick with the forefinger.

Poultice.—The poultice is the greatest abomination in 15 eye practice. I have seen poultices on the eye composed of tea leaves, scraped potatoes, rotten apples, and many other things, whose results are equally or more disastrous. There is not a single condition of the eye in the treatment of which poultices should be prescribed. 20

Massage.—There is perhaps no organ of the body whose vascular and lymphatic circulation is more readily affected by well-regulated massage than is the eye. Besides increasing the circulation of the blood and lymph, it stimulates muscular action, promotes absorption, reduces tension, and re- 25 lieves pain, and is, therefore, of special value in chronic diseases of the lids and conjunctiva, in corneal opacities, granulated lids, and subconjunctival hemorrhages. By it ab-

sorption is also stimulated and intra-ocular tension temporarily reduced, but it is contraindicated in all conditions



Fig. 40.—Massage of the upper lids. (Friedenberg.)



Fig. 41.—Massage of the lower lids. (Friedenberg.)

in which its use is followed by redness of the eye, the increased flow of tears, and sensitiveness to light. It consists of gentle stroking movements made upon the closed

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eyelids with the fingers in centripetal, centrifugal, and circulatory directions. In massaging the upper lid and the upper part of the eyeball the patient is directed to look down, and in massaging the lower lid and the lower part of the eyeball he is directed to look up. If the cornea is to be treated, the patient is instructed to look straight ahead. In no instance should undue pressure be exerted upon the eyeball. Ocular massage may be administered from one to four times a week for from three to four minutes at a time.

Electricity, both the galvanic and the faradic, is frequently employed in spasmodic or paralytic affections of the external ocular muscles, in supra-orbital neuralgia, in progressive atrophy of the optic nerve, hysteric affections of the eye, etc.

The positive pole has a calmative action and the negative pole a stimulant action, therefore the one which is applied over the eye depends upon the effect desired. The other pole is generally applied to the nape of the neck. Usually from 3 to 5 milliamperes for five minutes every day or two will suffice. Electricity in the form of the galvanocautery is sometimes used to destroy diseased tissue and check the progress of corneal ulcers. This method, however, is hardly as safe as the actual cautery, as it is less easily controlled.

Leeching.—Many deep-seated inflammations of the eye, like iritis and cyclitis, with sluggish circulation and severe pain, are benefited by the local abstraction of blood, which diminishes the tension upon the vessels and nerves and promotes absorption, therefore it behoves the nurse to be

thoroughly acquainted with the method of applying leeches. Norwegian leeches are usually the best. They absorb from 1 to 2 drams of blood a piece and should be tested before applying. If all right, they will generally assume an egg shape when touched and will swim around lively when placed
5 in cold water. Before applying them they should be placed in clear cold water and handled as little as possible. After the temple has been washed clean and a drop of milk placed upon it, $\frac{3}{4}$ inch behind the external angle of the eye, the leeches are
10 taken, one at a time, out of the cold water by means of a pair of plain dressing forceps and placed in a homeopathic

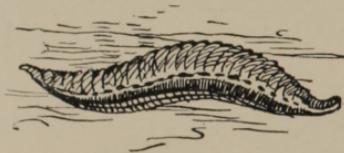


Fig. 42.—The leech.

phial, which is held so that the leech will touch the milk. If unsuccessful in making it bite, a drop of blood brought by scratching the temple with the point of a scalpel or taken
15 from a pin-pricked finger, may serve as better bait. When leeches have their fill, they will drop off, or if, for any reason, you should desire to remove them sooner, a pinch of salt or a little saleratus, or even a couple of drops of cocaine solution will usually suffice to dislodge them. As a
20 rule, one or two leeches do very little good; at least six should be employed, or, better still, one leech may be used and that followed by the application of the artificial leech,

which I have found to be a very satisfactory method of depletion, as in this way we avoid the pain caused by the mechanical scarifier and extract the blood more rapidly and at less expense than where leeches alone are employed. If continued bleeding is desired, this may be accomplished by the application of hot fomentations. If continued depletion is not desired, a firm pressure bandage is necessary, as bleeding of the natural leech bite is often quite difficult to check in any other way. Occasionally I have succeeded in dispensing

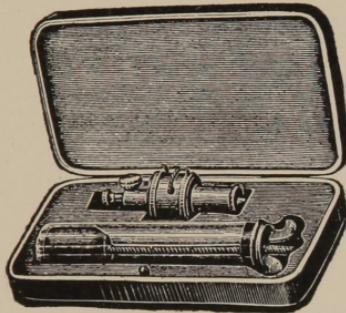


Fig. 43.—The artificial leech.

with the bandage by applying a pledget of cotton soaked in adrenalin chlorid or chlorid of iron and exert pressure for a few minutes. It is perhaps well to try this method first, as the pressure bandage is anything but comfortable to the patient. One should rest several hours after leeching.

Counterirritants, such as tincture of iodine or cantharides, are sometimes applied at some distance from the eye for the purpose of reflexly influencing the affected parts. When counterirritation is desired the iodine or a small piece of mustard leaf may be placed behind or in front of the ear or on

the forehead and allowed to remain there for twenty minutes. The next day it is placed in another of the three positions named, and on the third day in the remaining one, so that on the fourth day the place originally selected will be fit for
5 the reception of a new piece. This form of blistering is very efficacious and the degree of severity is easily controlled.

Mercurial Inunctions.—One of the most important measures of general treatment in many eye diseases is the mercurial inunction, followed, in specific cases, by increasing
10 doses of potassium iodid. For inunction we generally use the ordinary blue mercurial ointment either alone or combined with an equal part of green soap. After washing and drying the skin, 20 to 30 grains of this mixture may be patted on until it has disappeared. The parts usually selected for
15 this operation are the inner surfaces of the thighs and the under surfaces of the arms, taking a different location each time to avoid blistering. This procedure is repeated usually once a day until about 3 ounces of the ointment have been used unless symptoms of ptyalism, such as soreness of
20 the teeth and gums or increased flow of saliva, are noticed. Proper care should be paid to the patient's teeth during the use of the mercurial inunction and the nurse should protect herself against absorption by the use of rubber gloves. Many intra-ocular affections even of a non-specific nature, such as
25 iritis, cyclitis, and the various forms of sympathetic ophthalmia, are also benefited by these inunctions, while the iodids of potash and soda are valuable adjuncts in chronic affections of the choroid and vitreous.

Sweating.—Another important means of treatment in certain ocular diseases is diaphoresis or sweating. It is particularly indicated where the absorption of an exudate or relief of active congestion is desired, but is contraindicated in certain organic heart affections. Diaphoresis is best obtained by the administration of pilocarpin hydrochlorate ($\frac{1}{30}$ to $\frac{1}{6}$ grain hypodermically), beginning with small doses and increasing according to the results obtained. Hot drinks, blankets, hot mustard foot-baths, and hot-water bags are valuable adjuncts. This treatment should be administered on a comparatively empty stomach, and, after sweating for two hours, the patient should be thoroughly dried, then rubbed with alcohol, and afterward allowed to rest.

Rest.—The eye in waking moments is always under the influence of the sensory stimuli, and is consequently more or less active. Therefore eye patients more than others require plenty of sleep. If sleep is disturbed it is necessary to give remedies to induce it, such, for instance, as sulphonal (10 to 30 grains dissolved in a little hot water), several hours before bedtime; codein, gr. $\frac{1}{4}$; chloral, 10 to 30 grains in simple syrup and water, etc. Darkness does much to rest the eyes, and most eyes will do better in a room in which the amount of light has been properly regulated. In some cases a binocular bandage will answer the same purpose. The involuntary muscles of the eye may be put at rest by the use of mydriatics in the proper cases. Rest of the eyes is not necessary in ophthalmic cases only, but all patients con-

valescing from sickness of any kind should use their eyes as little as possible, especially while lying down.

Contagious Eye Diseases.—All eye diseases with a discharge are more or less contagious. The more abundant
5 the discharge and the more it resembles pus in its appearance, the more contagious it is. It has been proved that under certain conditions contagious eye diseases may be spread through the medium of the air. Purulent cases should be isolated as far as possible, each patient having his
10 own washing utensils, towels, etc., and a room which has been used for a purulent case should be disinfected before it is used for other cases. The nurse, when treating such cases, should wear goggles; she should keep her finger-nails closely clipped and afterward thoroughly brush her hands
15 with soap and cleanse with antiseptic solution before wiping. In case the nurse's eyes should become infected, prompt action should be taken. The lid should be everted, cleansed with a 1 : 8000 bichlorid of mercury solution, dried, and then painted with a 2 per cent. solution of silver nitrate,
20 followed by the use of cold compresses. These precautions, if carried out at once, will probably prevent further mischief.

In purulent diseases limited to one eye it is important to prevent spreading of the discharge to the other eye or infection by means of the patient's hands. The patient should
25 lie on the affected side as much as possible so that the matter may flow away from the other eye and, after being first anointed with iodoform ointment (1 part to 8), the good eye should be sealed with a Buller's shield made from a watch

crystal and court plaster, leaving the temporal side open, so as to admit air. This shield may be worn several days at a time without change unless, as sometimes happens, the skin beneath the plaster becomes eczematous, in which case it must be discontinued.

5

With infants, where it is difficult to keep on a Buller's shield, the eye may be covered with a piece of combined dressing, just large enough to cover the lids, which has



Fig. 44.—Buller's shield. (Jaefreson.)

been previously soaked in a bichlorid of mercury solution (1 : 10,000) and allowed to dry. Over this is placed a piece 10 of gutta-percha tissue large enough to cover the brow and part of the nose, reaching fairly well down on the cheek. This tissue is securely fastened down on all sides except the temporal with narrow strips of adhesive plaster. This dressing should be removed daily and the eye inspected. 15

The most common purulent affection of the eye is that

which is known as *ophthalmia neonatorum*, a disease which statistics show is responsible for fully 30 per cent. of the blindness in the United States. It usually appears on the third or fourth day after birth and is due to infection during
5 birth from a leukorrhoeal or gonorrhoeal discharge. The severer forms are due to the gonococcus, which germ is capable of producing such rapid destruction of the ocular tissues that little time is required for the disease to secure such a hold that the best of treatment will be of no avail in pre-
10 venting blindness. The discharge reaches its maximum about the end of the second week and after that period begins to decline, but too often only after irreparable mischief has been inflicted in the eye. In severe cases the disease runs a violent and rapid course, unchecked by any
15 remedies, and quickly destroys the eye.

The warmth and moisture of the eye make it a favorable ground for the growth of micro-organisms. The presence of a discharge, especially of a purulent nature, greatly favors the invasion and growth of bacteria, consequently the im-
20 portant feature in the treatment of purulent cases is cleanliness. The eye should be kept constantly and thoroughly free from accumulations of pus by frequent antiseptic irrigations. All pus should be washed away with boric acid solution as soon as it forms. This may have to be done in the
25 acute stages as often as every fifteen minutes, and is best accomplished by means of a small soft-rubber bulb syringe. More depends upon this procedure for the cleansing effect than from any practical action of the antiseptic solutions

used, for the latter could not be used in sufficient strength to have any pronounced germicidal effect without injuring the ocular tissues. Such solutions are, however, preferable to plain sterilized water. The author's irrigator is most convenient and useful in these cases. In shape it is similar 5 to an eye speculum and is introduced in the same way. It is made of thin tubing, so that the fluid passing through the distal end, which is connected with a fountain syringe, finds its exit through a series of small holes in the parts which pass beneath the lids. By elevating the handle the lids 10 may be drawn away from the eyeball and the whole of the bulbar and palpebral conjunctiva is freely flushed.



Fig. 45.—The author's irrigator.

Ophthalmia neonatorum can usually be prevented by the instillation of a 1 per cent. solution of silver nitrate or a 20 per cent. solution of argyrol into the baby's eyes immediately 15 after birth. The latter medicines should be used in the eyes of every newborn baby regardless of circumstances. Personally, I do not favor such measures as dropping upon the delicate cornea of a baby's eyes a 2 per cent. or even a 1 per cent. solution of silver nitrate. The use of silver nitrate 20 is by no means the ideal prophylaxis, neither is its instillation into the eye the ideal treatment for ophthalmia neonatorum, as it causes some pain and usually more or less conjunctivitis. There has been reported several cases in which its use has

been followed by corneal ulceration. If there is any reason to expect infection, a 10-grain solution of nitrate of silver might be advantageously employed by brushing the same over the mucous membrane of the everted lid, but I would
5 hesitate long before dropping a caustic solution of such strength upon the delicate cornea of a newborn babe.

I do, however, recommend the use of argyrol, which is nearly as effective in preventing and aborting the disease and seldom causes any local irritation. The procedure should
10 be practised as follows: As soon as the child is delivered the face is cleansed. This may be done with absorbent cotton and sterilized water, boric acid solution, or bichlorid of mercury solution 1 : 10,000, thus removing all secretions from outside the lids and lashes. The lashes are then
15 separated and the eye flushed out with a saturated solution of boric acid and a few drops of a 15 to 25 per cent. solution of argyrol dropped in. This treatment should be followed up for several days unless symptoms of the disease have by that time developed, in which case it is continued until the
20 eyes are well.

CHAPTER VI

ANTE-OPERATIVE CARE

THE well-known rules of asepsis and antisepsis which apply to general surgery are, with slight modification, applicable to eye work, and failure on the nurse's part to observe these rules when preparing a patient for an operation or when assisting in the operation and during the postoperative care would be criminal negligence. 5

A cheerful, sympathetic, and observing nurse may do much to encourage the patient and aid the doctor. The more information she can impart to the surgeon concerning the patient, with whom she is in daily contact, the more valuable will her assistance be to him, therefore she should keep strict watch for anything that is abnormal, noting the peculiarities and idiosyncrasies of the patient, her habits as regards eating, drinking, and sleeping, or the taking of narcotics. Also whether or not there are any little ailments, such as cough, cold feet, flatulence, weakness of the bladder, skin trouble, etc. She should also note the condition of the bowels, whether or not the patient is pregnant or menstruating, and should make a memorandum of everything of importance for the surgeon. 15 20

She should win the confidence and respect of the patient, quiet all anxiety, and encourage her as much as possible to expect a favorable result, and thus avoid the depressing

effect of despondency and its ultimate tendency to surgical shock.

The nurse should know beforehand the nature of the operation to be performed in order that she may thereby suitably
5 prepare the patient and the operating room, providing appropriate dressings, solutions, etc., as well as have some idea of what particular kind of attention the patient will require after being put to bed.

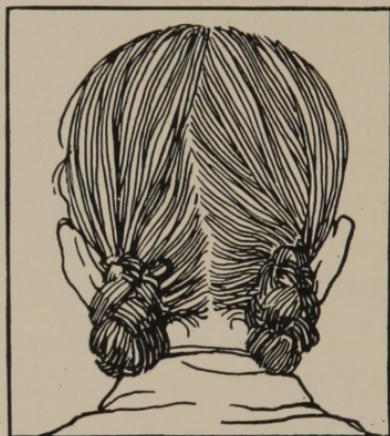


Fig. 46.—Method of dressing the hair. (Jaefferson.)

In all major operations where the eyeball is to be opened
10 it is well for the patient to go to bed the day before the operation, after first having a thorough general bath, special attention being paid to the head and face. Men should be previously shaved and women should have their hair dressed in a suitable and convenient form so that it may be
15 out of the way and remain untouched for several days. After being combed well it should be parted at the back

and divided into two portions, each of which is tightly braided and tied with a ribbon, then rolled and fastened with safety-pins in a convenient roll in the hollow of the neck. The lashes of the eye to be operated upon should be carefully and closely trimmed with a pair of small curved scissors, great 5 care being taken that none of the hairs get into the eye.

In some cases it is also necessary to trim the eyebrow. Carefully wipe away all loose hairs, then thoroughly wash the eyebrow, lids, lashes, and adjacent part of the face with green soap and sterile water, afterward thoroughly rinsing 10 it with sterile water and 1 : 10,000 bichlorid of mercury solution; also flush the eye with the latter solution and then apply a combined dressing and a bandage.

The *diet* should be fluid unless otherwise ordered. A purgative should be administered on the night before the opera- 15 tion, and on the following morning, if the desired result has not been obtained, an enema of soapsuds and glycerin should be given. One hour before the operation the dressings should be removed, the eye again flushed with bichlorid of mercury solution, 1 : 10,000, and any other medicine or- 20 dered by the surgeon instilled, after which new dressings are applied. The nurse should not fail to observe the appearance of the dressings removed, and if there is any evidence of discharge on them from the eye she should report the fact to the surgeon at once. 25

Just before the patient is taken to the operating room his bladder should be emptied, if he has artificial teeth they should be removed, and he should be clothed in suitable

antiseptic attire, a sterile night gown and a rubber cap which covers the ears and all the hair. Some operators prefer to give the patient a suppository of opium or some other anodyne just before going to the operating room, especially if
5 he is inclined to be nervous.

When the operation is to be done at the patient's home the nurse should be there at least a day before, and in selecting a room for the operation its size and the facilities for ventilating and lighting should be carefully considered.
10 If artificial light is necessary the electric light with a good reflector is by far the most preferable, especially where a general anesthetic is to be employed, as the vapor of ether is highly inflammable, and chloroform, when administered in a room with a gas or oil flame, will produce fumes which
15 are exceedingly irritating and even dangerous to all in the room.

All the hangings and movable articles should be removed and the room thoroughly cleaned at least twenty-four hours before the operation. If only a few hours' preparation is
20 available, however, nothing in the room should be touched nor should any sweeping or dusting be done, but the floors and everything, as far as possible, should be covered with sheets wrung out in a 1 : 10,000 solution of bichlorid of mercury.

25 **Operating Table.**—A kitchen table covered with a folded blanket, a rubber sheet, and a clean linen sheet may be used as the operating table, and it should be placed so as to insure good light on the proper side and be most convenient for

the operator. Three small tables should also be provided, two for the surgeon and one for the anesthetist. These are, of course, to be covered with sterile towels. Upon one should be placed the instruments; upon the second, the solutions, cotton, torpedoes, and small gauze sponges; while upon the 5 third should be an ether cone or chloroform mask, several small towels, some large gauze sponges, the anesthetic, a hypodermic syringe loaded with $\frac{1}{100}$ grain of nitroglycerin and $\frac{1}{60}$ grain of strychnin.

The nurse should ascertain on which side the surgeon is to 10 stand while operating so as to arrange the tables accordingly.

Other things to be provided are a stool for the operator to sit on, if he wishes to, sterile gown and cap for the operator, sterile droppers and several small glasses or deep dishes for the solutions, which are usually bichlorid of mercury, 15 1 : 10,000; adrenalin chlorid, 1 : 3000; normal salt; cocain, 4 per cent.; eserin, $\frac{1}{2}$ gr. to the ounce; atropin, 1 per cent., and a saturated solution of boric acid.

In an adjoining room preparations should be made for the surgeon to sterilize his hands. Here should be nail picks and 20 brushes, green soap, sterile towels, and whatever solutions he prefers for his hands, usually bichlorid of mercury 1 : 1000 or carbolic acid 1 : 20, and sterile water.

Previous to the operation the nurse should see that the *patient's bed* is properly prepared. It should be accessible 25 from both sides, a folded sheet or bath towel should be placed where the head is to rest, with a rubber sheet under it to protect the bedding. If a general anesthetic is to be used

the bed should be warmed by hot-water bottles, no matter what the climatic conditions may be, for the patient's resistance is always lowered by the anesthetic. Be sure, however, that the bag is not too hot, as many malpractice suits have
5 originated from burns thus produced. All of these preparations should be completed at least an hour or two before the surgeon's arrival and without unduly attracting the patient's attention.

It must be remembered that the *instruments* of the oculist,
10 especially the cutting ones, are the most delicate used in



Fig. 47.—Using the test-drum.

surgery. They must have such an edge that when lying on the palm of the hand they will perforate the test-drum by the force of their weight. Their edges and points are, therefore, so easily blunted that they require the most careful
15 manipulation. Boiling them too long, leaving them in formalin too long, wiping them carelessly with cotton or touching the points with the fingers will injure them.

All but the cutting instruments and those with ivory handles should be scrubbed with a tooth-brush in soap and
20 water, then sterilized by boiling for ten minutes in a solution of bicarbonate of soda (1 dram to 10 quarts of water),

after which they are immersed in alcohol for a few moments, and finally rinsed in sterile water.

The cutting instruments should first be tested on a test-drum, which consists of a piece of beetle skin or thin kid tightly stretched between two hard-rubber rings, very much 5 in the way linen is stretched for working. They should then be held in boiling water for a quarter of a minute, then placed in formalin (1 : 10) for a couple of minutes, then in alcohol for five minutes, and finally rinsed in sterile water, and carefully wiped with soft linen. Do not wipe with cotton or 10 some of the fibers may cling to the instrument and be in-

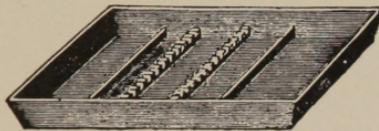


Fig. 48.—The instrument tray.

roduced into the eye. To make sure that such a mistake may not occur it is well to examine each one with a magnifying glass. Never touch the points or allow them to come in contact with other instruments, therefore it is well to use 15 the glass tray which is made purposely for them. This tray has a series of grooves which support the handles of the instruments while the blades are free. All other instruments may be placed on towels which have been previously wrung out in a 1 : 20 carbolic solution. 20

All solutions should be previously prepared with sterilized or distilled water and, if convenient, it is better to have them lukewarm. When the operation is to be performed at the

patient's home it is a good idea to have all solutions in bottles, each one being labeled and sealed with a slip of paper, which is not to be broken until needed, at which time a sterile dropper is put in each one and placed where it can
5 be easily reached by the operator.

The sterilization of *dressings* and *bandages* is a procedure with which you are all acquainted. Here the principal point to remember is that dry heat is much less efficient as a germicide than steam on account of its inferior penetrating
10 power. For this reason it is better to steam them first, then dry them.

The usual dressings after eye operations are small linen disks or eye-pieces, torpedoes of absorbent cotton, and gauze bandages 2 inches wide and from 4 to 6 yards long.

15 When we stop to consider that the surgeon, in doing operations upon the eye, seldom touches the parts with his hands, but that the nurse is obliged to handle sponges, dressings, etc., we can realize how necessary it is for her to have her hands in an absolutely sterile condition.

20 After carefully cleansing and paring the nails, the hands and arms should be thoroughly scrubbed with green soap and hot water, then thoroughly rinsed in sterile water, and finally in a hot bichlorid of mercury solution 1 : 3000 or a 1 : 20 carbolic acid solution and wiped with a sterile towel. When a
25 bichlorid of mercury solution is used it is well to remember that this germicide is readily precipitated by soap, hence it is necessary to thoroughly rinse the hands with the sterile water before immersing them in the bichlorid solution

CHAPTER VII

IN THE OPERATING ROOM

THE operator is dependent to no small degree upon the efficiency of the nurse who assists him. When the patient is brought into the operating room she should remove the dressings, cover the rubber hood with a sterile towel, passing it under the nape of the neck and fastening it with a safety- 5 pin over the forehead, so that the ends can be brought back and tucked in under the occiput. The eye should then be flushed both inside and outside with a 1 : 10,000 bichlorid of mercury solution, then with normal salt solution, after which it is anesthetized. 10

The nurse should familiarize herself with the technic of the various operations, and should pay strict attention to the successive steps, so that she may anticipate the surgeon's need and have each instrument ready and at hand almost before it is asked for. She should never lay instruments upon 15 the operating table, but should hand them directly to the surgeon.

If the temperature of the operating room is above 72° F. a second nurse should stand ready with a towel to dry the forehead and face of the operator, to prevent the possibility 20 of drops of perspiration falling on the operative field.

Dressings.—After the completion of the operation the nurse should stand ready to apply the dressings. If the

operation is one which requires opening the eyeball, like cataract extraction or iridectomy, both eyes are first covered with the so-called Knapp dressing, which consists of absorbent



Fig. 49.—The Knapp dressing (single).

cotton about $\frac{1}{4}$ inch thick between two pieces of soft linen so
5 shaped as to nicely cover each eye, joined by a narrow



Fig. 50.—The figure-of-8 bandage.

bridge across the nose. These pads are first smeared with steriline and then laid over the eyes and fastened down with narrow strips of adhesive plaster. Then the figure-of-8 ban-

dage is applied, so called because being brought alternately around the head and diagonally up over each cheek and eye, so that every turn overlaps the preceding one, it resembles in shape the figure after which it is named.

For operations which do not require opening of the eye- 5
ball the monocular bandage is used. This is applied by passing it alternately across the eye and under the ear, then across the eye and over the ear.



Fig. 51.—Monocular bandage.

Eye bandages are usually applied for one of two purposes—for pressure or for protection. The former is ap- 10
plied to check bleeding after removal of the eye, to prevent ecchymosis of the blood after muscle operations, etc. The latter is used to keep the lids immovable after such operations as cataract, and if too tight may do irreparable harm. In applying it, however, the nurse should take care to fill the 15
hollow of the orbit with bits of cotton until a level surface is obtained so as to avoid unequal pressure on the eyeball, and 1-inch safety-pins should be employed instead of com-

mon pins, placing one over the forehead, one on each side, and one in the back. Should a protective bandage at any time seem uncomfortably tight to the patient, the nurse should cut a slit about $\frac{1}{2}$ inch across it just under or both
5 under and above the ears. Should it become disarranged and the surgeon is not accessible, the nurse should remove it, and, without disturbing the lids in the least, should re-bandage, taking special care not to get it too tight. A very good idea in some cases is to apply splints to the patient's
10 elbows, which prevent him from interfering with the bandage. Should discharge or blood show through a pressure bandage, the nurse should sprinkle iodoform over it and apply another bandage, as organisms can very easily work their way along a tract from which discharge has washed
15 away and exhausted the original antiseptic. If such a procedure fails to check the hemorrhage, the surgeon must be informed.

If the operation has been done under a local anesthetic, especially for such operations as cataract or iridectomy,
20 care should be taken in *removing the patient from the operating table*. He should be instructed to stiffen his body, relax the neck, and hold the mouth open while being moved.

If the operation has been done under a general anesthetic the anesthetist should remain with the patient until the
25 nurse has had time to remove the floor coverings, soiled sponges, and all traces of the operation as far as possible, as it would be unwise to permit any member of the family to do this. A fresh gown should be kept ready in case the first

one is soiled. Before putting away the instruments wash them with soap and water and dip them in absolute alcohol. This speedily evaporates and leaves them perfectly dry.

All tissues, tumors, etc., removed by the surgeon must be carefully preserved, placed in a small wide-mouthed bottle, 5 filled with preserving fluid (alcohol or formalin 1 : 10), and labeled with the patient's name, the surgeon's name, and the date of operation.

CHAPTER VIII

POSTOPERATIVE NURSING

No matter how skilful an operator may be, his efforts will be fruitless and his ability frustrated unless the subsequent management of his cases is carefully and intelligently carried out. An injudicious movement, as getting out of bed
5 for purposes of nature, a cold draft from a window or door, a single rough manipulation of the eye while dressing it, may ruin the most carefully performed operation, destroying the eye, or perhaps, with less disastrous results, prolonging the treatment for weeks or months. Therefore it is evident how
10 much depends upon the care and watchfulness of the nurse in charge, and upon her ability to meet every emergency.

After general anesthesia the patient should be watched constantly for awhile, because, in his semiconsciousness, he may tear off the bandages or injure the eye. The nurse
15 should keep the patient as still as possible and should exclude friends and members of the family from the room, at least until the intoxicating effects of the anesthetic have worn off.

The room should be properly heated and ventilated without any draft over the bed. This can usually be avoided by
20 dropping the window slightly from above or by placing a large screen between the window and the bed. Many cases of iritis following iridectomies and cataract extraction have resulted from such exposure.

Patients with both eyes bandaged should not be allowed to feed themselves or to take a single step without guidance.

The temperature should be taken at least twice a day. A slight rise in temperature just after an operation is to be expected, but a sudden rise after it has been running a 5 regular course or a subnormal temperature should be promptly reported to the surgeon.

For a few hours following an iridectomy or a cataract extraction the patient will complain of a slight burning pain. Any marked pain should be reported to the surgeon at once. 10 Sometimes elevation of the head by an extra pillow, thus relieving some of the blood-pressure, will lessen the pain. It is a safe plan to administer $\frac{1}{4}$ grain of codein every three hours for several doses.

If there is evidence of a chill or sudden weakness, place 15 hot-water bottles to the feet, elevate the head of the bed, and give stimulants.

If the patient feels disposed to sneeze he should be advised to press his upper lip forcibly against the upper teeth. If there is a tendency for the patient to vomit, lower the head 20 by removing the pillow, fan him and give him some ice to suck, a little lemon-juice, beaten white of egg, or milk and lime-water; also apply a mustard plaster over the stomach. If the patient does vomit, the nurse should support his head, taking care not to exert any pressure over the bandage, and 25 after vomiting the mouth should be rinsed out with some antiseptic solution such as listerine.

Shock seldom follows operations on the eye, but when it

does occur the nurse should be able to recognize it and know how to meet it. The symptoms of shock are dilated and sluggish pupils, irregular, weak pulse, a clammy, cold skin, nausea or vomiting, and a loss of control of the bowels or
5 bladder. At such a time the patient's head should be lowered, the lower extremities bandaged, hot water applied, and an enema of black coffee and brandy administered.

As a large percentage of the operative eye cases consist of cataract extractions, and as the results in such cases de-
10 pend so much upon their postoperative care, it might be well to devote a little time to this specialty.

If suppuration, iritis, or prolapse of the iris takes place during the care of a patient who has been successfully operated on for cataract it is natural to suppose that there has
15 been some lack of skill or attention on the nurse's part, therefore she must be constantly on guard to prevent the patient from moving about in bed, touching the bandage, or lifting the head.

The first twenty-four hours after a cataract operation is
20 of the greatest importance. During that time, in healthy and vigorous patients, the corneal wound will become securely closed, the anterior chamber re-established, and all danger of prolapse of iris or vitreous passed, therefore during that time the patient should lie mostly on his back with
25 his head moderately elevated. If he is restless or finds his position too irksome the nurse should gently roll him over on the non-operated side and support his back with a pillow or two.

During the first few days no food should be given which requires masticating, but fluids should be taken through a tube. A cathartic having been given on the day preceding the operation, no solid food having been taken, and codein having been administered, there is not likely to be any 5 evacuation of the bowels for two or three days following the operation, at least such may be hoped for, as the straining which usually accompanies defecation is liable to cause prolapse of the iris through the corneal wound. For this reason cathartics should never be administered to cataract cases 10 within three days after operation.

Some elderly patients have difficulty in urinating while lying down. In such cases apply hot compresses over the bladder or pass a catheter.

If the patient persists in interfering with the bandage, 15 splints should be placed on the elbows so as to make it impossible for him to get his hands up to his eyes.

Many cataract cases suffer depression resulting from the occlusion of both eyes and from anxiety over the results of the operation. This may be warded off by the nurse 20 reassuring them, reading to them, and in every way diverting their attention from their affliction.

Usually on the fifth or sixth day the bandage is removed from the non-operated eye. At this time the nurse should see that the room is darkened and that the window shade 25 is not allowed to blow back and forth by the wind, so that flashes of sunlight enter. On the seventh or eighth day the operated eye is uncovered, and during the following two or

three days the room is made gradually lighter until the patient can stand ordinary daylight, at which time he is allowed to go home.

Following cataract operations rigid antiseptic precautions should be observed each time the eye is dressed, therefore the nurse must see to it that when the surgeon calls every-
5 thing in the line of sterile solutions and dressings are prepared. Cut the bandage and remove all but the pads next to the eye. These should be left for the surgeon to remove

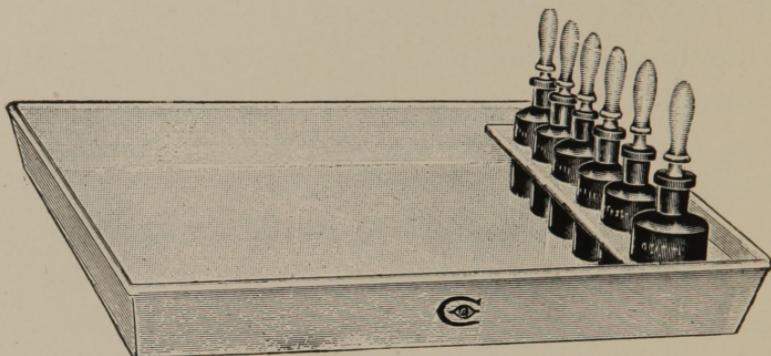


Fig. 52.—The eye tray.

10 himself, as their condition, whether soiled or not, is an indication of the patient's progress. Place a sterile towel under and over the patient's head and have your eye tray ready, with its contents carefully arranged, so the surgeon can quickly place his hands on anything he
15 wants, and always make sure that the tray contains the following articles: torpedoes of absorbent cotton (long fibered); medicine-droppers; wooden toothpicks; eye-pieces of combined dressing (single and double); adhesive plaster;

bandage (2 inches wide); small pus basin; atropin solution (1 per cent.); cocain solution (4 per cent.); eserin solution ($\frac{1}{2}$ grain to the ounce); silver nitrate 2 per cent. (in blue or amber bottle); safety-pins; tube of steriline; sterile towels; bandage scissors; probe; dressing forceps, and a candle. A 5
warm solution of boric acid (saturated) and hgd. bichlorid (1 : 10,000) should also be freshly prepared.

CHAPTER IX

OPHTHALMIC MATERIA MEDICA

WE will very briefly consider the use, action, and preparation of some of the medicines used in ophthalmology. By "some" I mean those only which are used in every-day practice. These we will consider alphabetically, after first defining the different classes under which most of them belong.

Local anesthetics are medicines which paralyze the sensory nerve-endings of the part to which they are applied and produce a loss of sensation in that part. The large majority of ophthalmic operations are performed under the influence of some local anesthetic.

Among the agents of this group are alypin, cocain, eucain, holocain, and novocain.

Analgesics (local sedatives) are remedies which diminish the nervous and vascular irritability or excitement by reducing the functional activity of the part to which they are applied. They, consequently, relieve local inflammation and pain. Only those that are used for their local action will be mentioned in this book.

They are atropin, belladonna, camphor, cocain, dionin, duboisin, eserin, homatropin, hyoscin, lead acetate, opium, pyoctanin, and scopolamin.

Antiseptics are remedies which destroy, arrest, or restrict the growth of pathogenic micro-organisms and neutralize or

destroy the toxic products of these micro-organisms. They are, consequently, useful after operations or injuries, to prevent infection, also in the treatment of those diseases of the eye which are due to the presence of micro-organisms, and for the sterilization of the hands, dressings, instruments, etc. 5

Actol, alum, argentamin, argonin, argyrol, aristol, boric acid, calomel, camphor, carbolic acid, chlorin-water, formalin, glycerin, iodine tincture, iodoform, mercury bichlorid, mercury cyanid, resorcin, salicylic acid, silver nitrate, sodium bicarbonate, sodium borate, tannic acid, zinc sulphate. 10

Astringents are remedies which cause contraction of the capillary blood-vessels in the parts to which they are applied, thus lessening the secretion and the blood-supply. They coagulate albumin and check hemorrhage and morbid discharge, and, if used in strong solutions, may act as 15 caustics.

Actol, adrenalin chlorid, adrin, alum sulphate, argentamin, copper sulphate, hamamelis, lead acetate, mercury, peroxid of hydrogen, silver and its salts, argyrol, protargol, etc., tannic acid. 20

Caustics or **escharotics** are substances which destroy tissues when applied to them locally, and are most frequently used in eye work to destroy the diseased tissue of an ulcerated cornea, so that the remedies to follow will come in contact with the healthy corneal tissue. 25

Acetic acid (glacial), alum sulphate, carbolic acid, copper sulphate, mercury bichlorid, mercury yellow oxid, silver nitrate, zinc sulphate.

Counterirritants are remedies used to produce an irritation in one part of the body in order to counteract a morbid condition in another part.

Cantharides, croton oil, mustard.

- 5 **Disinfectants** are agents which destroy the causes of infection.

Hydrogen peroxid, itrol, lysol, potassium permanganate, pyoctanin.

- Emollients** are remedies of a bland, soothing character
10 which, when applied to a part, protect it from friction and from the air, relieve tension, and diminish pain.

Acacia, castor oil, cocoa-butter, glycerin, lard, olive oil, starch, vaselin.

Escharotics.—See *Caustics*.

- 15 **Germicides.**—Remedies which have the power of destroying micro-organisms. See *Antiseptics*.

Hemostatics are remedies which arrest hemorrhage. See *Astringents*.

- Irritants** are remedies which increase the vascularity of the
20 parts to which they are applied, thus increasing the power of absorption. According to the degree of their action they are classed as rubefacients, those which simply redden the surface; epispastics or vesicants, which occasion blisters; and pustulants, which excite sufficient inflammation to form pus.
25 When corneal ulcers become indolent an irritant starts the healing process.

Arnica, cantharides, capsicum, chloroform, croton oil, ether, iodine tincture, mustard, silver nitrate, turpentine.

Lymphagogues are remedies which promote the formation of lymph in the parts to which they are applied.

Dionin.

Mydriatics are medicines which dilate the pupil by paralyzing the sphincter muscle or by stimulating the dilator muscle of the iris. They also more or less increase the tension of the eyeball. 5

Atropin sulphate, belladonna, cocain, duboisin, euphthalmin, homatropin, hyoscyamin, hyoscin, mydrin, scopolamin. 10

Myotics contract the pupil by paralyzing the dilator muscle or by stimulating the sphincter muscle of the iris. They also reduce the tension of the eyeball. In other words, myotics have just the opposite effect on the eye that mydriatics do. Right here it might be stated that all medicines which dilate the pupil increase the intra-ocular tension, while all medicines which contract the pupil diminish it. 15

Eserin, pilocarpin.

Refrigerants have the effect of cooling or reducing the temperature of the parts to which they are applied. 20

Vinegar.

Rubefacients are remedies which when applied to a part cause redness of that part. See *Irritants*.

Sedatives (local) are medicines which when applied to a part allay the irritability. See *Analgesics*. 25

Staining agents are remedies which are employed in mapping out defects in the corneal epithelium, to determine the limits of corneal ulcerations, and the exact location of foreign

bodies. Dropped into the conjunctival sac they stain the defective area so that the contrasting color is readily seen.

Argyrol, fluorescein, pyoctanin.

Stimulants are medicines which have the power to excite
5 organic action or to increase the vital activity of an organ.

Eserin, mercury yellow oxid, silver nitrate, and other silver salts, such as argyrol, protargol, etc.

Styptics are remedies which have the power of checking hemorrhage through an astringent quality. See *Astringents*.

10 **Vasoconstrictors** are remedies which cause contraction of the capillary blood-vessels of the part to which they are applied.

Adrenalin chlorid and other suprarenal preparations.

Vasodilators are remedies which cause dilation of the cap-
15 illary blood-vessels of the part to which they are applied.

Dionin, amyl nitrate (when inhaled).

Vesicants are agents which, when applied to a part, cause the exudation of a thin serous fluid under the skin. See *Irritants*.

CHAPTER X

CONSIDERATION OF OPHTHALMIC REMEDIES

Acacia, Gum Arabic (Emollient).—A gummy exudate from the *Acacia denegal*. Soluble in water. Valuable for its soothing effect and adhesive qualities. Used as a vehicle. Occasionally dusted into the eye for burns.

Acetate of Lead.—See *Plumbi Acetate*. 5

Acetic Acid.—The acid of common vinegar. Astringent and refrigerant. It is of value in neutralizing burns of the conjunctiva and eyeball from caustic soda, potash, or lime. The immediate instillation of diluted vinegar in such cases will greatly lessen the harmful effects. 10

Glacial acetic acid, nearly or quite absolute acetic acid, is a caustic.

Acid, Boric.—See *Boric Acid*.

Acid, Carbolic.—See *Carbolic Acid*.

Acid, Tannic.—See *Tannic Acid*. 15

Acoïn is a local anesthetic which does not affect the pupil, accommodation, or tension of the eye. It is especially used for subconjunctival injection in a 1 per cent. solution with a cyanid of mercury or mineral salt solution. Like holocain, it acts upon the alkali of glass, therefore it should be mixed 20 in a porcelain vessel with distilled water.

A 1 per cent. solution of acoïn in oil is one of the best analgesics for painful eyes from any cause. A few drops relieve the pain for several hours.

Solutions of acoïn should be kept in the dark, as they are
5 altered by the light.

Actol (Lactate of Lead).—Astringent and powerful anti-septic. One of the best of the germicidal inorganic silver salts used in ophthalmic practice.

Adrenalin Chlorid (Astringent and Hemostatic).—Derived
10 from suprarenal capsules and preserved by the addition of 5 per cent. chlorotone in solution 1 : 1000, is both an astringent and a hemostatic. It is of inestimable value in a great many affections of the eye, especially all highly inflamed conditions, as it contracts the capillaries and drives
15 away the blood from the part, thus assisting in the absorption of other remedies. In iritis with adhesions, where a complete and rapid effect of the atropin is desired, the instillation of a few drops of a 1 : 4000 adrenalin solution five
20 minutes before using the atropin will greatly assist in its action. Cocain seems to reinforce the action of adrenalin and is a valuable adjunct.

It is especially useful in preventing hemorrhage during operations on the eye. None of the suprarenal derivatives should be used at regular intervals for any great length of
25 time, as the continued effects interfere with the nutrition of the cornea and produce ulceration of that membrane.

Adrenalin chlorid turns to a light amber color on exposure to air and light, but this change does not effect its activity.

Adrin is another suprarenal product. It is an astringent, vasoconstrictor, styptic, and hemostatic, and is probably identical with adrenalin chlorid.

Alum sulphate (sulphate of aluminum and potassium) is a powerful astringent and styptic. The pure crystal is sometimes applied to the everted lids in cases of inflammation of the palpebral conjunctiva. A solution of 5 or 6 grains to the ounce of sterile water is beneficial to sockets that carry artificial eyes. In such cases it lessens the mucopurulent discharge and renders the mucous membrane less susceptible to irritation from the artificial shell. It is frequently applied to the conjunctiva in the form of the solid crystal. Alum should never be used in the eye where there is any abrasion or disease of the cornea.

Burnt alum forms a mild escharotic and powerful astringent, and as such has been used in granular masses and fungating wounds of the lid, globe, and orbit.

Alypin.—A local anesthetic which is derived from glycerin. Its anesthetic action is somewhat greater than that of cocain, while its toxicity is only about half that of the latter drug. A 4 per cent. solution causes complete anesthesia of the cornea in two or three minutes, and provokes no mydriasis or disturbance of accommodation, but, unfortunately, it causes a transitory yet troublesome turbidity of the corneal surface, with shedding of epithelium. A 2 to 4 per cent. solution is quite stable, but weaker solutions are likely to become moldy. It will keep better if protected from the light and air.

Amyl Nitrite.—A vasomotor dilator. It is never used locally in eye diseases, but is generally inhaled as a cardiac stimulant. For this purpose it is put on the market in pearls, made of thin glass, each containing from 2 to 5 min-
5 ims of the drug. One of these is crushed in a piece of gauze or handkerchief and slowly inhaled. When inhaled it will temporarily improve vision, in cases of atrophy or anemia of the optic nerve, by stimulating the heart's action and increasing the supply of blood to the starved nerve tissue. For
10 this reason it is frequently used in tobacco amblyopia partly as a remedy and partly to determine whether a temporary improvement in vision will follow its use, in which case the prognosis is decidedly more favorable.

Argentine Nitras.—See *Silver Nitrate*.

15 **Argonin** is prepared by adding silver nitrate to the sodium compound of casein. It contains 4 per cent. of silver and is but slightly soluble in water.

It penetrates more deeply than silver nitrate and does not coagulate the albumin. A 3 per cent. solution is of use in
20 conjunctival affections where silver is indicated. It is especially useful in ophthalmia neonatorum, as it destroys the gonococcus very rapidly and irritates very little.

Argyrol, a combination of silver with albumin, containing from 20 to 25 per cent. of the metal, is one of the most val-
25 uable silver salts used in ophthalmology, as it is antiseptic, non-toxic, and free from the irritating character of silver nitrate. It is used in solutions of from 6 to 30 per cent., and is of special value in all forms of conjunctivitis with free

discharge, and in catarrh of the lacrimal sac or duct. In using it great care should be taken not to get it on the clothing, as its stains are difficult to remove. When used for any length of time in a baby's eyes only 1 drop should be instilled, as it may run down the lacrimal duct into the nose and throat, sooner or later causing systemic disturbance. If used too continuously, like other silver salts, it will stain the conjunctiva. Old solutions are more apt to irritate and stain the conjunctiva than fresh ones. It is prone to deteriorate when exposed to light, air, or heat, and should, therefore, be kept in a cool place and in tightly corked colored bottles.

Aristol (thymol iodine) is a reddish-brown powder made by the action of iodine, potassium iodide, and sodium hydroxide or thymol, contains about 40 per cent. of iodine and is a substitute for iodoform in dressing wounds. It seems to be about as efficacious as iodoform and is much less disagreeable to the patient, as it has no offensive odor. It is frequently used as a dressing in operations on the eyelids and after enucleation of the globe. It is also used as an irritant in indolent ulcers of the cornea and in the form of an ointment (8 per cent.) in blepharitis. When applied to mucous membranes it promotes secretion.

Atropin, next to boric acid, is probably the most commonly used drug in ophthalmology, and, I might say also, the most commonly misused. It is the active principle of belladonna and is usually employed in from $\frac{1}{2}$ to 2 per cent. solutions. It dilates the pupil and paralyzes the accom-

modation, and consequently is usually employed in those diseases where both complete continuous mydriasis and cyclopegia are desired for a length of time, as in iritis, cyclitis, corneal ulcers, etc., in which diseases it also acts as an anodyne and sedative, relieving pain and counteracting inflammation. Its effects are complete in a half-hour after the instillation, and last from eight to ten days after the instillations are discontinued. In suitable cases atropin will do much good, but in unsuitable cases it may do irreparable harm. It is practically contraindicated in most conjunctival affections and in glaucoma, and should always be used with great caution in elderly people, especially if their anterior chambers are shallow. Some people are extremely susceptible to atropin, even in mild doses, and, as a rule, light complexioned people are more susceptible to it than dark ones. The symptoms of atropin poisoning are redness and swelling of the lids and conjunctiva, dryness of the throat, difficulty in swallowing, slight dizziness, flushed skin, rapid, bounding pulse, restlessness, delirium, and coma. Antidotes for atropin or belladonna are morphin, caffen, coffee, whisky, strychnin, and digitalis. Another point which I might mention here is, that the nurse should thoroughly wash her hands after applying atropin to avoid the danger of dilating her own pupils. The toxic effects of atropin are less apt to occur when it is employed in the form of an ointment.

Beta-eucain.—See *Eucain*.

Bicarbonate of Soda.—See *Sodium Bicarbonate*.

Bichlorid of Mercury.—See *Mercury Bichlorid*.

Boric acid or boracic acid is a mild and non-irritating anti-septic obtained by heating borax with hydrochloric acid, and allowing the crystals to separate. It is without doubt the most commonly used drug in ophthalmology throughout the world. It is soothing and is generally used in a saturated solution, which is about 18 grains to the ounce, although occasionally, even in weaker solution, it is not well borne and irritates more or less. Considerable depends upon the make of the acid used. Perhaps the most thoroughly reliable is Squibbs. The addition of an equal part of borax renders the acid more soluble and at the same time adds to its effectiveness. A large bottle of the saturated solution should be always kept on hand, as freshly made solutions are apt to contain more or less of the undissolved crystals, which, if introduced in the eye under certain conditions, may do considerable damage. The easiest and most simple method of preparing a saturated solution of boric acid is to take two large bottles, fill one nearly full of distilled or boiled water, put in a lot of powder, more than will dissolve, shake the bottle for a few moments and allow it to stand over night, during which time the undissolved crystals will settle to the bottom of the bottle and a clear solution can then be gently poured or siphoned off into the other bottle. I emphasize the use of cold water, for if warm is used the solution will be filled with floating crystals of boric acid when it becomes cold. Boric acid ointment in the strength of 10 grains to the ounce is a valuable non-irritating and mildly antiseptic ointment for the eye.

Calomel (mercurous chlorid) dusted into the eye is useful as an irritant to stimulate the healing of indolent ulcers of the cornea, but it should never be used while the iodids are being administered internally, unless several hours have
5 elapsed since the last dose, as there would then be danger of iodid of mercury forming in the eyes, which would be more or less irritating.

Camphor is a crystal which deposits under the bark of the camphor tree.

10 **Camphor-water**, 8 parts of camphor in 1000 parts of water, is one of the oldest eye-waters mentioned in the Pharmacopœia. It is soothing and mildly astringent, and is frequently used as a vehicle for other eye remedies.

Cantharides (Spanish flies) is used as a counterirritant in
15 deep-seated and painful inflammations of the eye. A small plaster of the desired size may be applied over the temple and allowed to remain until a blister forms. The plaster is then removed, the bleb pinched to allow the escape of the serum, and then dressed with a boric acid, aristol, or zinc
20 oxid ointment. Combined with collodion it can be conveniently applied with a camel's-hair brush.

Carbolic Acid (Phenol).—An antiseptic and local anesthetic obtained during the instillation of coal-tar between the temperature of 180° and 190° C.

25 Pure carbolic acid is crystalline at ordinary temperature, and is at first colorless, but reddens after exposure to the air. It is liquefied by 5 per cent. of water. Carbolic acid will destroy germ life quickly, and its effects penetrate deeper

than do those of corrosive sublimate. It is sometimes used in from $\frac{1}{2}$ to 5 per cent. solution for irrigating the eye, and in the full strength for cauterizing corneal ulcers, but none but the absolute phenol should be used, as the regular commercial product is irritating to the eye. For the latter purpose a 95 per cent. mixture with glycerin is preferable. After staining the cornea with fluorescein, irrigating and anesthetizing the globe, the diseased area is gently touched with the end of a wooden toothpick which has been soaked in the solution. A 1 to 20 per cent. solution is frequently used for sterilizing hands and instruments, but the latter should not be allowed to remain in it more than a few minutes, and should then be taken out and dipped in alcohol or boiling water.

Castor oil (oleum ricini) is an oil expressed from the seeds of the castor oil bean. Its bland viscid properties render it peculiarly valuable for instilling into the conjunctival sac as a protective and sedative, and is especially useful as a protection to the cornea when the lids are rough and inflamed, as in acute trachoma. It is one of the best solvents for alkaloids used in ophthalmology.

Cherry laurel water is distilled from the fresh leaves of the *Prunus laurocerasus*. It is used considerably in Europe, but very little in this country, as a vehicle for other remedies.

Chlorin-water (Labarraque's solution) is a clear greenish-yellow liquid containing $\frac{3}{10}$ of 1 per cent. chlorin and possessing astringent and antiseptic properties, being a favorite old remedy in purulent affections of the eye, as it prevents supuration without injury to the cornea. It is generally used

with water in the proportion of 1 to 4. It should be kept well corked and in a cool place, as it deteriorates rapidly.

Cocain (local anesthetic), the alkaloid of cocoa leaves, is another one of the most frequently used ophthalmic remedies. It is employed in solutions of from 1 to 10 per cent., a 4 per cent. solution being the most commonly employed. The solutions should be sterilized or prepared from distilled water and should contain about 10 grains of boric acid to the ounce, which acts as a preservative and prevents the formation of a fungus growth which otherwise would occur. When first dropped into the eye a cocain solution will smart for a minute or two. This smarting can be prevented by having the patient look upward and drop the solution in the lower culdesac, thus preventing it from coming in contact with the cornea until a few seconds after the conjunctiva has been impregnated. Besides its anesthetic effects, cocain contracts the capillaries, dilates the pupil, and has a tendency to slightly increase the intra-ocular tension, therefore great care should be exercised in using it on elderly people, and especially those with glaucomatous symptoms. When employed for its anesthetic effects, it is generally used in both eyes, even when the operation is limited to one, as it renders the act of winking less frequent and enables the patient to hold the eyes more steady. If thorough anesthesia is desired, a few drops of the solution should be instilled four or five times at intervals of five minutes, the patient keeping his lids closed between the instillations to prevent the cornea from becoming dry. The insensibility produced by cocain lasts about fif-

teen minutes and the maximum effects are reached in about eight minutes. If the operation lasts over ten or twelve minutes then the nurse should be prepared to use more cocain while the surgeon is at work. Inflamed eyes absorb cocain more slowly, and in such cases more time should be allowed for anesthesia. If a few drops of an adrenalin solution (1 : 4000) be dropped into the eye the cocain will act more effectively. 5

Cocain increases the effect of mydriatics, first, because it enhances absorption; second, because it provokes a contraction of the vessels of the iris; third, because it acts directly upon the dilating fibers of the iris and the ciliary muscle itself. It should not be used continuously for days, as it interferes with the nutrition of the cornea, producing dryness and sometimes suppuration. As has been said, great care should also be taken in using solutions of bichlorid of mercury stronger than 1 : 10,000 in eyes which have been cocainized, as the eroded condition of the cornea which is sometimes produced by the cocain affords a favorable ground for the deposition of the bichlorid salt. This may be prevented if the surface of the cornea is occasionally moistened with a boric acid solution. In some patients medicines which are instilled into the eye pass so rapidly through the lacrimal duct into the nose and throat that it is well to tell all patients upon whom cocain is used that if it makes their mouth taste bitter to spit it out. Cocainism seldom occurs from use of the drug in the eye, but once in a great while some patient who is particularly susceptible to 10 15 20 25

its influence may manifest toxic symptoms, such as dizziness, cold sweat, faintness, feeble and irregular pulse, etc. Under such circumstances the first thing to do is to have the patient lie down and administer whisky, morphin,
5 strychnin or strong coffee, or allow him to inhale nitrite of amyl.

Collodion consists of 3 parts of gun-cotton dissolved in 75 parts of ether and 25 parts of alcohol. It forms a neat protective dressing for small non-infected wounds about the
10 eyelids and brow, and for the contracting effect in some cases of ectropion. The ether and alcohol evaporates and leaves the surface covered with a thin film. Combined with cantharides it is used for its blistering or counter-irritant effects.

15 **Copper sulphate** (blue stone) is an antiseptic, styptic, and irritant which is freely dissolved in water (blue vitriol). It is an old-time remedy for chronic trachoma with scanty secretions, but it has fallen somewhat into disuse on account of the severe irritation following its application. The pure
20 crystal is usually applied to the everted lids, and if preceded by the use of a local anesthetic and followed by the instillation of a few drops of glycerin or castor oil the pain will be much lessened. Sometimes used in solution ($\frac{1}{4}$ to $\frac{1}{2}$ per cent.) as an irrigation in conjunctival affections with
25 scanty secretions.

Croton oil (oleum tigllii), a counterirritant, is a fixed oil expressed from the seed of croton tiglium, an East India tree.

Cyanid of Mercury.—See *Mercury Cyanid*.

Dionin, made by the action of ethyl iodid upon morphin, exerts upon the eye a vasodilator action such as is possessed by no other agent known. It is not only a powerful analgesic, but it has a favorable action upon the morbid process within the eye; thus it hastens the resolution of pupillary exudations and the absorption of corneal infiltration. It increases the flow of lymph, lessens the tension in glaucoma, and aids in the absorption of other remedies, such as atropin

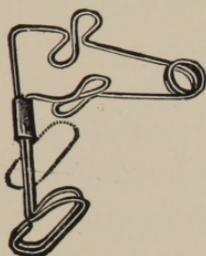


Fig. 53.—The author's puncta clamp.

and eserin, being of special value in the treatment of diseases of the iris, ciliary body, and sclera.

It has a favorable influence on the healing process after operations and injuries, and the relief given to pain in most cases is prompt and complete.

It may be regarded as doing good so long as its instillation in the eye is followed by a smarting sensation and redness or edema of the conjunctiva, and the greater the edema, the more decided is the analgesic action of the agent.

For this reason it is advisable to begin with the weaker solutions and gradually increase the strength, and as the

reaction wears off use it less frequently. It can be used in solutions of from 1 to 10 per cent., and in some cases of iritis with adhesions equal parts of pure dionin and atropin are dropped into the lower culdesac after first applying a
5 clamp on the puncta (Fig. 53) to prevent it from running into the tear duct.

When prescribing dionin for patients to use at home they should be told of the reaction which follows its use, else they might discontinue it through fear of its doing them harm.

10 **Dioxogen.**—See *Peroxid of Hydrogen*.

Duboisin, the active principle of the plant *Duboisia myoporoidea*, is a mydriatic similar in its action to that of atropin, but more prompt and less lasting. It is used in from $\frac{1}{4}$ to 1 per cent. solutions, and its effects usually wear
15 off in from four to six days. It is useful with patients who show idiosyncrasies to atropin, but, unfortunately, has marked toxic properties, which tend to limit its employment.

Ephedrin.—A mydriatic. A 2 per cent. solution dropped into the eye will be followed by complete mydriasis in about
20 fifty minutes and will last for ten or twelve hours. It has little or no action on the accommodation or tension.

Eserin sulphate (physostigmin), the alkaloid of calabar bean, is a yellowish powder which dissolves sparingly in water. Commercially it comes in 3- and 5-grain phials,
25 which are tightly sealed. When once exposed to the air it deliquesces very rapidly, therefore in filling a prescription, if the whole contents of the phial are not used, it is best to make a solution of that which remains, as it will

keep longer in solution. An excellent way to keep it is to mix it with ten times its weight of boric acid. A freshly made solution should always be the color of water, but with age and exposure to light it turns pink, and finally a deep red. If kept in a tightly corked blue or amber bottle it 5 will retain its proper color longer. The change in color does not materially alter its effect upon the tissues of the eye other than making it more liable to irritate the conjunctiva. In ophthalmology eserine is usually employed in solutions of from $\frac{1}{8}$ to 1 grain to the ounce. When intro- 10 duced into the eye it causes a contraction of the pupil, which begins in about fifteen minutes and lasts from four to eight hours. It is, therefore, valuable in diminishing intra-ocular tension in glaucoma and in preventing prolapse of the iris after corneal wounds. Its effect on the 15 eye is increased when used with cocaine on account of the contraction of the ciliary vessels produced by the latter. If its use causes headache, pilocarpin should be substituted.

Eucain, another local anesthetic, is less toxic than cocaine, and, like holocain, does not effect the eye in any way than 20 to render it anesthetic. It acts nicely upon inflamed eyes, but has rather gone into disfavor on account of the violent burning which it causes.

Euphthalmia hydrochlorate is a preparation which is used to dilate the pupil for diagnostic purposes solely, as it has 25 little or no effect upon the accommodation. It is generally used in a 5 per cent. solution and is very rapid in its effects, the pupil reaching its maximum dilation in an hour

and recovering therefrom within fifteen to twenty hours. It does not affect intra-ocular tension or irritate the conjunctiva, and is, therefore, especially useful to dilate the pupil before cataract extraction.

- 5 **Fluorescein** is obtained by fusing 7 parts of resorcin and 5 parts of phthalic anhydrid. It makes a yellowish-green solution and is used for diagnostic purposes only.

Eight grains to the ounce of water is the strength of the solution most generally employed, and when dropped into
10 the eye and afterward washed out with a boric acid solution it leaves any part of the cornea which is denuded of its epithelium stained a bright green. For this reason it is valuable in showing the exact extent of corneal ulceration and in locating minute foreign bodies in the cornea.

- 15 **Formaldehyd**, or formic aldehyd, is a gas obtained by the oxidation of methyl alcohol. Being readily absorbed by water, a solution has been prepared to which the term "formalin" has been given. The solution contains 40 per cent. of the formaldehyd. When allowed to stand this
20 fluid gives off the vapor of formaldehyd.

Formalin is a powerful antiseptic, irritant, astringent, and disinfectant. It is sometimes used for irrigating the eye during operations, and in suppurative conditions of the conjunctiva in solutions of 1 : 3000 to 1 : 10,000, but is so
25 irritating to the mucous membranes that it is seldom used. A solution 1 : 10 is frequently used for the sterilization of cutting instruments and for the preservation of pathologic specimens. The instruments should not be allowed to

remain in formalin solution over five minutes, and then should be dipped in alcohol and sterile water before using.

Glycerin, which is obtained as a by-product in the manufacture of soap, is very hygroscopic and mixes in all proportions with water and alcohol. When applied to the conjunctiva it acts as a mild stimulant, antiseptic, and protective. Having an affinity for water, it absorbs the latter from the mucous membrane and excites secretion, and when added to a nitrate of silver solution it increases the penetrating power of the latter drug and makes it less painful. It is frequently combined with solutions of other medicines, such as tannic acid and boric acid, to prolong their action, as it coats the conjunctival and corneal surface, and is not as easily washed away by the tears as is a plain aqueous solution.

Gum Acacia.—See *Acacia*.

Holocain, a derivative of phenacetin, is a local anesthetic. It is sparingly soluble in water and is stable in solution not stronger than 2 per cent. Stronger solutions will precipitate fine crystals. Holocain is so easily decomposed by alkalis that if mixed with ordinary drinking-water or in glass vessels it becomes cloudy. In order to avoid this it is necessary to use distilled water, and to either mix it in a porcelain vessel or first boil the glass vessel in a solution of hydrochloric acid. Boiling does not interfere with its activity, although boiling is not necessary, as holocain is in itself a powerful antiseptic. It is a more powerful local anesthetic and is more rapid and more lasting in its effects

than cocain. Anesthesia is complete within fifteen seconds after the instillation of a 1 per cent. solution and lasts from fifteen to twenty minutes. It more thoroughly anesthetizes inflamed surfaces and the deeper structures of the eye than
5 does cocain. Its great advantage in ophthalmology over the latter drug, however, is that it has no other effect upon the eye than to render it anesthetic. Unlike cocain, it does not contract the capillary blood-vessels, dilate the pupil, paralyze the accommodation, unfavorably effect the cor-
10 nea, or increase the intra-ocular pressure. For the latter reason it is especially advantageous in operations for glaucoma and for the removal of foreign bodies from the cornea.

Homatropin hydrobromate, another alkaloid of belladonna, also dilates the pupil and paralyzes the accommoda-
15 tion, but its effects, while more rapid, are not as lasting as those of atropin, usually passing off in from twelve to twenty-four hours. For this reason it is used principally for diagnostic purposes to render more easy an ophthalmoscopic examination or the determination of the refraction. It is
20 much increased in its action by the addition of cocain.

Hydrogen peroxid (dioxigen, perhydrol) is a strong antiseptic and disinfectant which comes commercially in a 3 per cent. solution. It has powerful bleaching, disinfecting, and oxidizing properties, and on account of its chemical
25 action upon pus it is especially valuable in suppurative conditions of the eye, such as purulent conjunctivitis, lacrimal abscesses, and corneal ulcers, also in the treatment of wounds of the lids. A 25 per cent. solution may be instilled

into the eye four or five times a day, but should be carefully washed out immediately afterward with sterile water. Being of an unstable nature and decomposing readily into oxygen and water, it should be kept in a cool place.

Hyoscin, another alkaloid of *hyoscyamus*, is a mydriatic 5 five times as powerful as the sulphate of atropin, but it does not increase the intra-ocular tension as much or as readily irritate the mucous membranes, and is, therefore, indicated in persons exhibiting an idiosyncrasy for the latter drug. One drop of a 1 per cent. solution relieves the ciliary spasm 10 sufficiently in one hour to make a refractive examination, and the accommodation recovers in three days.

Hyoscyamin, derived from the plant *Hyoscyamus niger*, is a powerful mydriatic, dilating the pupil ad maximum in ten minutes, and paralyzing the accommodation in two 15 hours after its instillation. The pupil does not return to the normal in less than eight or ten days. It is used when a prolonged rest of the accommodative muscle is desired in solutions of from 2 to 4 grains to the ounce of distilled water. It is decomposed by light and moisture, and should, 20 therefore, be kept in colored bottles with glass stoppers.

Iodin tincture, obtained from the ashes of sea-weed, is sometimes painted on the temple or forehead as a mild counterirritant or applied to corneal ulcers as a caustic. In using it great care should be taken not to get any of it in 25 parts of the eye where it is not required. It is sometimes applied to the skin of the ocular region to prevent the extension of an erysipelas.

Iodoform, made by heating together iodine, potassium carbonate, alcohol, and water, is not a powerful antiseptic, but its ability to check secretion is well known. On mucous membranes it has a slight local anesthetic effect. It is sometimes dusted over corneal ulcers and into sockets from which the eye has been removed. It is valuable as an ointment in the proportion of 1 to 10 or 20, and dissolved in collodion it makes an excellent dressing for wounds of the ocular region. It is little used on account of its disagreeable, penetrating odor. When used on raw surfaces it is sometimes absorbed and produces visual disturbances closely akin to those of tobacco.

Itrol (silver citrate) is made by precipitating a solution of silver nitrate by means of citric acid and sodium bicarbonate. It is used as a powder for dusting wounds of the conjunctiva, etc.

Lead acetate (sugar of lead) is frequently used in solution or in the form of the so-called "lead-and-opium wash" as a soothing application to inflamed and swollen lids. Care must be taken, however, not to use it in cases with abrasion of the cornea, as there is danger of the insoluble lead compounds being precipitated from the solution and causing white ineradicable incrustations on the cornea in such cases.

Mercurial ointment (blue ointment) is a mixture of the oleate of mercury, metallic mercury, benzoated lard, and prepared suet containing about 50 per cent. of metallic mercury. It is the favorite mercurial mixture for inunction in the treatment of ocular affections of specific origin.

Mercury Bichlorid (Corrosive Mercuric Chlorid, Corrosive Sublimate).—Solutions are used in the eye in strength varying from 1 : 5000 to 1 : 10,000. A stronger solution than 1 : 5000 should never be used, as it would be too irritating to the eye and skin, and when a cocain solution is used at the same time not even a 1 : 5000 solution should be used, as the eroded condition of the cornea which is sometimes produced by the cocain affords a favorable ground for the deposition of the bichlorid salt. A 1 : 500 solution is sometimes rubbed into the conjunctiva after operations for trachoma (granulated lids). Most hospitals keep a 1 : 1000 solution on hand and dilute it as required. The nurse should never guess at the dilution, but measure it out, for if too strong it may cause considerable irritation. Care should be taken not to make solutions for the eye of tablets containing ammonium chlorid, as the latter drug is irritating to the conjunctiva. It is put up in the form of an ointment known as White's Ointment, which is commonly employed after operations upon the eye.

Mercury Chlorid, Mild.—See *Calomel*.

Mercury cyanid in solutions of from 1 : 5000 to 1 : 20,000 is sometimes injected beneath the bulbar conjunctiva in purulent infections of the eyeball, as ulcers of the cornea, keratitis, and infections following cataract operations.

Mercury, yellow oxid, in ointment form, of from 4 to 12 grains to the ounce of vaselin, is a favorite astringent and antiseptic in cases of blepharitis (inflammation of the lid margins with scales), and as an irritant and stimulant in

connection with massage for the treatment of corneal opacities, chronic keratitis, and pannus. It should be put up in amber-colored glass jars instead of opal ones, as this prevents the chemical action of light upon the mercury salt and 5 preserves the ointment much longer. Unless thoroughly mixed it will irritate.

Methyl Violet.—See *Pyocetanin*.

Mustard (sinapis) is used in the form of a plaster as a counterirritant.

10 **Mydrin.**—A mydriatic, a powder composed of 1 part of homatropin to 100 parts of ephedrin. It is used as a mydriatic mainly for ophthalmoscopic purposes. Its effects pass off very quickly.

Nargol.—Nucleinate of silver. A silver compound with 15 nucleinic acid derived from yeast, containing about 10 per cent. of metallic silver. It is non-irritating, it penetrates deeper than silver nitrate, and has an action similar to that of argyrol and protargol.

It is commonly used as a stimulant in slow-healing cor- 20 neal ulcers, and in the chronic form of blepharitis.

Nitrate of Silver.—See *Silver Nitrate*.

Nitrite of Amyl.—See *Amyl Nitrite*.

Novocain.—An organic compound much less toxic than cocain and is, therefore, especially useful for hypodermic 25 injection. For this purpose it is generally mixed with adrenalin chlorid in solution of from 1 to 10 per cent. Its anesthetic effect is comparatively brief and it does not effect the pupil, the accommodation, or the tension of the eye.

Nucleate of Silver.—See *Nargol*.

Oleum Ricini.—See *Castor Oil*.

Oleum Tiglii.—See *Croton Oil*.

Olive Oil (Sweet Oil).—An emollient. Sometimes used as a solvent for atropin, eserin, and other alkaloids, and also 5 as an antidote in burns of the eye by lime and strong alkalies.

Perhydrol.—See *Peroxid of Hydrogen*.

Permanganate of Potash.—See *Potassium Permanganate*.

Phenol.—See *Carbolic Acid*.

Physostigmin.—See *Eserin*. 10

Pilocarpin hydrobromate, the alkaloid of jaborandi, is a myotic, milder in its effect on the eye than eserin, being non-irritating and devoid of any tendency to produce headache, ciliary congestion, or iritis, and it is generally used in solutions of twice the strength, from $\frac{1}{2}$ to 2 grains. It is 15 sometimes added to cocain solutions, as it will counteract the tendency of the latter drops to dilate the pupil and paralyze the accommodation, without interfering with its anesthetic action. It is given hypodermically in doses of from $\frac{1}{10}$ to $\frac{1}{6}$ gr. to produce sweating for the absorption of 20 exudates in deep-seated eye troubles. Solutions of pilocarpin keep better than do solutions of eserin.

Plumbi Acetate.—See *Lead Acetate*.

Potassium permanganate in solutions of $\frac{1}{2}$ to 1 per cent. is a very efficient wash in purulent eye cases, but has rather 25 fallen into disuse on account of its staining properties. It is also used as a spray in the nose preliminary to cataract operations.

Protargol, a combination of alum and silver, containing about 8 per cent. of the latter drug, is a valuable astringent in eye work, being usually prescribed in solutions of from 5 to 25 per cent. Like argyrol, it is less irritating than the
5 silver nitrate and is used in all forms of discharging conjunctivitis.

Pyoctanin, methyl-violet, is a pus destroyer. It penetrates tissues and acts upon deeply embedded pathogenic micro-organisms and does not coagulate albumin.

10 **Pyoctanin yellow** is sometimes applied directly to the lids in trachoma and to the ulcerated cornea.

Rose-water is somewhat astringent and is used as an agreeable flavoring agent and vehicle for eye lotions.

Scopolamin hydrobromate, identical with hyoscin, is a
15 mydriatic which is much more powerful than atropin, but has less effect upon the intra-ocular tension, therefore it is useful in cases where the latter drug fails to dilate the pupil.

Silver Citrate.—See *Itrol*.

20 **Silver Lactate.**—See *Actol*.

Silver nitrate, the oldest and most valuable astringent used in ophthalmology, is the best local remedy for almost all secretory affections of the conjunctiva, and has a strong antiseptic action on certain germs, especially the gonococ-
25 cus. It is generally used in solutions of from 1 to 3 per cent. and is of special value in acute contagious diseases of the eye. It is better to brush it over the conjunctiva of the everted lids, and if immediately neutralized with a normal

salt solution the pain and irritation following its use will be lessened. If used frequently and too long it will discolor the conjunctiva, and for this reason should seldom be prescribed for home use. It is contraindicated in all cases where there is an ulceration or other lesion of the cornea, as it may produce a permanent opacity of that membrane by precipitation. Much exposure to light will change it into the black oxid of silver, therefore it should be kept in blue or amber bottles. Various substitutes for silver have been devised. None of them take the place of silver, but most of them are less irritating and less painful when applied, and some of them are of special value in ophthalmology.

Silver Vitellin.—See *Argyrol*.

Sinapis.—See *Mustard*.

Sodium bicarbonate (*saleratus*) is frequently used in solution, 1 to 3 per cent., with distilled water, for cleansing the cilia and edges of the lids of scales and dried secretions.

Sodium borate (*borax*) is even a milder antiseptic than boric acid, and differs from it in that it is slightly alkaline. It is a good non-irritating cleansing solution, and is used in about the same strength as boric acid. Combined with the latter drug it renders it more soluble and adds to its effectiveness.

Sodium Chlorid (*Common Salt*).—The so-called normal salt solution is valuable for neutralizing the silver nitrate after it has been applied to the palpebral conjunctiva. It is also used as an irrigating and cleansing solution before,

during, and after operations on the eye, and especially for flushing out the anterior chamber after cataract operations.

Sulphate of Alum.—See *Alum Sulphate*.

Sulphate of Atropin.—See *Atropin Sulphate*.

5 **Sulphate of Copper.**—See *Copper Sulphate*.

Sulphate of Eserin.—See *Eserin Sulphate*.

Sulphate of Zinc.—See *Zinc Sulphate*.

Suprarenal Extract.—See *Adrenalin Chlorid*.

Tannic Acid (Tannin).—Owing to its affinity for albumin,
10 it has a powerful astringent action. It therefore contracts and toughens swollen and relaxed mucous membranes, and is frequently used in inflammatory conditions of the conjunctiva. It is especially effective when mixed with glycerin and camphor-water. The usual strength used is from
15 2 to 10 per cent.

Tannin.—See *Tannic Acid*.

Tincture of Iodin.—See *Iodin Tincture*.

Vaselin is used as a vehicle for many eye ointments and for anointing the lids before the application of hot or cold
20 packs.

Yellow Oxid of Mercury.—See *Mercury, Yellow Oxid*.

Zinc sulphate, in solutions of from $\frac{1}{4}$ to 1 per cent., is often used in the eye when astringents are indicated. It is similar in its effects to copper sulphate, but is somewhat less ir-
25 ritating, and is indicated in most forms of conjunctivitis, especially the form familiarly known as “pink-eye.”

SYNOPSIS OF PRECEDING TEXT MATTER

CHAPTER II. ANATOMY OF THE EYE

Orbit—shape, composed of what bones? { Optic foramen—purpose.
Orbital fat—purpose.

Eyeball— size, shape.	{	Tunics	First..	{ Cornea—description; nutrition. Sclera—description; attachments; perforations.
			Second	{ Iris—description; function; pigment; muscular system. Ciliary body—description; accommodation. Choroid—description; function.
		Third	{ Retina—description; macula. Optic nerve—description; function.	
		Humors.....	{ Aqueous—description; amount; how produced; anterior and posterior chambers. Vitreous—hyaloid membrane; description; location; function; nutrition.	
				{ Pupil—description; function; size.
External ocular muscles				{ Superior rectus, inferior rectus, external rectus, internal rectus. Superior oblique, inferior oblique—origin; insertion, and function of each.

Appendages	{	Eyebrows—description; function.	
		Lids.....	{ Cartilage—description; function. Conjunctiva, palpebral and ocular—description; function. Cilia—description; function. Meibomian glands—description; function.
		Lacrimal apparatus.	{ Gland—description; function. Punctæ—description; function. Sac—description; function. Duct—description; function.

CHAPTER III. PHYSIOLOGY OF THE EYE

Physiology	Refraction.	(Normal refraction—description.
		(Near-sightedness—description; correction; cause; result of neglect.
Physiology	Likeness of eye to a camera.	(Far-sightedness—description; correction.
		(Astigmatism, six kinds—description; correction.
		(Presbyopia, old sight—description; correction; cause.
		(Sclerotic = box.
		(Iris = shutter.
		(Retina = sensitive plate.
		(Crystalline lens = lens.
		(Accommodation = adjustment.

CHAPTER IV. HYGIENE OF THE EYE

Hygiene	Infants.	(Proper cleansing of maternal passages and of baby's eyes.
		(Ophthalmia neonatorum—prophylaxis.
		(Exposure to light—precautions.
Hygiene	Children.	(Objects held close to eyes.
		(Teething, convulsions.
		(Kindergarten.
Hygiene	Adults.	(School—books, hours of work.
		(Strabismus—cause.
		(Reading while convalescing from illness.
		(Reading while in motion.
		(Reading while lying down.
		(Reading in poor light.

CHAPTER V. PRACTICAL OPHTHALMIC NURSING

Eye drops	(For cleansing—how instilled.
	(Poisonous—how instilled.
	(Children—how managed; what precautions.
	(The pipet, sterile—how held; when used for mydriatic; when used in contagious diseases.
	(Atropism.
	Eversion of lids, lower and upper—how accomplished.
	Ointment—how applied; massage.
	Powders—how applied.
	Poultices—never used.
	Massage—how applied; when indicated; when contraindicated.
	Blisters—where and how applied; for what purpose.
Compresses—protection of skin	(Hot—dry and moist; action; indications; how applied.
	(Cold—action; indications; how applied; in traumatism; precaution.

Leeching—where and how applied; indications; best kind; how tested; how removed; best way of leeching.

Rest—sleep; narcotics; darkness; bandages; mydriatics; for convalescents.

Sweating—when indicated; when contraindicated; how obtained.

Inunctions—what preparations of mercury; where applied; how applied; when stopped; protection of nurse.

Contagious eye diseases	}	How treated; isolation; precaution; protection of good eye.
		Buller's shield—how made.
		Ophthalmia neonatorum—cause; prophylaxis, and treatment.

CHAPTER VI. PREPARATION FOR OPERATION

Responsibilities of the nurse; observe abnormalities of patient; preparation of operating room; preparation of patient; preparation of solutions; preparation of instruments; preparation of dressings; preparation of beds.

CHAPTER VII. IN THE OPERATING ROOM

Duties upon entrance of patient; knowledge of technic of operation; the instruments; the dressings; bandages; removal of patient from operating room; pathologic specimens.

CHAPTER VIII. POSTOPERATIVE NURSING

After general anesthesia; care of room; temperature; shock; sneezing; vomiting; cathartics; preparation for surgeon's call; contents of eye tray.

CHAPTER IX. CLASSIFICATION OF OPHTHALMIC REMEDIES

Local anesthetics; analgesics; antiseptics; astringents; caustics; counterirritants; emollients; irritants; lymphagogues; mydriatics; myotics; refrigerants; staining agents; stimulants; styptics; vasoconstrictors; vasodilators.

CHAPTER X. CONSIDERATION OF OPHTHALMIC REMEDIES

Acacia, acetic acid, acoin, actol, adrenalin chlorid, adrin, alum sulphate, alypin, amyl nitrite, argoin, argyrol, aristol, atropin, boric acid, calomel, camphor, cantharides, carbolic acid, castor oil, cherry laurel water, chlorin-water, cocain, collodion, copper sulphate, croton oil, dionin, duboisin, ephedrin, eserin, eucain, euphthalmin, fluorescein, formalin, glycerin, holocain, homatropin, hydrogen peroxid, hyoscin, hyoscyamin, iodine tincture, iodoform, itrol, lead acetate, mercury bichlorid, mercury cyanid, mercury yellow oxid, mustard, mydriasin, nargol, novocain, olive oil, pilocarpin, potassium permanganate, protargol, pyoctanin, rose-water, scopolamin, silver nitrate, sodium bicarbonate, sodium borate, sodium chlorid, tannic acid, vaselin, zinc sulphate.

OPHTHALMIC INSTRUMENTS

IF you wish to become an ophthalmic nurse of ability you will not only become acquainted with the preparation and postoperative care of patients, but you will familiarize yourself with the technic of the different operations and with the various instruments used in ophthalmic surgery, learning their names and uses, so that when assisting in an operation you may anticipate the needs of the surgeon and have each instrument ready to hand to him almost before he asks for it.

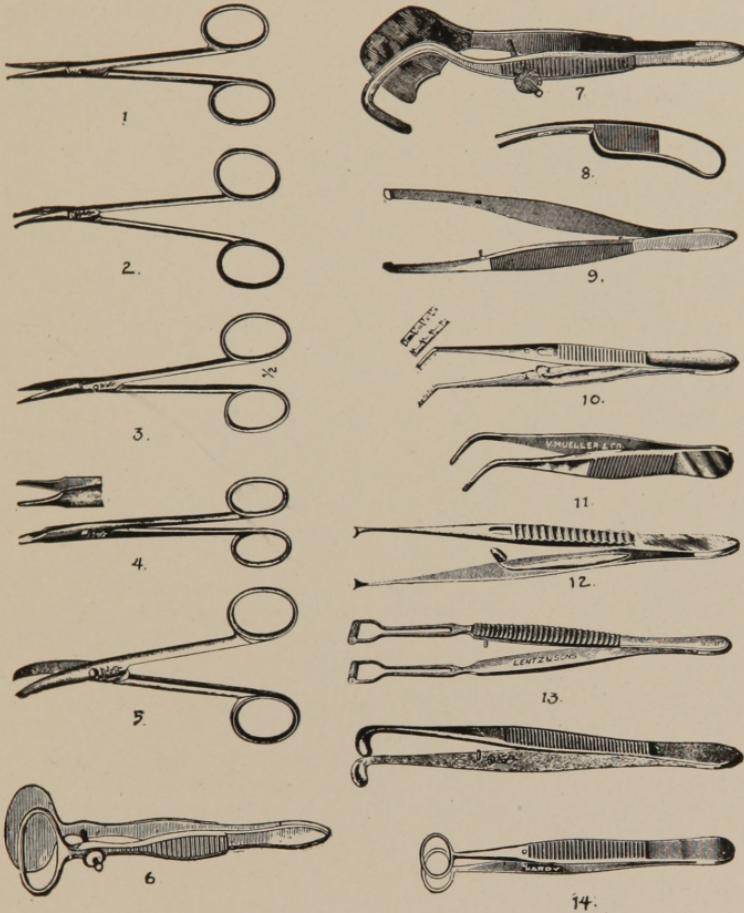
The following are illustrations of the most commonly used ophthalmic instruments:

PLATE I

- No. 1. Straight probe-pointed tenotomy scissors.
- No. 2. Curved probe-pointed tenotomy scissors. Used for cutting the conjunctiva and muscles in all operations on the external ocular muscles and in removal of eyeball.
- No. 3. Iris scissors. Used in cutting the iris in performing an iridectomy.
- No. 4. Stevens' tenotomy scissors. (Use same as Nos. 1 and 2.)
- No. 5. Enucleation scissors. For cutting the optic nerve in removal of eyeball.

No. 6. Chalazion clamp. To clamp on a chalazion before operation on same, in order to check the hemorrhage.

Plate I



No. 7. Ectropion forceps. To clamp on the lid in doing operations for ectropion.

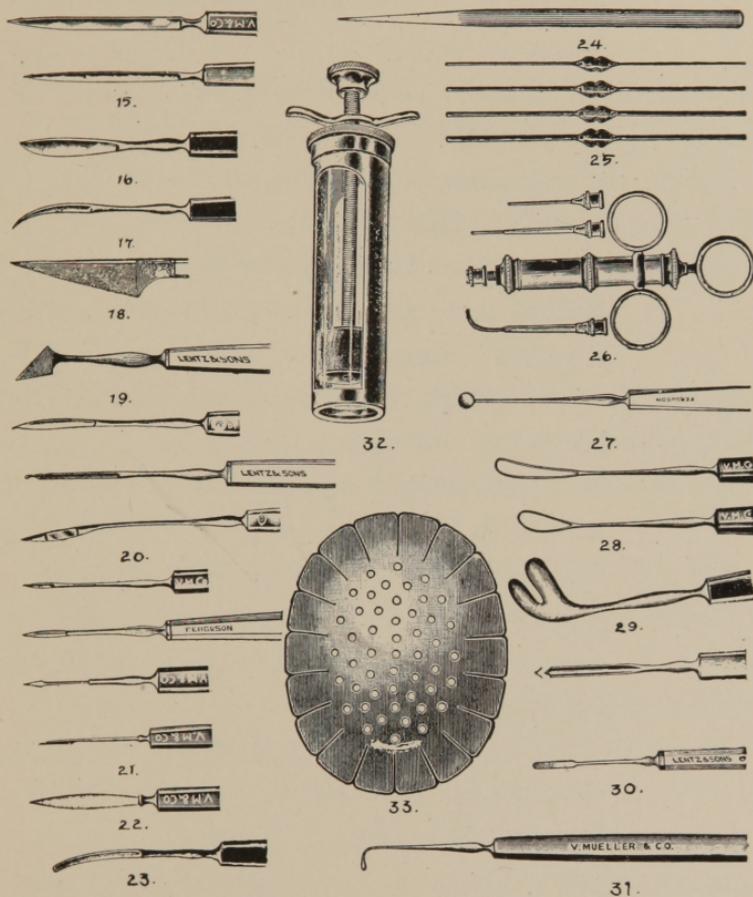
- No. 8. Iris forceps. For drawing the iris out through the corneal wound in doing an iridectomy.
- No. 9. Cilia forceps. For extracting wild hairs from the lid margin.
- No. 10. Advancement forceps. For holding the cut end of an external ocular muscle during the operation of advancement.
- No. 11. Capsule forceps. For grasping the lens capsule in cataract operations when the lens is extracted en capsule.
- No. 12. Fixation forceps. For holding the eyeball steady in all operations when it is to be operated on.
- No. 13. Trachoma roller forceps. For rolling out the granulations from the conjunctiva in trachoma.
- No. 14. Trachoma forceps. For squeezing out the granulations from the conjunctiva in trachoma.

PLATE II

- No. 15. Cataract knives. For making the corneal incision in cataract operations.
- No. 16. Scalpel. For making the initial incision in many operations on the lids.
- No. 17. Curved bistoury. For lancing abscesses, boils, etc., in the region of the eye.
- No. 18. Beers' knife. For incising the cornea. Used by some operators in the place of a cataract knife.
- No. 19. Keratome. For incising the cornea in performing an iridectomy.

No. 20. Canaliculus knife. For slitting or enlarging the puncta preparatory to probing same.

Plate II



No. 21. Needle knives. For needling or breaking up the lens in soft cataract or an opaque capsule several weeks or longer after the extraction of a cataract.

- No. 22. Paracentesis knife. For tapping the anterior chamber (making an incision through the cornea into the anterior chamber for the purpose of letting the aqueous escape when the tension of the eye is above par).
- No. 23. Blunt bistoury. For enlarging an incision which has been made by some other knife.
- No. 24. Lacrimal dilator. For dilating or stretching the puncta and lacrimal duct.
- No. 25. Lacrimal probes. For dilating or stretching the lacrimal duct, thus breaking up and destroying strictures of same.
- No. 26. Lacrimal syringe. For injecting fluids through the lacrimal sac and duct.
- No. 27. Chalazion scoop. For scooping out the contents of a chalazion (small tumor of eyelid formed by distention of a Meibomian gland with secretion).
- No. 28. Lens scoop. For extracting the lens which does not come out by the usual method during a cataract operation.
- No. 29. Enucleation spoon. For engaging and holding the optic nerve preparatory to cutting same in removal of the eyeball.
- No. 30. Foreign body spuds. For removing foreign bodies which are embedded in the cornea.
- No. 31. Strabismus hook. For engaging and drawing forward the external ocular muscles during operations on same.

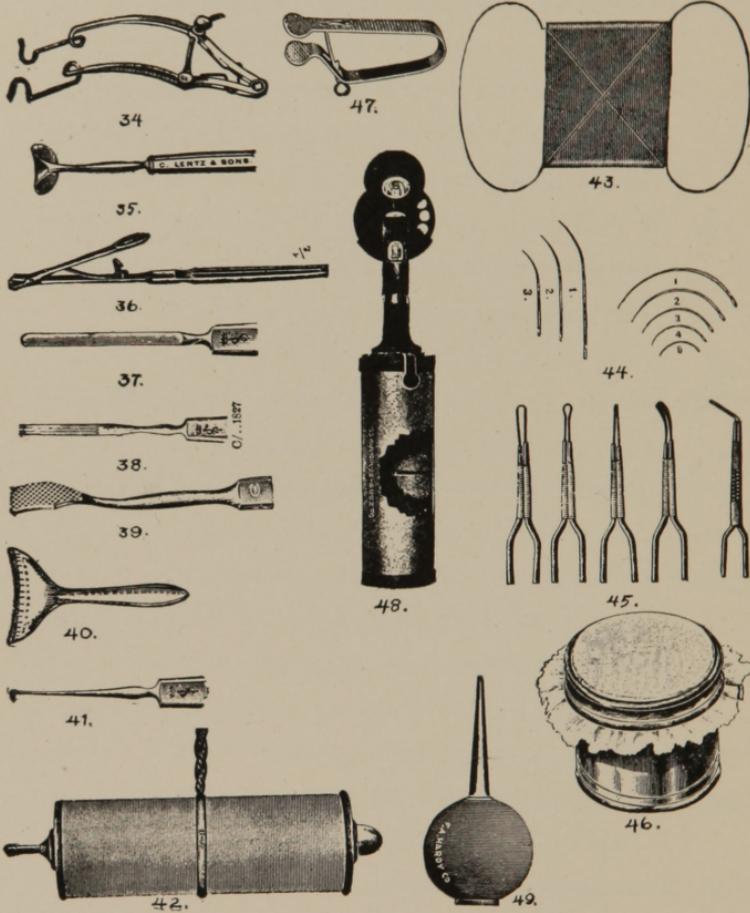
- No. 32. Artificial leech. For extracting blood from the temple.
- No. 33. Aluminum shield. For protecting the eye against blows, etc., after operations on the eyeball.

PLATE III

- No. 34. Eye speculum. For holding the lids apart during most operations on the eyeball.
- No. 35. Lid retractor. For holding the upper lid up and away from the eyeball during many operations on the latter.
- No. 36. Needle-holder (as name implies).
- No. 37. Spatula. For exerting pressure on the eyeball during extraction of the lens and for removing small particles of lens substance after cataract extraction.
- No. 38. Tattoo needle. For tattooing India-ink on the opaque cornea of a blind eye for the purpose of making it appear less conspicuous.
- No. 39. Trachoma file. For filing or rubbing out the granulations of a trachomatous lid.
- No. 40. Strabismometer. For measuring the degree of deviation in a case of strabismus.
- No. 41. Cystotome. For cutting the lens capsule preparatory to extraction of the lens in cataract operations.
- No. 42. Magnet. For extracting particles of steel or iron from the eye.

No. 43. Silk suture. Used in stitching up most wounds after injuries to or operations upon the eye.

Plate III



No. 44. Needles.

No. 45. Electrodes. For cauterizng corneal ulcers with the galvanocautery.

- No. 46. Test-drum. For testing the points and edges of eye-cutting instruments.
- No. 47. Puncta clamp. For closing the puncta when poisonous solutions are used in the eye, so that they will not flow through the tear duct into the nose.
- No. 48. Ophthalmoscope. For examining the media within the eye. With this simple instrument can be seen the optic nerve head, the retina, choroid, vitreous, and lens.
- No. 49. Soft-rubber bulb syringe. For flushing the eye with cleansing solutions.

A LIST OF SOME OF THE MOST COMMONLY PERFORMED OPERATIONS ON THE EYES, GIVING PURPOSE OF SAME AND THE INSTRUMENTS REQUIRED

OPERATIONS UPON THE CORNEA

Paracentesis of the Cornea.—For the purpose of allowing an escape of the aqueous humor, thereby temporarily reducing the intra-ocular tension.

Instruments.—Speculum (34), fixation forceps (12), paracentesis knife (22).

Saemisch's section is performed in those cases in which there exists a large sloughing ulcer of the cornea which is rapidly progressing, the corneal tissue itself being infiltrated with pus and accompanied by the condition known as hypopyon (pus in the anterior chamber).

Instruments.—Speculum (34), lid retractor (35), fixation forceps (12), cataract knife* (15).

Tattooing the Cornea.—This operation is done for cosmetic purposes, when there is a dense white opacity of one eye in or near the center of the cornea. It can be tattooed with India-ink so as to resemble at a short distance the black pupil of the opposite eye, thus rendering the appearance of the patient more agreeable.

Instruments.—Speculum (34), fixation forceps (12), India-ink and tattoo needles (38).

OPERATIONS UPON THE EXTERNAL OCULAR MUSCLES

Tenotomy (Partial or Complete).—For the purpose of lessening the strength of any particular one of the external ocular muscles in order to make it more nearly in the right proportional strength to its opponent.

Instruments.—Speculum (34), small toothed forceps (11), tenotomy scissors (2), strabismus hooks (31), needles (44), needle-holder (36), silk suture (43).

Advancement.—Performed for the purpose of increasing the strength of any particular one of the external ocular muscles in order to make it nearer the right proportional strength to its opponent.

Instruments.—Speculum (34), fixation forceps (12), iris forceps (8), tenotomy scissors (4), strabismus hooks (31), advancement forceps (10), needles (44), silk sutures (43), needle-holder (36).

Shortening of the external ocular muscles consists of taking a loop in a muscle or removing a piece, afterward suturing the ends together, in order to reduce the length and thereby increasing its strength.

Instruments.—Speculum (34), fine-toothed forceps (11), tenotomy scissors (4), strabismus hooks (31), muscle tucker, needles (44), needle-holder (36), silk sutures (43).

LID OPERATIONS

Chalazion Operation.—For removal of a chalazion or cystic tumor of lids.

Instruments.—Chalazion clamp (6), scalpel (16), chala-

zion spoon (27), lacrimal syringe (26), needles (44), needle-holder (36), silk suture (43).

Ectropion Operation.—For the correction of ectropion or eversion of the lid margin.

Instruments.—Ectropion forceps (7), scalpel (16), small toothed forceps (11), straight scissors (1), needles (44), needle-holder (36), silk suture (43).

Entropion Operation.—For the correction of entropion or inversion of the lids.

Instruments.—Scalpel (16), small toothed forceps (11), straight scissors (1), needles (44), needle-holder (36), silk suture (43).

OPERATIONS UPON THE LENS AND LENS CAPSULE

Cataract Extraction.—For the purpose of delivering the cataractous lens *in toto*.

Instruments.—Speculum (34), fixation forceps (12), cataract knife (15), iris forceps (8), iris scissors (3), cystotome (41), spatula (37), lens scoop (28), capsule forceps (11).

Needling Operation for Secondary Cataract.—When a hard cataract is extracted without the capsule, the latter is apt to become opaque later on and obstruct vision. The needling is done for the purpose of making an opening or pupil through this opaque capsule.

Instruments.—Speculum (34), fixation forceps (12), knife needle (21).

Discission of Cataract.—Performed in cases of soft cataract where it is desired to get rid of a cataractous lens by

absorption. An opening is made in the anterior capsule of the lens, thus permitting the entrance of aqueous humor, which produces dissolution of the lens substance and is followed by its absorption.

Instruments.—Speculum (34), fixation forceps (12), needle knives (21).

OPERATIONS UPON THE SCLERA

Anterior Sclerotomy.—Performed for the purpose of lessening the intra-ocular tension in glaucoma.

Instruments.—Speculum (34), fixation forceps (12), cataract knife (15).

Posterior Sclerotomy.—Performed in cases of detached retina and as a preliminary operation to iridectomy in cases of glaucoma.

Instruments.—Speculum (34), fixation forceps (12), cataract knife (15).

OPERATIONS UPON THE IRIS

Iridectomy consists of removing a V-shaped piece of the iris. It is performed for many purposes, among which are the relief of intra-ocular tension (glaucoma); the improvement of vision where there is a large central opacity of the cornea and as a preliminary to the operation for the extraction of cataract.

Instruments.—Speculum (34), fixation forceps (12), keratome (19), cataract knife (15), iris forceps (8), iris scissors (3), spatula (37).

Iridotomy is usually performed for the purpose of making an artificial pupil, when the pupil has been closed by severe inflammation or exudation. A slit is made in the iris in such a manner that the contraction of the fibers of the membrane on either side of the slit will make an opening through which the patient can see.

Instruments.—Speculum (34), fixation forceps (12), keratome (19), DeWecker scissors.

OPERATION UPON THE EYEBALL

Enucleation of the Eyeball.

Instruments.—Speculum (34), small toothed forceps (11), tenotomy scissors (4), strabismus hook (31), enucleation spoon (29), enucleation scissors (51).

GLOSSARY ¹

Abrasion.—1. A rubbing or scraping off. 2. A spot rubbed bare of skin or mucous membrane.

Adipose.—Of a fatty nature; fatty; fat.

Albinism.—Abnormal, but not pathologic, whiteness of the skin, hair, and eyes; achromoderma. This condition is often attended with astigmatism, photophobia, and nystagmus.

Albino.—A person affected with albinism.

Albumin.—A simple protein found in nearly every animal and in many vegetable tissues, and characterized by being soluble in water and coagulable by heat. It contains carbon, hydrogen, nitrogen, oxygen, and sulphur.

Alkali.—Any one of a class of compounds which form salts with acids and soaps with the fats.

Alkaloid.—Any alkaline or basic principle of vegetable origin. The alkaloids are nearly all unsaturated ammonia compounds or amins, and act like ammonia in combining with acids to form crystalline salts.

Amblyopia.—Dimness of vision from imperfect sensation of the retina and without organic lesion of the eye.

Anemia, Anæmia.—A condition in which the blood is deficient either in quantity (*oligemia*) or in quality. The deficiency in quality may consist in diminution of the amount of

¹The definitions given in this Glossary are taken from Dorland's American Illustrated Medical Dictionary.

hemoglobin (*oligochromemia*) or in diminution of the number of red blood-corpuscles (*oligocythemia*).

Anesthesia, Anæsthesia.—Loss of feeling or sensation, especially loss of tactile sensibility, though the term is used for loss of any of the other senses.

Anesthetic.—1. Without the sense of touch or of pain. 2. A drug that produces anesthesia.

Anesthetist.—An expert in administering anesthetics.

Anodyne.—Relieving pain. A medicine that relieves pain. The anodynes include opium, morphin, codein, hyoscin, atropin, coniin, ether, lupulin, potassium bromid.

Anomaly.—Marked deviation from the normal standard.

Antidote.—A remedy for counteracting a poison.

Antiseptic.—Preventing decay or putrefaction. A substance destructive to poisonous germs. Some of the chief antiseptics are alcohol, boric acid, phenol, creosote, corrosive sublimate, common salt, charcoal, chlorin, tannic acid, sugar, and vinegar.

Appendage.—Any thing or part appended.

Aqueous.—Watery; prepared with water.

Asepsis.—Absence of septic matter, or freedom from infection.

Assimilation.—The transformation of food into living tissue.

Atrophy.—A wasting or diminution in the size of a part; defect or failure of nutrition.

Atropinism, Atropism.—Poisoning due to the misuse of atropin or of belladonna.

Blepharitis.—Inflammation of the eyelids.

Bulbar.—Pertaining to a bulb, particularly the eyeball.

Canthus.—The angle at either end of the slit between the eyelids: the canthi are distinguished as an outer or temporal and inner or nasal.

Centigrade.—Having one hundred degrees or grades.

Centrifugal.—Moving away from a center; efferent or exodic.

Centripetal.—Moving toward a center; esodic or afferent.

Chalazion.—A small tumor of the eyelid, formed by the distention of a meibomian gland with secretion.

Choroiditis.—Inflammation of the choroid coat of the eye.

Cilia.—The eyelashes.

Coagulation.—The process of changing into a clot or of being changed into a clot.

Cocainism.—The morbid habit of mind and body caused by prolonged misuse of cocain as a stimulant or a narcotic.

Coma.—Profound stupor occurring in the course of a disease or after severe injury.

Conjunctivitis.—Inflammation of the conjunctiva.

Culdesac.—A blind pouch or cecum; a cavity closed at one end.

Cyclitis.—Inflammation of the ciliary body.

Cycloplegia.—Paralysis of the ciliary muscle.

Defecation.—The discharge of fecal matters from the bowel.

Deliquescence.—The condition of becoming liquefied as a result of the absorption of water from the air.

Delirium.—A mental disturbance marked by illusions, hallucinations, short unsystematized delusions, cerebral excitement, physical restlessness and incoherence, and having a comparatively short course.

Diaphoresis.—Perspiration, and especially profuse perspiration.

Diplopia, Diplopy.—The seeing of single objects as double or two.

Discission.—A cutting in twain, or division, as of a soft cataract.

Ecchymosis.—An extravasation of blood; also a discoloration of the skin caused by the extravasation of blood.

Ectropion, Ectropium.—Eversion or turning out of the edge, as of an eyelid.

Eczematous.—Affected with or of the nature of eczema.

Edema, Œdema.—Swelling due to effusion of watery liquid into the connective tissue.

Enema.—A clyster or injection; a liquid thrown or to be thrown into the rectum.

Enucleation.—The removal of a tumor or other body in such a way that it comes out clean and whole, like a nut from its shell.

Epithelium.—The covering of the skin and mucous membranes, consisting wholly of cells of varying form and arrangement.

Erysipelas.—An acute febrile, somewhat contagious disease, believed to be due to the presence of *Streptococcus erysipelatis*, and marked by chill, fever, and intense local redness of the skin and mucous membranes.

Extra-ocular.—Outside of the eyeball.

Flatulence.—Distention of the stomach or intestines with air or gases.

Focus.—The point of convergence of light rays or of the waves of sound.

Fomentation.—Treatment by warm and moist applications; also the substance thus applied.

Fungate.—To grow rapidly like a fungus.

Fungus.—A growth on the body resembling a fungus; a spongy mass of morbid granulation tissue.

Galvanocautery.—Cautery by a wire heated with a galvanic current.

Glaucoma.—A disease of the eye marked by intense intra-ocular pressure, resulting in hardness of the eye, atrophy of the optic disk, and blindness.

Gonococcus.—A bacterial coccus, the specific organism of gonorrhœa: the *Micrococcus gonorrhœæ*.

Hygroscopic.—Readily absorbing moisture.

Hypermetropia, Hyperopia.—Far-sightedness.

Hypopyon.—An accumulation of pus in the anterior chamber of the eye.

Idiosyncrasy.—A habit or quality of body or mind peculiar to any individual.

Impregnation.—1. The act of fecundation or of rendering pregnant. 2. The process or act of saturation; a saturated condition.

Incrustation.—The formation of a crust; a crust, scale, or scab.

Indolent.—Causing little pain, as an *indolent* tumor.

Inorganic.—1. Having no organs. 2. Not of organic origin.
3. Pertaining to substances not of organic origin.

Instil.—To apply a remedy by drops.

In toto.—As a whole; completely.

Intra-ocular.—Situated within the eye.

Inunction.—The act of anointing or of applying an ointment with friction.

Iridectomy.—Surgical removal of a part of the iris by cutting.

Iritis.—Inflammation of the iris. The condition is marked by pain, congestion in the ciliary region, photophobia, contraction of the pupil, and discoloration of the iris. It is caused by injury, syphilis, rheumatism, gonorrhoea, tuberculosis, etc.

Isolate.—To separate from other persons, materials, or objects.

Keratitis.—Inflammation of the cornea.

Lanolin.—Rectified wool-fat: used as an excipient for remedies for external use.

Lymph.—A transparent, slightly yellow liquid of alkaline reaction which fills the lymphatic vessels. It is occasionally of a light rose color from the presence of red blood-corpuscles, and is often opalescent from particles of fat.

Micro-organism.—Any minute animal or plant.

Milliampere.—One-thousandth part of an ampere.

Monocular.—Pertaining to or having but one eye.

Mucopurulent.—Containing both mucus and pus.

Myopia.—Near-sightedness, or short sight; defective eyesight due to too great refractive power of the eye, so that the rays coming from an object beyond a certain distance are focused in front of the retina.

Narcotic.—1. Producing sleep or stupor. 2. Any drug that produces sleep or stupor and at the same time relieves pain.

Occiput.—The back part of the head.

Palpebral.—Pertaining to an eyelid.

Pannus.—An abnormal membrane-like vascularization of the cornea, mainly due to the presence of trachomatous granulations.

Paracentesis.—Surgical puncture of a cavity; to draw off fluid; tapping.

Pathogenic, Pathogenetic.—Giving origin to disease or to morbid symptoms.

Pharmacopeia, Pharmacopœia.—An authoritative treatise

on drugs and their preparations. The United States Pharmacopeia is revised and issued every ten years, under the supervision of a national committee.

Pink-eye.—An epidemic, contagious conjunctivitis due to the bacillus of conjunctivitis.

Pipet, Pipette.—A glass tube used in handling small quantities of liquid or gas.

Presbyopia.—Long sight and impairment of vision due to advancing years or to old age. It is dependent on diminution of the power of accommodation from loss of elasticity of the crystalline lens, causing the near-point of distinct vision to be removed farther from the eye.

Prognosis.—A forecast as to the probable result of an attack of disease; the prospect as to recovery from a disease afforded by the nature and symptoms of the case.

Prolapse.—The falling down, or sinking, of a part or viscus; proidentia.

Prophylaxis.—The prevention of disease; preventive treatment.

Ptyalism.—Excessive secretion of spittle; salivation.

Purgative.—1. Cathartic; causing evacuations from the bowels. 2. A cathartic medicine.

Purulent.—Consisting of or containing pus; associated with the formation of or caused by pus.

Reaction.—Opposite action, or counteraction; the response of a part to stimulation.

Reflex.—1. Reflected. 2. A reflected action or movement.

Sanguine.—1. Abounding in blood. 2. Ardent; hopeful.

Sclerotomy.—Surgical incision of the sclera.

Senile.—Of, or pertaining to, old age.

Serum.—The clear portion of any animal liquid separated from its more solid elements; especially the clear liquid (*blood-serum*) which separates in the clotting of blood from the clot and the corpuscles. Blood-serum from animals that have been inoculated with bacteria or their toxins. Such serum, when introduced into the body, produces passive immunization by virtue of the antibodies which it contains.

Shock.—Sudden vital depression, due to an injury or emotion which makes an untoward impression upon the nervous system.

Siphon.—A bent tube of two unequal arms: used in the transfer of liquids, also in wound-drainage and in lavage of the stomach.

Solvent.—1. Dissolving; effecting a solution. 2. A liquid that dissolves or that is capable of dissolving.

Specific.—1. Pertaining to a species. 2. Produced by a single kind of micro-organism. 3. A remedy specially indicated for any particular disease.

Sphincter.—A ring-like muscle which closes a natural orifice.

Strabismus.—A squint; deviation of one of the eyes from its proper direction, so that the visual axes cannot both be directed simultaneously at the same objective point.

Suppository.—An easily fusible medicated mass to be introduced into the vagina, rectum, or urethra.

Suprarenal Capsule.—A small organ in front of the upper part of either kidney.

Sympathetic Ophthalmia.—Inflammation of the iris and of the ciliary apparatus following disease or injury of the fellow-eye.

Technic.—The method of procedure and the details of any mechanical process or surgical operation.

Tenotomy.—The cutting of a tendon, as for strabismus or club-foot.

Toxicity.—The quality of being poisonous, especially the degree of virulence of a toxic microbe or of a poison.

Trachoma.—Contagious granular conjunctivitis, or granular lids; a disease of the conjunctiva attended by the formation of small elevations on the conjunctiva of the lids and by atrophy, cicatricial contraction, and deformity of the lids.

Traumatism.—1. A condition of the system due to an injury or wound. 2. A wound.

Vehicle.—A liquid substance in which a medicine is dissolved or incorporated.

CATECHISM

DIRECTIONS FOR USING

[The first figure indicates the page; the second figure, the line on the page.]

THE questions asked in this Catechism cover everything of any importance pertaining to ophthalmic nursing.

After a thorough perusal of the preceding chapters, and perhaps a review of same, the nurse should write down on paper the answer to each question, numbering them accordingly. When all of these questions have been answered in this way she may refer to the page and line indicated by the number after each question to see how correctly she answered it. She should mark the questions which are not satisfactorily answered, again review the subject matter pertaining thereto, and after a lapse of a few days, repeat the examining process as described above.

1. What is the shape of the orbit? 22—6.
2. Of how many bones does the orbit consist, and what are they? 22—8.
3. What is the function of the orbital fat? 23—5.
4. What is the length of the average eyeball? 23—7.
5. Of how many tunics or coats is the eyeball composed? 23—8.
6. Of what is the first tunic of the eyeball composed? 23—9.
7. Describe the cornea. 23—10.
8. In what way is the cornea nourished? 23—13.
9. Describe the nerve supply of the cornea. 23—15.
10. Describe the sclera. 23—22.
11. By what is the sclera perforated? 23—26.
12. What are the *venæ vorticosæ*? 23—28.
13. Of what is the second or middle coat of the eyeball composed? 24—3.
14. What is the uveal tract? 24—5.
15. How does the iris derive its name? 24—7.
16. Upon what does the color of the iris depend? 24—9.
17. What makes the eye of the albino pink in color? 24—10.

18. What color have all eyes at birth? 24—14.
19. At what age does the iris change color? 25—1.
20. Why are dark colored eyes stronger than light colored ones? 25—2.
21. Describe the anterior and posterior chambers of the eye. 25—5.
22. Describe the muscular system of the eyes. 25—7.
23. What muscular fibers of the iris cause contraction of the pupil? 25—7.
24. What muscular fibers of the iris cause dilation of the pupil? 25—8.
25. Describe the ciliary body. 25—10.
26. Describe the ciliary muscle. 25—15.
27. Describe the choroid. 25—18.
28. What is the function of the choroid? 25—19.
29. Of what is the third or inner tunic of the eyeball composed? 25—23.
30. Describe the retina. 25—24.
31. What is the function of the retina? 25—27.
32. What is the optic disk or papilla? 26—3.
33. What is the fovea centralis? 26—6.
34. What is the function of the fovea centralis? 26—9.
35. What is the macula lutea? 26—12.
36. How many humors within the eye? 26—15.
37. Describe the aqueous humor. 27—1.
38. How is the aqueous humor secreted? 27—3.
39. What is the function of the aqueous humor? 27—4.
40. Describe the crystalline lens. 27—8.
41. What is the ciliary ligament? 27—12.
42. From what source does the ciliary ligament receive its nourishment? 27—14.
43. Explain the method in which the lens adjusts itself for vision at different distances. 27—15.
44. Describe the vitreous humor. 28—3.
45. What is the hyaline membrane? 28—5.
46. How does the vitreous humor receive its nourishment? 28—8.
47. Describe the pupil. 28—9.
48. What is the function of the pupil? 28—11.
49. What is the average diameter of the pupil when the iris is at rest? 28—14.
50. How does the pupil vary in people of different temperaments? 28—16.
51. Does the pupil change in size with age, and if so, how? 29—3.

52. What other general conditions affect the size of the pupil? 29—4.
53. What refractive errors have any influence on the size of the pupil? 29—5.
54. How does general anesthesia affect the pupil? 29—9.
55. How is the pupil affected by distant and close vision? 29—10.
56. How does the general health affect the pupil? 29—12.
57. How many muscles are there which perform all the movements necessary in the function of vision? 29—14.
58. Is sight a passive or an active function? 30—2.
59. How many external ocular muscles are there, and what are they? 30—9.
60. Describe the internal rectus muscle. 30—10.
61. Describe the external rectus muscle. 30—13.
62. Describe the inferior rectus muscle. 30—16.
63. Describe the superior rectus muscle. 31—2.
64. Describe the superior oblique muscle. 31—5.
65. Describe the inferior oblique muscle. 31—10.
66. What is the function of the eyebrows? 31—15.
67. What is the function of the eyelids? 31—19.
68. Describe the eyelids. 31—20.
69. Describe the conjunctiva. 31—25.
70. What is the palpebral conjunctiva? 32—1.
71. What is the bulbar conjunctiva? 32—2.
72. Describe the epithelial layer of the conjunctiva. 32—2.
73. Describe what happens when a foreign substance gets into the eye. 32—5.
74. When are the conjunctival blood-vessels visible and when invisible? 32—9.
75. What are the cilia of the eye? 32—12.
76. What is the principal function of the cilia? 32—13.
77. Describe the Meibomian glands. 32—17.
78. What seems to be the function of the Meibomian glands? 32—18.
79. Of what does the lacrimal apparatus consist? 33—1.
80. Describe the lacrimal gland. 33—3.
81. What is the function of the lacrimal gland? 33—5.
82. Describe the lacrimal punctæ. 33—6.
83. What is the function of the lacrimal secretion? 34—3.
84. Why do the tears run over the cheek when one cries? 34—6.
85. Through what tissues of the eye do rays of light enter before they become focused upon the retina? 35—1.

86. Describe the eye with normal refraction. 35—4.
87. Describe the near-sighted eye. 35—7.
88. Describe the far-sighted eye. 35—9.
89. How does the focusing in the eye differ from that in the camera?
36—6.
90. Describe the change which takes place in the lens during the
act of accommodation. 37—1.
91. Describe accommodation. 37—6.
92. Why is the near-sighted eye not required to accommodate as
much as the far-sighted eye? 37—12.
93. Why is the far-sighted eye required to accommodate more than
the eye with normal refraction? 38—1.
94. How are refractive errors corrected? 38—5.
95. What kind of lens is required in the correction of near-sighted-
ness? 38—8.
96. What kind of lens is required in the correction of far-sighted-
ness? 38—11.
97. What is the cause of so-called "old sight"? 39—6.
98. At what age does old sight manifest itself? 39—16.
99. What condition besides age will hasten old sight? 39—18.
100. Why are people with a small amount of near-sightedness apt
to neglect the correction of same? 40—1.
101. Near-sightedness left uncorrected will do what? 40—4.
102. How is blindness frequently caused by progressive near-sighted-
ness? 40—6.
103. What causes detachment of the retina in high degrees of near-
sightedness? 40—7.
104. Describe astigmatism. 40—12.
105. To what is astigmatism due? 41—2.
106. How many kinds of astigmatism are there? 42—3.
107. Describe simple far-sighted astigmatism. 42—4.
108. Describe simple near-sighted astigmatism. 42—7.
109. Describe compound far-sighted astigmatism. 42—9.
110. Describe compound near-sighted astigmatism. 42—11.
111. Describe mixed astigmatism. 42—13.
112. Describe irregular astigmatism. 42—14.
113. What care should be taken of the newborn babe's eyes?
43—4.
114. What eye disease is responsible for two-thirds of the inmates
of our blind institutions? 43—15.
115. What precaution should be taken relative to exposure of
infants' eyes to bright light? 43—18.

116. What is the harm of holding objects too close to the eyes of infants? 44—13.
117. What eye diseases are likely to occur during the period of teething? 44—16.
118. What is a common cause of cataract in children? 44—18.
119. Why should the eyes not be used a great deal for close work at an early age? 44—20.
120. Why should every child undergo a thorough examination of the eyes before entering upon school life? 44—25.
121. What are some of the causes of near-sightedness? 45—3.
122. What is the longest period of time that a child of six or seven should be allowed to use his eyes for close work? 45—11.
123. Why should mental work not be required of a child immediately after a meal? 45—15.
124. What kind of books should be placed in the hands of young children? 45—21.
125. Why should patients not be allowed to read while lying down or while convalescing from disease? 46—3.
126. How should a boric acid solution be instilled into the eyes? 47—5.
127. How should poisonous solutions be instilled into the eyes? 48—9.
128. How are little children best managed when drops are to be instilled into their eyes? 49—9.
129. What precaution should be taken regarding the use of the pipet? 50—8.
130. What precaution should be taken regarding the pipet used in contagious eye diseases? 51—8.
131. What precaution should be taken regarding the use of a pipet which has been previously used for a mydriatic? 51—10.
132. When and how should a bulb syringe be used in eye cases? 51—16.
133. How is the eye-cup used? 51—20.
134. Why should a camel's-hair brush not be employed in the application of fluid to the eye? 52—5.
135. What precaution should be observed regarding the use of poisonous solutions in the eyes of small children? 52—8.
136. Describe the symptoms of atropism. 52—16.
137. How would you evert the lower lid? 53—10.
138. How would you evert the upper lid? 53—13.
139. What effect upon the eye do cold packs have? 54—6.
140. In what class of eye cases are cold packs used? 55—3.

141. What precaution should be used regarding the use of cold packs on the eye? 55—4.
142. What is the advisable thing to do with injuries of the eye when seen early? 55—7.
143. What effect do hot packs have upon the eye? 55—11.
144. In what class of eye cases are hot packs indicated? 55—13.
145. Why are hot packs especially indicated in inflammation of the cornea? 55—15.
146. How are dry hot packs prepared for use on the eye? 56—4.
147. How are moist hot packs prepared for use on the eye? 56—6.
148. How are cold packs prepared for use on the eye? 57—1.
149. How should the face be prepared for hot or cold packs? 57—14.
150. How are ointments applied in the eye? 58—3.
151. How are powders applied in the eye? 59—9.
152. In what class of eye cases are poultices used? 59—15.
153. What effect does massage have upon the eye? 59—21.
154. In what class of cases is massage of the eye contraindicated? 60—2.
155. How is massage of the eyes applied? 60—5.
156. What forms of electricity are used in eye work? 61—10.
157. In what class of eye cases is electricity used? 61—11.
158. How is the galvanic current used on the eye? 61—15.
159. In what class of eye cases are leeches employed? 61—24.
160. What effect does leeching have upon an inflamed eye? 61—27.
161. Where are the best leeches from? 62—2.
162. How much blood will an ordinary leech extract? 62—2.
163. How are leeches tested? 62—4.
164. Where and how are leeches applied? 62—7.
165. How are leeches removed? 62—17.
166. What is the most satisfactory method of local depletion in eye diseases? 62—20.
167. If continued bleeding is desired after leeching how may it be accomplished? 63—5.
168. How may bleeding from a leech bite be checked? 63—6.
169. For what purpose are counterirritants used? 63—17.
170. What remedies are generally used as counterirritants? 63—18.
171. Where are they usually applied? 63—19.
172. In what class of cases are mercurial inunctions applied? 64—7.
173. What preparation of mercury is generally used for inunction? 64—10.
174. How are inunctions applied? 64—12.

175. What precautions should be taken while using mercurial inunctions? 64—21.
176. In what class of eye cases is sweating or diaphoresis indicated? 65—3.
177. What do we usually do to produce diaphoresis? 65—5.
178. Why is rest a necessary adjunct in the treatment of eye diseases? 65—15.
179. What remedies do we frequently give to induce sleep? 65—19.
180. How can the eyes be rested other than by sleep? 65—25.
181. What class of eye diseases are contagious? 66—3.
182. How should purulent eye cases be managed? 66—8.
183. What precautions should the nurse take in handling purulent eye cases? 66—12.
184. What should the nurse do if she infects her own eye while treating a purulent case? 66—16.
185. What precaution should be taken when a purulent disease is limited to one eye? 66—22.
186. Describe a Buller's shield. 66—28.
187. How may the unaffected eye of an infant be protected against discharge from the affected eye? 67—6.
188. What is the most common purulent affection in childhood? 67—16.
189. How long after birth does ophthalmia neonatorum appear? 68—4.
190. What is ophthalmia neonatorum? 68—5.
191. Why is the eye a favorable ground for the growth of microorganisms? 68—16.
192. What is the most important step in the treatment of purulent eye cases? 68—20.
193. What solutions are generally used for cleansing purulent eyes? 68—23.
194. How can ophthalmia neonatorum usually be prevented? 69—13.
195. What routine treatment should be pursued with all newborn babes? 69—18 and 70—7.
196. What unfavorable action upon the eye does the instillation of silver nitrate solutions have at times? 69—23.
197. When a silver nitrate solution is used in the eye how should it be applied? 70—1.
198. What particular observations should be made by the nurse in cases that are being prepared for eye operation? 71—12.
199. Describe preparation of patient for eye operation. 72—3.

200. Describe the way a woman's hair should be dressed preparatory to an eye operation. 72—13.
201. How should the eye be prepared preliminary to an eye operation? 73—4.
202. What should the diet be preliminary to an eye operation? 73—14.
203. In selecting the room for an operation at patient's home what conditions should be considered? 74—6.
204. If artificial light is necessary for the operation what particular light is most desirable? 74—10.
205. What objection is there to lamp or gas light where operations are to be performed under a general anesthetic? 74—12.
206. How should the room at one's home be prepared for an operation? 74—17.
207. What preparation should be made at one's home for the operation? 74—25.
208. How should the bed of a patient be prepared who has undergone an operation under general anesthesia? 75—28.
209. What precaution should be taken regarding the sterilization of cutting eye instruments? 76—15.
210. How should non-cutting eye instruments be sterilized? 76—18.
211. How are cutting eye instruments tested? 77—3.
212. How are cutting eye instruments prepared for operation? 77—7.
213. What precaution should be taken in handling cutting eye instruments? 77—14.
214. How should the solutions be prepared for eye operations? 77—21.
215. What is a good way of preparing solutions for eye operations at the home? 78—1.
216. Which is preferable, the sterilization of dressings by dry heat or by steam? 78—8.
217. What are the usual dressings required for most eye operations? 78—12.
218. Why is it especially necessary for the nurse who assists in operations to have her hands absolutely sterile? 78—17.
219. How should the hands be prepared preliminary to an operation? 78—20.
220. How should a patient be prepared when brought in the operating room? 79—2.
221. Why should the nurse familiarize herself with the technic of the various eye operations? 79—11.

222. What is the proper temperature of the operating room? 79—18.
223. What are the duties of the nurse after completion of an eye operation? 79—22.
224. What kind of bandage is applied after an operation upon the eyeball like cataract extraction or iridectomy? 80—2.
225. Describe the Knapp dressing. 80—3.
226. Describe the figure-of-8 bandage. 80—8.
227. Describe the monocular bandage. 81—6.
228. For what two purposes are bandages applied? 81—9.
229. In what class of eye cases is the pressure bandage applied? 81—10.
230. In what class of eye cases is the protective bandage applied? 81—13.
231. What should the nurse do if the bandage becomes disarranged? 82—5.
232. What should the nurse do if the patient interferes with his bandage? 82—9.
233. What should the nurse do if blood or discharge shows through a pressure bandage? 82—11.
234. Why is it necessary to cover a pressure bandage through which discharge or blood shows? 82—13.
235. How should a patient be removed from the operating table when operation has been done under a local anesthetic? 82—21.
236. What should be done with all pathologic specimens which have been removed by operation? 83—4.
237. What precautions should be observed after patient has been removed to his own room following operation under general anesthesia? 84—12.
238. What precautions should be taken relative to a patient with both eyes bandaged? 85—1.
239. What observation should be made relative to the patient's temperature following an operation upon the eye? 85—3.
240. What should the nurse do in case the patient complains of pain after operation upon the eye? 85—8.
241. What should be done if patient complains of chill or sudden weakness after an eye operation? 85—15.
242. What should be done if the patient feels disposed to sneeze after cataract operation? 85—18.
243. If there is a tendency for the patient to vomit after cataract operation what should the nurse do? 85—20.

244. What should be done in case symptoms of shock are manifest after an operation on the eye? 85—28.
245. What are the symptoms of shock? 86—2.
246. If suppuration, iritis, or prolapse of the iris take place in an eye which has been successfully operated upon, what are we naturally to assume? 86—12.
247. How should a patient lie during the first twenty-four hours after a cataract operation? 86—24.
248. If a cataract patient finds his position irksome what should the nurse do? 86—26.
249. What diet should be given for the first few days after a cataract operation? 87—1.
250. What medicine is generally administered for the first ten or twelve hours following cataract operations? 87—4.
251. Why should cathartics never be administered within four days after cataract operations? 87—7.
252. What should be done in case urination is difficult after cataract operations? 87—13.
253. Why are patients who have had cataract operations prone to suffer from depression? 87—18.
254. How may such depression be warded off? 87—20.
255. How many days after cataract extraction is the bandage usually removed from the non-operated eye? 87—23.
256. What precaution should be taken at the time the bandage is removed from the non-operated eye? 87—25.
257. What preparation should the nurse make for the surgeon's call after cataract operations? 88—4.
258. What should the eye tray contain? 88—15.
259. What are local anesthetics? 90—6.
260. Under what form of anesthesia are most ophthalmic operations performed? 90—9.
261. Name the local anesthetics used in eye work. 90—11.
262. What are analgesics? 90—13.
263. Name the analgesics used in eye work. 90—19.
264. What are antiseptics? 90—22.
265. In what class of eye cases are antiseptics used? 91—2.
266. Name the principal antiseptics used in eye work. 91—6.
267. What are astringents? 91—11.
268. Name the principal astringents used in ophthalmology. 91—17.
269. What are caustics? 91—21.
270. For what are caustics used in eye work? 91—22.
271. Name the caustics used in eye work. 91—26.

272. What are counterirritants? 92—1.
273. Name the counterirritants used in eye work. 92—4.
274. What are disinfectants? 92—5.
275. Name some of the disinfectants used in eye work. 92—7.
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465. What effect upon tissues does pyoctanin have? 118—7.
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474. In what class of eye cases is the use of silver nitrate contra-indicated? 119—4.
475. How will the light affect a solution of silver nitrate? 119—7.
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478. What effect does sodium borate have when combined with a solution of boric acid? 119—22.
479. For what purpose is sodium chlorid sometimes used in eye work? 119—25.
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481. What effect upon the eye does a solution of tannic acid have? 120—10.
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486. In what class of eye cases is zinc sulphate generally used? 120—25.

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488. Iris scissors. 124—17.
489. Enucleation scissors. 124—21
490. Chalazion clamp. 125—1.
491. Ectropion forceps. 125—4.
492. Iris forceps. 126—1.
493. Cilia forceps. 126—3.
494. Advancement forceps. 126—6.
495. Capsule forceps. 126—8.
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497. Trachoma forceps. 126—13.
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500. Curved bistoury. 126—21.
501. Beers' knite. 126—23.
502. Keratome. 126—25.
503. Canaliculus knife. 127—1.
504. Needle knives. 127—3.
505. Paracentesis knife. 128—1.
506. Blunt bistoury. 128—6.
507. Lacrimal dilator. 128—8.
508. Lacrimal probes. 128—10.
509. Lacrimal syringe. 128—13.
510. Chalazion scoop. 128—15.
511. Lens scoop. 128—17.
512. Enucleation spoon. 128—20.
513. Foreign body spud. 128—23.
514. Strabismus hook. 128—25.
515. Artificial leech. 129—1.
516. Aluminum shield. 129—3.
517. Eye speculum. 129—5.
518. Lid retractor. 129—7.
519. Needle holder. 129—10.
520. Spatula. 129—11.
521. Tattoo needle. 129—15.
522. Trachoma file. 129—18.
523. Strabismometer. 129—20.
524. Cystotome. 129—22.
525. Magnet. 129—25.
526. Electrodes. 130—4.
527. Test-drum. 131—1.
528. Puncta clamp. 131—3.
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532. What instruments are required for the Saemisch section?
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534. What instruments are required for tattooing the cornea?
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540. What instruments are required for shortening the external ocular muscles? 133—20.
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542. What instruments are required for a chalazion operation?
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