deeper structures, and when the latter occurs it usually corresponds in direction to the defect in the iris. Cases have been reported, however, in which an upward coloboma of the iris was associated with a downward coloboma of the choroid.

The explanation of typical coloboma of the iris seems simple enough. Its downward direction and its frequent association with coloboma of the choroid point clearly to some relationship with the fœtal cleft. Normally there is at no stage in the development of the eye a cleft in either the choroid or the iris, so that the defect cannot be due, as often supposed, to imperfect closure of clefts in these structures. On the other hand it is perfectly possible that a delayed closure of the cleft in the secondary optic vesicle would lead to an imperfect development of the choroid in this region, and since the iris grows as a prolongation of the choroid, this in turn would lead to a localized defect in the iris also. According to this theory, the coloboma of the iris must always be preceded by a defect in the choroid. In those cases in which no such defect is found, it is assumed that the latter was repaired after the iris had been sufficiently hindered in its development to produce a coloboma, or that the defect in the choroid was small and occurred only in the ciliary region. Cases of coloboma of the choroid without coloboma of the iris are readily explained by assuming that the fœtal cleft was delayed in closing only posteriorly.

This theory, however, fails to explain satisfactorily the atypical cases of coloboma, for instance the cases in which the coloboma is directed upward. To explain the latter, Pflüger assumes that a torsional rotation of the eye occurs during fœtal life, but if this is the case it is difficult to understand why the macula develops in its normal position. It is still more difficult to explain the cases in which a coloboma of the iris differs greatly in direction from a coloboma of the choroid in the same eye, or the cases in which one iris shows two colobomata. It seems likely that these atypical cases and possibly certain cases of corectopia as well, are all examples of incomplete irideremia and are dependent upon the same factors which give rise to the latter anomaly. For it is readily conceivable that the factors which would lead, if acting strongly, to complete irideremia, if acting less strongly would give rise to incomplete irideremia, coloboma of the iris, or simply corectopia. The cases in which there is an atypically directed coloboma in one eye and complete irideremia in the other support this view. And Theobald's case of a mother with double-sided upward coloboma of the iris, whose child had complete irideremia in each eye, suggests not only this as the explanation, but also that the predisposing factors are hereditary and hence probably not, as sometimes supposed, of an inflammatory nature.

Anomalies of Pigmentation.—The variations in the color of the iris are dependent upon the amount of pigment in its stroma, the posterior layers of epithelium being always densely pigmented except in cases of albinism. In a blue iris there is very little pigment in the stroma, and from this all gradations are met with up to the black eye of the negro in which the stroma is intensely pigmented. The epithelial layers are pigmented at birth, but the stroma does not contain pigment until later so that the eyes of babies are always blue or gray. The irides of the two eyes may differ entirely in color, one being a decided blue and the other a dark brown—*heterochromia*. Or a blue iris may show a brown sector or be studded over with brown patches. In *melanosis oculi* the iris together with other structures of the eye, conjunctiva, sclera, optic nerve, and choroid, may show circumscribed areas of deep pigmentation comparable to the pigmented moles of the skin. Like the latter they may form the starting-points for malignant tumors.

In *albinism* there is a marked absence of pigment in the iris as well as in other parts of the body which normally contain pigment. The color of the iris in this condition depends to some extent upon the illumination and it may appear of a lilac, rose, or yellowish-white hue. In structure the iris is perfectly normal, but the pupil is always very narrow and dilates but little in a feeble light. Photophobia is a marked symptom and as a rule the eyes are almost amblyopic. Nystagmus is a frequent complication. The fact that in the fœtus pigment is so sparingly present suggests that albinism represents a lack of development. Heredity is undoubtedly an important factor in its occurrence. It is interesting that this anomaly is relatively common among negroes.

For the literature on congenital anomalies of the iris, reference should be made to von Hippel, "Die Missbildungen und angeborenen Fehler des Auges," Graefe-Saemisch "Handbuch der gesammten Augenheilkunde," 2. Auf., ii. Bd., ix. Kap. *Frederick Herman Verhoeff.*

IRITIS.—Iritis, or inflammation of the iris, is one of the common affections of the eye. It arises from a variety of causes, may attack one or both eyes, and, while almost always amenable to treatment if recognized in its inception and judiciously managed, it usually impairs the sight more or less seriously and permanently damages the integrity of the eye if allowed to run its course unchecked, or if improperly or only tardily treated. It is of the first importance, therefore, that its true character should be recognized at the outset, and that the requisite therapeutic measures should be resorted to without delay. The diagnosis of inflammation of the iris is commonly not a difficult matter, and the indications for its treatment are usually plain. It is nevertheless true that it is frequently confounded with other forms of inflammation of the eye, and improperly treated; and in consequence of this, or because of the ignorance or indifference of those whom it attacks, it is by no means an uncommon cause of blindness.

Speaking generally, the presence of iritis is to be suspected whenever, without increase of intra-ocular tension or other evident cause, pain in and around the eye, usually worse at night, is complained of, and is accompanied by pericorneal subconjunctival injection and a contracted pupil. This concourse of symptoms does not necessarily indicate the presence of iritis, but it is distinctly suggestive, and should lead to a careful search for other evidences of its existence. A dull, lack-lustre appearance of the iris, with appreciable change of color and more or less swelling of its tissue; immobility of the pupil, and perhaps loss of its circular form; loss of transparency of the aqueous humor, and frequently of the cornea as well, with consequent indistinctness of vision; adhesions between the margin of the pupil and the anterior capsule of the lens, which, however, are frequently not evident until a mydriatic has been used; and in severe cases a grayish opacity of the pupil from the deposition of an organized exudate upon the lens capsule, are the other changes which should be sought for, and which, if found, establish the diagnosis beyond question.

Among the causes of iritis, syphilis doubtless deserves the most prominent place. Traumatism is another frequent cause, and not only when the iris itself is involved in the injury, but also when the cornea, lens, or ciliary body is wounded. Rheumatism and gout, diabetes, and the acute infectious diseases, also deserve prominent mention in this connection, and gonorrhœa, though an infrequent cause, occasionally gives rise to it, the ocular inflammation having the same relation to the urethral disease that gonorrhœal arthritis has. Iritis may also be a consequence of inflammation of other structures of the eye, as, for instance, abscess or perforating ulcer of the cornea.

There is also another cause of iritis to which the writer is disposed to attach great importance, and which he believes to be an essential factor in the production of several apparently distinct varieties of the disease. He refers to an influence transmitted through vaso-motor or "trophic" nerves, which is frequently reflex in its character, and is probably always dependent upon structural changes in gray nerve matter, either in the cerebral ganglia themselves, or in the ganglia connected with the fifth nerve, or in both. It is such an influence as this, he believes, that determines the development of sympathetic iritis,

the iritis which is frequently found associated with herpes zoster ophthalmicus, that which occasionally follows malarial attacks, and probably also certain cases of serous iritis. In this category belong also those cases of iritis which he thinks have been rightfully ascribed to reflex dental and uterine irritation, as well as certain intractable forms of irido-keratitis, which are not infrequently accompanied by anæsthesia of the cornea. Obstinacy and intractability are the common characteristics of these several varieties of iritis, and in the pathological changes which they exhibit, there are also striking resemblances.*

The consequences of a severe attack of iritis which has not been properly treated are disastrous to the integrity of the eye in several ways. In the first place, especially in syphilitic iritis, the other structures of the eye are liable to become involved in the inflammatory process, the ciliary body, choroid, retina, lens, and cornea not infrequently suffering irreparable damage. Again, the pupil may be closed or obstructed by an organized membrane (occlusion), so that vision is reduced to mere perception of light; or the iris may become adherent to the anterior surface of the lens, at its pupillary margin only (exclusion), or throughout its whole extent (complete posterior synechia). In the two former conditions operative interference may accomplish great good; in the latter, the prognosis is less favorable, as the nutrition of the eye is apt to be seriously impaired, and in time the deeper tunics suffer and the lens loses its transparency. Sympathetic inflammation of the fellow-eye is another result which, though not of frequent occurrence, happens often enough to deserve mention.

Although there are so many causes of iritis, there are not, strictly speaking, so many different kinds of iritis.

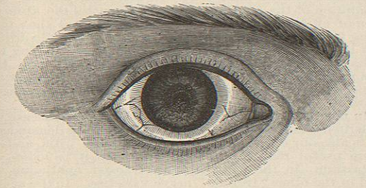

FIG. 2964.—Serous Iritis. (Noyes.)

Indeed, it seems scarcely necessary to describe more than three varieties—plastic iritis (*iritis plastica*), suppurative iritis (*iritis suppurativa*), and serous iritis (*iritis serosa*, Descemetitis) (see Fig. 2964). The first-named variety is by far the most comprehensive. It includes most cases of syphilitic, of rheumatic and gouty, and of sympathetic iritis. Many cases of traumatic iritis are also of this character, and so are most of those which have been spoken of as due to "trophic" nerve influence. Suppurative iritis is less common. It is usually the result of penetrating wounds of the eyeball, or of operations in which the globe is opened, and is almost always due to the presence of pyogenic micro-organisms. It may also follow extensive suppurative inflammation of the cornea. Iritis serosa is a disease of by no means rare occurrence, but it is one about the pathology of which we have yet much to learn. There is no doubt but that the iritic inflammation is often only a part of an inflammatory process which involves the entire uveal coat. In some instances it seems to be dependent upon a rheumatic diathesis, and in others, as has already been intimated, upon a reflex or "trophic" nerve influence. It occasionally exhibits a mixed type, the characteristic dots upon the membrane of Descemet and a tendency to glaucomatous tension, which belong to the usual form of the disease, being associated with a disposition to the formation of posterior synechiæ. When, as is very commonly the case, the deeper portions of the uveal tract are involved in the inflammatory process, cloudiness of the vitreous humor and the development of floating opacities in it are of frequent occurrence. It usually runs a protracted course, and does not always respond satisfactorily to treatment. When the tension is above normal the pupil is apt to be dilated rather than contracted, and under such circumstances the supervention of a distinctly glaucomatous condition is to be feared.

All of the varieties of plastic iritis are characterized by a tendency to the formation of an organized exudate, but this tendency is much more marked in some than in others. It is especially so in sympathetic iritis, in the iritis of herpes zoster ophthalmicus, and, in fact, in all those forms of iritis which appear to be due to "trophic" nerve influence. In syphilitic and in rheumatic iritis this tendency usually manifests itself by the formation of adhesions between the pupillary margin of the iris and the capsule of the lens, but in sympathetic and the other allied forms of iritis a felt-like exudation develops upon the posterior surface of the iris, causing it to adhere throughout its whole extent to the lens, and the pupil is commonly occluded by similar material. Under such circumstances, also, projecting portions of the anterior surface of the iris may become adherent (without ulceration) to the inner surface of the cornea (anterior synechiæ).

A characteristic, but by no means constant, feature of syphilitic iritis is the development upon the anterior surface of the iris, and occasionally upon its posterior surface in the pupillary zone (Bull), of yellowish or reddish-brown nodules, which project forward into the anterior chamber, and sometimes even press against the cornea. Usually there are not more than one or two present; but they may be so numerous, and of such size, as to fill the anterior chamber. They occur more frequently in the iritis which develops during the secondary stage of the disease, and are then of the nature of condylomata; those met with in the iritis of tertiary syphilis are gummata. Hence the former variety of iritis is sometimes designated as *iritis condylomatosa* and the latter variety as *iritis gummosa*. They may undergo absorption, or may disappear through fatty or purulent degeneration. The inflammation of the iris tissue being more intense over the area which corresponds to their base, we find here a special tendency to the formation of adhesions to the lens capsule. All of the varieties of iritis may be complicated by hypopyon, though it is more common in the purulent and syphilitic types. It is due to the deposition from the aqueous humor of leucocytes and fibrin, and, as a rule, undergoes absorption slowly.

Some authors describe a fourth variety of iritis, which they call "spongy iritis." It is, however, only a type of the plastic variety, in which there occurs a low form of plastic exudation in the anterior chamber, which presents a cyst-like appearance, and might be mistaken for a dislocated lens. Such cases are commonly of rheumatic origin.

A chronic form of plastic iritis is occasionally met with, in which the inflammatory symptoms are but slightly marked. It is often associated with a rheumatic or gouty diathesis, and shows a disposition to recurrence. Points of adhesion between the iris and lens are apt to take place before the true nature of the attack is discovered, as it develops insidiously, and is unattended by pain or other symptoms calculated to alarm the patient and induce him to seek medical advice.

In examining a case of suspected iritis the use of "oblique illumination" is of great assistance, since it enables one to detect slight changes in the cornea and in the tissue of the iris, and in many cases to discover adhesions between the iris and lens, which cannot be seen by simple inspection. If, however, any doubt remains as to the

* The writer realizes that, from the standpoint of the prevalent school of pathology, it is heterodoxy to express such an opinion as this regarding the genesis of inflammation. He is not without hope, however, that some day he may see a change of opinion upon this point.

existence of iritis after this method of examination has been employed, a weak solution of atropine (gr. ss.–i. to ʒ i.) or of homatropine (gr. iv. to ʒ i.) or euphthalmin (gr. iv.–viij. to ʒ i.) should be dropped into the eye, when, if iritis is present, the pupil will almost certainly dilate in an irregular manner, showing points of adhesion between its margin and the lens capsule.

The character of the vascular injection of the eyeball is not a very trustworthy guide in the differential diagnosis of iritis. When, however, it is most marked around the corneal margin, is of a pinkish rather than a brick-red color, and the vessels involved are for the most part small, and radiate more or less regularly from the margin of the cornea toward the equator of the globe, we may, at least, conclude that some of the structures deeper than the conjunctiva are involved in the inflammatory process, and that the existence of iritis is, at any rate, probable. If, however, the inflammation of the iris is of a severe type, the conjunctival, as well as the pericorneal, vessels will be involved; the injection of the ball will then be diffuse, and even the lids may be hyperæmic and œdematous.

The *treatment* of iritis depends, of course, in a great measure, upon the nature of the cause which has provoked the attack. The indications are to control and overcome the inflammation as quickly as possible, and, by the use of mydriatics, to keep the pupil widely dilated, so that adhesions shall not form between the posterior surface of the iris and the lens capsule. As a rule, constitutional, as well as local, measures are called for. Among the latter the most important are the instillation of a solution of sulphate of atropine, the application of a belladonna or opium lotion, the inunction of the forehead and temples with an ointment of mercury and belladonna, and the local abstraction of blood by leeches or by the artificial leech. Four grains to the ounce (about one per cent.) is the strength of the solution of atropine usually employed. In the different varieties of plastic and suppurative iritis it must be used freely, the frequency of the applications being determined chiefly by the state of the pupil and the amount of ciliary neuralgia and photophobia. When there are recent pupillary adhesions, which we hope to break up (for we can usually accomplish this, unless the bands are firm and broad), an instillation every hour may be required, or even for a short time several instillations an hour may be permissible. Such frequent applications, however, cannot be long continued without the constitutional effects of the drug becoming manifest, and, as cases of marked individual susceptibility to the action of belladonna are occasionally met with, due caution should be exercised in prescribing the use of atropine in this manner. Ordinarily, four to six applications a day are sufficient. In serous iritis atropine is commonly indicated to prevent the possible formation of synechiæ, but it should not be used so frequently or in such strong solutions, since in this affection the pupil generally yields readily to its influence. Moreover, owing to the tendency to increased tension which characterizes this disease, there is danger that a too liberal use of atropine may precipitate a glaucomatous condition.

Occasionally individuals are met with in whom atropine fails to produce a mydriatic effect, and others in whom it greatly irritates the conjunctiva, a few applications producing a conjunctivitis, which may be attended by an eczematous inflammation of the lids and cheek. Under such circumstances hydrobromate of hyoscyamine or sulphate of duboisine may be substituted for atropine. As these mydriatics, especially the latter, are more apt to produce constitutional effects when applied to the eye than atropine, greater caution is required in their use. Two grains to the ounce will usually be a strong enough solution of either of these to employ, and this should not be applied more than three or four times a day.

In many cases of iritis no other local treatment than the employment of a mydriatic is required; but, when the inflammation is of a severe type, the application of three or four leeches to the temple may accomplish great good, and, when there is severe pain, much relief is often experienced from the use of a lotion of opium (ext. opii gr. x.–xv. to aquæ ʒ iv.) or of belladonna (ext. belladonnæ gr. xv. to aquæ ʒ iv.), which should be applied to the closed lids more or less constantly upon a pad of gauze or soft linen. The application in the same way, for half an hour at a time, several times a day, of water as hot as can be borne is also a useful expedient under the same circumstances. In obstinate cases, especially those of syphilitic origin, it is well to supplement the use of constitutional remedies by keeping the forehead and temples constantly anointed with mercurial ointment, to which ext. belladonnæ or ext. opii may be added in the proportion of ʒ i.–ij. to ʒ i. A more cleanly, but perhaps less efficacious, preparation is the oleate of mercury and morphine.

Of constitutional remedies, the most valuable that we possess are mercury, iodide of potassium, and the salicylates. If to this list are added quinine, which is especially useful in suppurative iritis; opium, which seems not only to control the pain, but favorably to influence the inflammation; muriate of pilocarpine, which is useful especially when there is increased tension; and some brisk purgative combination which, as a rule, should contain calomel, it will include all the drugs that are likely to be needed in treating any of the varieties of the disease. A supplemental list of less important, but at times useful, remedies would include arsenic, colchicum, lithia, iron, and the Turkish bath. In acute iritis, whether of specific or non-specific origin, salicylate of sodium or lithium, given in liberal doses (gr. x. to xv. every two or three hours, according to the susceptibility of the patient), is, on the whole, perhaps the most promptly efficacious remedy that we have. In many cases it not only relieves the pain very quickly, but hastens the resolution of the inflammation and promotes the absorption of effused material. The writer believes that this drug has not been widely employed in syphilitic iritis, but it is in such cases that some of the most striking results which he has observed have been obtained. He has also found it useful in serous iritis, and, as might be expected, especially so in iritis dependent upon rheumatism.

In most cases of syphilitic iritis, whether the disease be inherited or acquired, mercury in some form is demanded. It is also our chief reliance in sympathetic iritis, and is more useful than anything else—unless it be iodide of potassium—in the iritis of herpes zoster ophthalmicus and in the other "trophic" nerve varieties. In the acute stage of syphilitic iritis it should be administered liberally, and in such shape as to impress the system promptly. Salivation is to be avoided, but in severe cases we must not stop far short of it. Small doses of calomel, frequently repeated (gr. ⅛ every hour, or gr. ss. every three hours), supplemented, if necessary, by inunctions of mercurial ointment, or a twenty-per-cent. solution of oleate of mercury, afford the best means of accomplishing the desired result. There seem to be no contraindications to the administration of salicylate of sodium and mercury at the same time, and the writer has obtained good results in this way. Opium may be given if the pain is severe, or if a purgative effect is produced by the mercury. In subacute cases, or when the symptoms are less urgent, biniodide of mercury, in doses varying from gr. $\frac{1}{24}$ to gr. $\frac{1}{12}$, may be given three times a day. This is a very efficacious and convenient method of administering mercury, and salivation is less apt to occur than when calomel is employed. It may be given in tablet triturates or pills, or preferably in solution in water, a small quantity of iodide of potassium being added to render the mercury soluble. When a prolonged course of mercury is required this, or the protoiodide, is decidedly the best form in which to administer it. It is therefore especially useful in the iritis of inherited syphilis, in obstinate cases of serous iritis, and in sympathetic iritis.

Iodide of potassium is valuable in rheumatic iritis, and in the later stages of sympathetic iritis; it may also advantageously supplement the use of mercury in syphilitic iritis. It may be administered in combination with mercury or by itself. In serous iritis it is the most efficacious remedy that we possess, but its good effects are not always manifest until it is given in large doses.

In suppurative iritis, which, as has been said, usually follows wounds of the eye or operations upon it, and is frequently accompanied by purulent infiltration of the cornea, the free administration of sulphate of quinine offers the best prospect, though not a very promising one, of success. Muriate of pilocarpine, which seems to be as efficacious when administered by the mouth as when introduced into the system by the hypodermatic method, is sometimes useful in cases of serous iritis in which the tension of the globe is high; and in any of the other varieties, if this condition obtains or if there is cloudiness of the vitreous humor, it may be prescribed with advantage. The writer has found it convenient to prescribe it in a solution of the strength of gr. i. to ʒ i. Ten drops of this solution, containing one-sixth of a grain of the salt, is the commencing dose, to be taken by the mouth once a day. According to the effect produced, the dose is increased by adding each day two or three to the number of drops administered. In any severe attack of iritis an active cathartic may be given with advantage at the commencement of the treatment. A very efficacious one is a powder containing from two to five grains of calomel, two grains of scammony, and six of powdered rhubarb, which should be given at bedtime.

When the iritic inflammation is dependent upon a gouty diathesis, colchicum and the preparations of lithia are useful; and in the iritis which sometimes follows malarial attacks, and in that which accompanies ophthalmic shingles, arsenic, in the form of Fowler's solution, may be prescribed with benefit. The daily use of the Turkish bath is commended by Bull as a valuable remedy in arthritic iritis.

In the management of every case of iritis, the question arises whether the patient should be confined to the house during the continuance of the attack. Undoubtedly, in acute cases, and especially when the inflammation is severe, this should be done if practicable. It is very rarely necessary, however, that he should be shut up in a dark room. With a shade and with dark glasses (London-smoke coquilles), he may safely be allowed the freedom of the house. This makes the treatment much less irksome to the patient, and does not seem in the least to retard the cure. In subacute cases, and even in acute cases when there is but little pain or photophobia, the patient need not be confined to the house unless, of course, the weather be unpropitious. Indeed, most patients with iritis are treated successfully as "out-patients," being seen by the medical attendant either at his office or at his hospital clinic.

Surgical interference is rarely required during the active stage of iritis. There are, however, some exceptions to this rule, as, for instance, in serous iritis, when the supervention of glaucomatous symptoms may demand the prompt performance of an iridectomy, or in suppurative iritis, when paracentesis of the cornea may be required for the relief of hypopyon. To remedy the consequences of iritis, however, and to prevent recurrent attacks, operations upon the eye are frequently called for. When, after an attack of iritis, a few slender bands of adhesion between the margin of the pupil and the lens are left, probably no ill consequences will result therefrom, and for such a condition no operation is required. If, however, as happens not infrequently in neglected cases, the margin of the pupil is completely glued to the surface of the lens, an iridectomy should be performed without unnecessary delay, for soon the iris will be bulged forward by the accumulation of fluid behind it, and will undergo atrophy, while at the same time the deeper structures of the eye will suffer from the consequent disturbance of their nutrition. When, though not completely adherent, the margin of the pupil is attached to the lens by several broad bands, an iridectomy may be required, since recurrent attacks of inflammation are not infrequently induced in consequence of the irritation produced by the traction of these bands during the muscular movements of the iris. When the pupil is closed, or is occluded by an organized exudate, an iridectomy is clearly indicated, and may restore almost normal vision to a nearly blind eye by yielding a clear artificial pupil. It is also frequently necessary to perform an iridectomy after the more severe types of iritis, when there is complete adhesion of the iris to the capsule of the lens. Under such circumstances it is more difficult to obtain a clear pupil, since it often happens that the pigment from the posterior surface of the iris remains adherent to the lens, while only the muscular tissue of the iris yields to the traction of the forceps. There is greater danger, too, that the artificial pupil may again become closed or occluded. The operations devised by Streatfeild and Passavant, for breaking adhesions between the margin of the pupil and the capsule of the lens, are not often practised at the present day, though in skilful hands they may at times fulfil a good purpose. In sympathetic iritis the condition of the fellow-eye should, of course, be carefully examined, and if it be blind, or nearly so, and still acting as a source of irritation, it should be enucleated without a moment's unnecessary delay. This will probably not arrest the disease which has become established in the second eye, but it will be likely to influence its progress favorably, and will certainly do no harm.

Samuel Theobald.

IRON.—I. General Medicinal Properties of Compounds of Iron.—All iron preparations capable of absorption are qualified, in some degree, to exert a peculiar influence upon nutrition generally. Given to a person in health, the influence appears to be slight, since the clinical symptoms are insignificant. A rather hard and quickened pulse, a feeling of fulness and tension of the head, and dull pains and discomfort, generally, constitute about all the obvious derangement. When, however, the mineral is administered to a sufferer from *anæmia* of the ordinary type, or from *chlorosis*, much more marked effects follow. The morbid conditions, in these diseases, that are the expression of deficient hæmoglobin tend to subside with greater or less rapidity; the pale, waxy skin becomes rosy, the flabby tissues become firm, weight increases, appetite is gained, and in every way the invalid improves in health and strength. In pernicious anæmia, however, iron is commonly without effect.

The clinical results thus seen to follow the medicinal giving of iron, both in health and disease, obviously suggest that the action of the drug is to determine an increase in the quantity of hæmoglobin present in the circulation, either by enrichment in hæmoglobin of the red blood corpuscles or by a quickening in the rate of evolution of these bodies, or possibly by both means combined. Exact observations on the blood of anæmics and chlorotics during a course of iron show that the medicine is indeed capable of producing both the effects described.[1] With large doses, the tendency is first to increase the hæmoglobin richness of the red corpuscles, and later the number of the globules; with small doses, to reverse this order of proceeding. Probably, in either case, the essential action of the iron is to determine hæmoglobin enrichment, the effect on rate of corpuscular evolution being a secondary consequence. How iron accomplishes this feat is, as usual in the matter of the action of a medicine, entirely unknown. The original idea was the simple one that since in chlorosis there is a deficiency of hæmoglobin, medicinal iron is absorbed and appropriated to make good the deficit, and that is the whole of the story. Later, however, it was observed that even when iron is given in quantities enormously in excess of physiological needs, the normal trace of iron occurring in the urine is not increased. Accordingly, it was argued that no excretion by the kidneys of adventitious iron must mean none to excrete, and therefore that medicinal iron is not absorbed. So came about theories of the action of iron in chlorosis based on the different chemical behavior of iron when in ordinary saline combination, on the one hand