vexity either sharply outlined by a more or less conspicuously pigmented border or shading gradually into the normal choroidal tissue in the general direction of the fovea. Traversing this area the finer retinal vessels, which supply the region about the macula, are seen somewhat straightened in their course, as if stretched longitudinally. The crescent may vary in width from a thin sickle-shaped band at the disc-margin, from which it is with difficulty to be distinguished, to a large area, approximately parabolic in outline, which, from its resemblance to a conic section, has been named "conus." In other cases, especially in myopia of high grade, the approximately regular curvilinear outline is lost, the altered area taking on irregular and often bizarre shapes.

The myopic crescent is essentially the expression of a localized atrophy of the choroid, accompanied in many cases by a stretching and thinning of the sclera adjacent to and mainly at the temporal side of the optic disc. It then becomes an area of least resistance which may be the seat of a gradually increasing protuberance or, in extreme cases, of a deforming boss, at the posterior pole of the eye (*staphyloma posticum*).

The pathological processes leading to the development of the crescent are still imperfectly understood. In general, the ophthalmoscopic appearances are such as to suggest a sliding of the choroid on the sclera, with attendant stretching of the choroidal tissue at the temporal side of the disc. As a result of this stretching, a localized choroidal inflawmation of low grade, passing into atrophy, may be invoked as offering the best explanation of the origin and subsequent enlargement of the crescentic area. The irregular extension of the conus in advanced stages of the disease is clearly the expression of atrophy following choroiditis. Atrophic spots in different parts of the fundus, indicating areas of previous circumscribed inflammation of the choroid, are of not infrequent occurrence in high grades of myopia.

The optic disc in myopic eyes often presents an oval contour, as if shortened in its horizontal diameter. This appearance may be simply the effect of foreshortening due to an oblique position of the disc with reference to the direction from which it is viewed. In many cases, however, there is almost certainly an actual variation from the typical circular form.

Capillary hyperæmia of the disc is a frequent condition, especially in young myopes whose myopia is in the progressive stage; it may be regarded as the local expression of general ocular hyperæmia. At a later period, after the congestion has disappeared, the disc often assumes a pallid tint indicative of anæmia, and may even present the appearance of a shallow excavation.

Liquefaction of the vitreous, with the presence of finer or coarser floating specks or shreds, is very common in myopia of high grade and long standing. Myopic eyes are also especially subject to detachment of the retina,

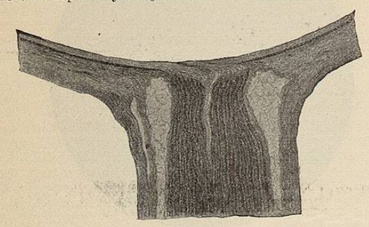

FIG. 3475.—Longitudinal Section Through the Optic Nerve at its Entrance into the Eye. (From Jaeger.)

a disaster which has been attributed to a dragging of the vitreous upon the retina. A bow-shaped reflex concentric with the disc (best seen through a concave lens, a little weaker than the measure of the myopia, behind the hole in the mirror of the ophthalmoscope) has been described by Weiss[6] as a sign of posterior separation of the vitreous from the retina.

*Pathological Anatomy.*—A meridional section through the fovea and the distal end of the optic nerve (Fig. 2475) shows, in cases of highly developed conus, a wide separation of the inner and outer nerve sheaths where the nerve joins the globe. Beyond the limits of the conus the outer sheath becomes continuous with and reinforces the sclera, but within the area corresponding to the conus, where the reinforcing fibres of the outer sheath are absent, the outer coat of the eye appears very much thinner than in its normal condition or than at the posterior region of the globe generally.

A general thinning of the sclera, the decrease in thickness becoming gradually more marked posteriorly, is characteristic of the higher grades of myopia.

A typical change in the form of the ciliary body, as shown in a meridional section of the anterior segment of the eyeball, conjoined with an appearance as of an increased development of the radiating fibres and a decrease in the number of the circular fibres of the ciliary muscle, as first described by Iwanoff,[7] may be regarded as an expression of the general stretching of the choroid.

*Causes of Myopia.*—The causes leading to the typical pathological changes in myopia are but imperfectly understood. Donders[8] laid much stress on the hypothesis of an inherited predisposition, and this opinion is supported by many clinical facts. Certain families show a very large proportion of myopes, others comparatively few. The inheritance of a special anatomical condition of the sclera or optic nerve, implying less than normal resistance to the operation of distending forces, is not more improbable than the inheritance of a hypermetropic configuration of the eyes. Corneal asymmetry, the ordinary cause of astigmatism, is distinctly transmissible from parent to offspring, and astigmatic refraction is too frequently associated with myopia to admit of reasonable doubt that the former stands in a causal relation to the latter. The general distention of the globe, mainly in its posterior half and especially about the posterior pole, corresponds to the thinner and presumably less resistant scleral region posterior to the insertions of the recti muscles. The immediate causes of the distention, whether they are to be sought in original structural weakness of the tissues or in increased intraocular pressure, or both, are matters of dispute. Continuous close application to fine near work, in which strong accommodation and convergence go hand-in-hand, is a most important etiological factor. After elongation of the globe has begun, convergence for the ordinary reading or working distance tends to evoke accommodation for some shorter distance; but reading or working at this shorter distance implies an increase in convergence, which in turn incites to increased exercise of the accommodation. As a result of this inter-action of convergence and accommodation, the tendency is to a progressive shortening of the reading distance, and, *pari passu*, to an increase in the grade of the myopia.

Weiss[9] has suggested that a short optic nerve, dragging on the sclera in inward rotation of the eyes, may be a factor in the development of posterior staphyloma. Stilling[10] has called attention to a particular conformation of the orbit, giving rise to an alteration in the direction of the pull of the reflected tendon of the superior oblique muscle, as a supposed cause of injurious traction upon the globe.

*Treatment of Myopia.*—"The cure of myopia belongs to the *pia vota*" (Donders). Erroneous assumptions regarding the causes of short-sightedness have led in the past to the proposal of a variety of futile or harmful plans of treatment. Thus attempts have been made to diminish the convexity of the cornea by the prolonged application of pressure, or by corneal paracentesis repeated at short intervals. Practice in reading at progressively increasing distances from the eye has been strongly advocated, in the belief that a supposed excessive lenticular refraction might thus be gradually lessened. Division of one or more of the recti, or of the





oblique, muscles, in order to diminish a supposedly injurious muscular pressure on the globe, has also been advised and practised.

Therapeutic measures directed to the removal of conditions of irritation which not infrequently appear in connection with rapidly progressive myopia, belong to the realm of rational therapeutics. Rest of the eyes from near work, protection from exposure to excessive light, regulation of the general physical condition, and, in some cases, the local abstraction of blood from the temples—preferably by means of the artificial leech of Heurteloup—are all of value. The so-called atropine cure is also employed, with good effect, in certain cases of rapidly increasing myopia; the eyes are kept under the full influence of atropine for about two weeks, in a moderately darkened room, after which the patient is permitted to go about with the eyes well protected by dark glasses; the use of the eyes in near work is forbidden for another fortnight.

*Use of Concave Glasses.*—The wearing of concave glasses to improve the distant vision of myopes is first mentioned by writers of the latter half of the sixteenth century; but the intelligent prescribing of such glasses, with a view to their effect upon myopia considered as a disease, belongs exclusively to modern ophthalmology; and even now there is notable divergence of opinion on certain points. In general, it may be accepted as a well-established principle that in uncomplicated myopia of low or medium grade, with normal acuity of visual perception and unimpaired range of accommodation, concave glasses should be chosen of such strength as to correct the vision accurately for distance, and that the same glasses should be worn for near work. Furthermore, it should be the aim to raise the vision, as controlled by tests made at a distance, to the highest point of acuity of which the eyes are capable; and to this end even low grades of astigmatism should be carefully investigated and corrected. The distance at which the glasses are worn, their proper centration before the two eyes, and the direction of the plane of the glasses with reference to the line of sight should all be definitely prescribed and controlled. Inasmuch as the same glasses are worn both for distance and in reading, they should be tilted so that the angle made by the visual axes to the plane of the lenses shall be as nearly equal as practicable in looking forward at distant objects and downward on the book ("pantoscopic" position). The effect of the tilting of the glasses in increasing their effective refractive power in the vertical meridian, and to a less degree in the horizontal meridian, should, in every case in which glasses of high power are required, be considered and allowed for in deciding upon the formula for the lens. The eyes should, further, be re-examined, at first at short intervals and later at intervals of a few months, in order that any change in the grade of the myopia may be promptly discovered and corrected. Explicit instruction should be given as to the kind and amount of work which may be permitted; reading or sewing without glasses, and especially the use of the eyes in near work by failing daylight or by insufficient artificial illumination, should be absolutely forbidden. The glasses (ordinarily spectacles made with elastic sides curved to fit accurately behind the ears*) should be worn continuously during the waking hours.

The wearing of neutralizing concave spectacles is ordinarily attended with great comfort to the patient, and the progress of the disease is, as a rule, either greatly retarded or wholly checked. Every renewal or change of glasses should be rigorously controlled, and it should be fully explained to the patient or, in the case of a child, to the parents, that the condition is one that must be kept under continuous observation for years.

Cases of myopia complicated by low acuity of vision, whether dependent on impaired perceptive power of the retina or on irregularity or imperfect transparency of the cornea or crystalline lens, present especial difficulties which militate against the best results from wearing glasses. In general, such patients cannot see small objects unless they are brought very near to the eye, a condition unfavorable to binocular vision. Accordingly, they often form the habit of using only one eye in reading. By this, perhaps unconscious, neglect of the retinal image in one of the eyes, the conditions which ordinarily give rise to a state of conflict between accommodation and convergence are eliminated, so that reading to a limited extent without glasses may be practically innocuous. Concave glasses may, however, be accepted in distant vision, although not in all cases.

*Operation for the Removal of the Transparent Crystalline Lens.*—The proposal to lower the grade of myopia in extreme cases, or to render a strongly myopic eye either moderately hypermetropic or possibly emmetropic, by the removal of the transparent crystalline lens, has been frequently discussed, although generally rejected by ophthalmic surgeons, to be revived and somewhat extensively practised in recent years.[11] Simple discission of the lens capsule, discission followed by removal of the swollen lens through a small corneal incision, and, in older subjects, extraction combined with iridectomy are the methods which have been recommended and employed. Apart from the immediate risks incident to the operation, and the uncertainty as regards its possible effect in arresting or retarding the progressive distention of the globe, the possibility of later adverse complications, such as not infrequently occur in patients upon whom an apparently ideal operation has been performed for cataract, would seem to forbid resort to an operation on the transparent lens except in extreme cases, and even then only after an exhaustive study of the particular case in all its aspects. In addition to the ordinary chances of disaster following operations for cataract, it is probable that the removal of the lens increases the tendency to retinal detachment, which is always to be feared in the higher grades of myopia. On the other hand, the fact that in the highest grades of myopia the ordinarily beneficial effect of concave glasses, in sharpening the definition of the retinal images, is largely neutralized by the diminution in the size of the images may afford an argument in favor of the operation. The incidental sacrifice of the accommodation should not be accorded undue weight in the exceptional cases in which alone the operation may be regarded as permissible.

*Effect of the Removal of the Lens on the Refraction of Highly Myopic Eyes.*—The average focal length of the crystalline lens, *in situ*, is estimated at 43.707 mm., which represents a power equal to 22.877 D. But the removal of the crystalline lens changes the eye from a compound dioptric system, of three refracting surfaces, to one in which the entire refraction is effected at the surface of the cornea, and in which a single principal point at the vertex of the cornea and a single nodal point at the centre of curvature of the cornea replace the two principal points and the two nodal points of the complete eye.

In the case of a previously emmetropic eye of average dimensions, the refractive insufficiency caused by the removal of the crystalline lens is exactly corrected by an addition of 13.428 D at the cornea, which may be represented by an effectively equivalent meniscus, of negligible thickness, assumed to be worn in contact with the cornea. But a convex spectacle lens, of a thickness such as is ordinarily required after an operation for cataract, is necessarily worn at a distance of approximately 15 mm. in front of the cornea, in which position it becomes a part of a new compound system in which a convex lens of 11.177 D suffices to correct the aphakial eye for distant vision.

A myopic eye whose length of axis is equal to the posterior focal length of the cornea (31.692 mm.) has a focal length (measured from the second principal point, $h'$) of 29.336 mm., and the distance of the concave spectacle lens which is worn to correct the myopia, measured from the first principal point, $h$, is about 2 mm. greater than its distance from the cornea. In the case which we have assumed, the myopia is measured by a thin concave lens

*So much of a concession to fashion may often be made as to permit the occasional use of a carefully adjusted *pince-nez*, instead of the spectacles, in distant vision.

of −16.326 D, supposed to be placed at the position of the second principal point of the eye, but a stronger concave lens, of no less than −21.234 D, is required for distinct distant vision when worn 15 mm. in front of the first principal point, or 13 mm. in front of the cornea.* It follows that in a case of axial myopia measured by a spectacle lens of −21.234 D, the eye, after the removal of its crystalline lens, will be adapted for distinct distant vision without a glass; and a spectacle lens of + 3. D or + 4. D will then suffice for reading.

K. Bjerke[12] has collected, from different sources, 93 reported cases of myopia in which emmetropic refraction is said to have followed the removal of the crystalline lens by operation. In 29 of these cases (31 per cent.) the pre-existent myopia, as measured by a concave spectacle lens, is given as 20. D. In 44 cases (47.3 per cent.) it is given as between 20. D and 26. D, and in 44 cases (47.3 per cent.) it is given as between 14. D and 19. D. The tabulated figures would seem to point to about 19.5 D as the mean grade of myopia in which emmetropic refraction may be expected to follow the removal of the crystalline lens from the eye. The difference of about −1.7 D, between the mean of the observed results and that calculated from the dimensions and corneal curvature of the schematic (average) eye, may be explained, in part at least, by errors of observation incident to the employment of collections of trial lenses of insufficient range and with too great intervals between the higher numbers. The very large number of cases (thirty-one per cent.) given as of 20. D, which corresponds to the strongest concave lens in the trial cases in ordinary use, points to a probable higher grade of myopia than that reported for these especially typical cases.† If we could assume a slightly greater radius of corneal curvature in the average highly myopic eye as compared with the emmetropic eye, the discrepancy between the mean observed grade and the calculated grade of myopia corresponding to emmetropic aphakial refraction would practically disappear. The assumption of an exceptionally short radius of corneal curvature in the higher grades of observed myopia, and of a curvature of exceptionally long radius in the lower grades, as tabulated, would similarly explain the comparatively few aberrant cases in which a very wide departure from the mean has been observed. As regards possible or probable differences in the focal length of the crystalline lens or differences in its effective power due to variations in its distance from the cornea, in individual eyes or as related to ametropia, trustworthy data are as yet almost wholly wanting.

*Prevention and Control of Myopia.*—In the evolution of the race the eyes have become admirably adapted to the requirements of binocular vision both at long and at short range. But the demands upon the eyes, incident to higher civilization, have doubtless been always in excess of the ability of certain eyes to withstand assiduous and prolonged application to near work. Certain myopes must always have had a notable advantage over emmetropes in many kinds of exceptionally fine work, such as engraving gems, embroidery, writing and illuminating manuscripts, etc.; and even now it is said that only myopes are successful in the production of the finest needle-wrought lace. In view of the fact that the gravest disabilities of the myope appear somewhat late in life, it is hardly conceivable that the predisposing causes, of myopia can ever be appreciably lessened through the operation of natural or artificial selection. It remains to consider some of the more common exciting causes, incident to the lives of children, with reference to the possible amelioration of existing harmful conditions.

In civilized communities the school is an all-important factor in the life of the child, and it is during school life that myopia ordinarily develops and attains to a notably high grade. So striking is the observed relation of myopia to the grade of the pupil in school, that the designation *Schulmyopie* (school myopia) has been widely adopted by German writers. As regards ocular hygiene, the prevalent methods in teaching and the conditions under which they are carried out are radically faulty. As a rule, there is an excessive amount of book-work, required of all pupils alike and relegated in great part to hours of study at home by uncontrolled and often badly arranged or insufficient light; many of the best hours of daylight, during the school sessions, being too often given up to exercises or occupations unrelated or remotely related to the curriculum of studies. School-rooms, especially in large school-buildings, are often inadequately or unequally lighted, and the desks are not always so placed with reference to the windows as to afford the best illumination to the greatest number of pupils. Preliminary investigation of the vision of children entering upon school life, and periodical examination of the eyes from year to year, with a view to the early detection of possible visual defects, are scarcely thought of. Indifference, on the part of teachers, to recognized symptoms of beginning myopia; inciting children with known ocular defects to perform tasks which are necessarily attended with danger to the eyes; and, in general, sacrificing individual pupils to inflexible arrangements of class work are some of the besetting faults of routine wherever children are brought together in large classes.

A general recognition, on the part of physicians, that myopia is essentially a progressive and often a dangerous disease; that it may be prevented in certain cases and arrested in its progress in other cases, but never cured; that prompt attention and careful and continuous hygienic control, together with the exercise of the highest professional skill in the adaptation and renewal of glasses, are necessary in order to check its progress and guard against possibly grave pathological changes later in life; and that the haphazard resort for glasses to venders who offer advice gratuitously, and make their profit by selling a possibly badly selected *prince-nez* or pair of spectacles, is an unintelligent evasion of a serious problem in therapeutics, will go far toward creating and disseminating juster views than now prevail.

The not uncommon habit, with children, of reading an interesting book by failing daylight or by insufficient or badly arranged artificial illumination, is especially harmful in the early stages, as indeed in any stage, of myopia; fine sewing or embroidery, as an habitual occupation for leisure hours, and long-continued application to fine work of whatever kind are also to be deprecated.

Imperfect vision at a distance, as demonstrated by easily available visual tests such as the test-letters of Snellen or as revealed by inability to follow blackboard exercises at school, should be promptly reported by the teacher, and the child excluded from school until an investigation of the condition of the eyes has been made by an ophthalmic practitioner of recognized competency and any necessary treatment, by glasses or otherwise, has been prescribed and adopted. In this way astigmatism will often be detected and corrected, and other abnormal conditions which militate against the easy and safe use of the eyes may be ameliorated.

*John Green.*
*John Green, Jr.*

* The assumption of a shorter distance from the cornea, in the case of a strong concave as compared with a strong convex spectacle lens, is justified by the fact that a concave lens, however strong, is very thin at its centre. But a double-convex spectacle lens of 11. D has a thickness of about 4 mm. at its centre; a plano-convex lens, and still more a meniscus, is even thicker.

As the optical distance of a spectacle lens from the eye is measured to the second principal (= nodal) point of the lens, which in the case of a double-convex lens lies nearly half the thickness of the lens within its substance, the optical distance of a double-convex lens from the eye is greater, by nearly half its thickness, than its distance, or that of a double-concave lens, as measured from the surface of the cornea to the back of the lens. In the case of a plano-convex lens, worn with its plane surface toward the eye, the optical distance exceeds the measured distance by about the thickness of the lens, and in the case of a meniscus, worn as a periscopic lens, the difference is still greater. Conversely, a concavo-convex lens, worn with its concave surface toward the eye, has its principal (= nodal) points outside of, and behind the lens, so that the optical distance of such a lens is less than its measured distance, and still less than the measured distance of any convex spectacle lens.

In all cases in which lenses of high power are worn, and especially when a thick convex lens is given in aphakia, or a very strong concave lens in myopia of high grade, the form of the lens becomes a factor of too great importance to be neglected.

† The appearance, in the table, of 11 cases of M = 16. D and 14 cases of M = 18. D, with only a single case of M = 17. D and 5 cases of M = 19. D, has been explained by Bjerke as resulting probably from the general omission of the numbers − 17. D and − 19. D from the series of trial-lenses in common use. The occurrence of 29 cases of M = 20. D, with only 2 cases of M = 21. D and 5 cases of M = 22. D, may be interpreted as indicating a similar source of error growing out of the general omission, from the series, of trial-lenses of higher power than − 20. D.





[List of abbreviations used in this article: M = myopia; H = hypermetropia; A = range of accommodation; *r* = far-point (*punctum remotissimum*) of distinct vision; p = near-point (*punctum proximum*) of distinct vision; R = distance of *r* from the first principal point of the eye; P = distance of *p* from the first principal point of the eye; R − P = region of accommodation; D = dioptrie or dioptries; *h* = principal point: *h'* = first principal point; *h''* = second principal point; *k* = nodal point; *k'* = first nodal point; *k''* = second nodal point.]

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[8] Donders: *Op. cit.*, pp. 39, 350.
[9] Weiss: Zur Anatomie der Eintrittstelle des Sehnerven. Verhandl. des internat. ophthalmol. Congresses in Heidelberg, p. 339, 1888.
[10] Stilling: Verhandl. des internat. Ophthalmol. Congresses in Heidelberg, p. 97, 1888.
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[12] Bjerke, K.: Ueber die Veränderung der Refraction und Sehschärfe nach Entfernung der Linse. Graefe's Archiv für Ophthalmologie, liii., 3, 1902.

**MYOTICS.** See *Mydriatics and Myotics.*

**MYRONIN** is a mixture of potash soap, carnauba wax, and doegling oil (chenoceti), and is employed as a very stable ointment base. *W. A. Bastedo.*

**MYRRH.**—*Myrrha. Gum Myrrh.* "A gum resin obtained from *Commifera Myrrha* (Nees) Engler (*Balsamodendron M.* Nees.—fam., *Burseraceæ*)." The variety of myrrh thus defined is that known in commerce as Somali or Herabol myrrh. It is official in all pharmacopœias, though these are much at variance as to the species named as its source. There appears no good reason to believe that it is derived from any other than the species named in our definition, though the inferior varieties (Arabian and Yemen) and various spurious substances often sold for it are—some of them certainly, others probably—obtained from other species of *Commifera*. This plant is a spiny, large shrub or small tree of northeastern Africa. The myrrh exudes as a thick milky juice from natural and artificial fissures, and slowly hardens to a red-brown mass, which is then collected by the Somali natives, either from the plant or from the ground where it has fallen. "Drossy myrrh," containing a large amount of earthy matter, may result from the accidental entrance of dirt into these fallen masses or from its intentional admixture. The substance is chiefly carried to Aden, whence it is exported to Europe and America, either directly or, as was formerly usual, viâ Bombay. The "Turkish myrrh," which a generation ago was a favorite brand, was simply a carefully selected quality exported viâ Turkey. Either at Aden or in Bombay the myrrh is picked and assorted, yet when it leaves those places it commonly contains a considerable percentage of spurious or inferior fragments.

Description.—In irregular, more or less rounded nodules or tears, from 2.5 to 10 cm. (1 to 4 in.) in diameter, the surface more or less roughened by nodules and small cavities, as though eroded, red-brown, dull, and more or less gray from adhering powder; heavy, hard, and rather tough-splintery in fracture, the freshly fractured surface of a waxy lustre and oily feel, red-brown, usually variegated by gray crescent-shaped spots and intersecting lines; thin fragments translucent, usually strongly so; strongly and agreeably aromatic, the odor characteristic; the taste bitter and somewhat acrid, and producing a hardening and slight wrinkling of the mucous membrane of the mouth, though different from the astringency of tannin; readily powdered when cold and dry, but with difficulty when warm and damp; the freshly fractured surface, moistened with alcohol, colored purplish, as is the brownish-yellow alcoholic tincture, by nitric acid (distinction from bdellium); yielding a brownish-yellow emulsion with water; the ten-per-cent. ethereal extract acquiring a violet color in the presence of bromine vapor; if six drops of a seven-per-cent. petroleum ether extract be mixed with 3 c.c. of acetic acid, and 3 c.c. of sulphuric acid be then added, forming a heavy lower layer, the latter takes only a light rose color, which does not deepen (*distinction from Bissabul myrrh*); not more than seventy per cent. should be insoluble in alcohol, and the ash should not exceed six per cent.

Constituents.—Good myrrh consists of from two to five per cent., or occasionally more, of the volatile oil *myrrhol*, and from twenty-five to forty per cent., rarely nearly fifty per cent., of resin, the remainder being mostly gum, with a very small amount of a bitter principle, and from two to six per cent. of ash. In "drossy myrrh," the earthy matter increases the ash, frequently to fifteen per cent. or more. In the poorer grades of myrrh the amount of gum is larger, at the expense of the resin. Myrrh resin is a complex substance, the composition of which is not fully understood. Myrrh oil, which is sold for use in perfumery, is yellow or greenish-yellow, thick and viscid, and almost as heavy as, rarely appreciably heavier than, water.

Action and Uses.—Myrrh is essentially an aromatic stimulant, with slightly bitter properties, and a mild disinfectant. Its stimulant properties are especially active on mucous or raw cutaneous surfaces with which it comes into contact, so that it is a favorite ingredient of mouth washes, hardening the gums and acting like a mild astringent, and an excellent cleansing and stimulating application to ill-conditioned sores, for which purpose the tincture is diluted to about one-fourth strength. Combined with cathartics, it enhances their activity and is at the same time somewhat carminative. When administered internally it acts as a mild stimulating expectorant and diuretic, through its respiratory and renal excretion. In connection with the latter mode of elimination, it acts as a stimulating emmenagogue. It has from ancient times been credited with specific emmenagogue properties, but these effects have probably been largely imaginary. In all its internal uses it is almost invariably combined with other drugs, as in the pills and the tincture of aloes and myrrh, the pills of iron and myrrh, the compound iron mixture, etc.

The principal preparation of myrrh is the official twenty-per-cent. tincture, the dose of which is 1 to 4 c.c. (fl. ʒ ¼ to i.). The Tinctura aloes et myrrhæ contains ten per cent. each of aloes, myrrh, and liquorice root, and the dose is 4 to 8 c.c. (fl. ʒ i. to ij.). The Pilulæ aloes et myrrhæ each contain 0.13 gm. (gr. ij.) of aloes, about half as much myrrh, and one-third as much aromatic powder, the dose being from two to eight pills. The Mistura ferri composita contains 1.8 per cent. of myrrh, 0.6 per cent. of ferrous sulphate, 0.8 per cent. of potassium carbonate, and 6 per cent. of spirit of lavender, with sugar, etc.

Allied Substances.—*Bdellium* (elsewhere considered) is very similar in composition and properties to myrrh, but is very inferior, being less aromatic and one of its varieties being devoid of bitterness. The myrrh of the Bible is not our myrrh, but the Balm of Gilead or Mecca balsam, from *Commifera* ("*Balsamodendron*") *Opobalsamum* (Kunth.) Engler, now rarely seen in commerce.
*Henry H. Rusby.*

**MYRRHOLIN**—a solution of equal parts of tincture of myrrh and castor oil, is used as a vehicle for creosote in tuberculosis. *W. A. Bastedo.*