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THE AMERICAN METHOD OF GIVING POTASSIUM IODIDE IN VERY LARGE DOSES FOR THE LATER LESIONS OF SYPHILIS; MORE ESPECIALLY SYPHILIS OF THE NERVOUS SYSTEM.

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THE use of potassium iodide in very large doses under certain indications is a slowly spreading practice in this country, and constitutes, I firmly believe, a marked gain in therapeutics. By large doses I mean such as shall make up a total of from 10. (3 ijss.) to 40. (3 x.) in twenty-four hours.

This practice has been in use in New York for fully fifteen years if not longer, in a small circle of physicians whose experience has tended more and more to establish the reality of the advantages obtained by such dosage. After considerable search, and by means of personal inquiries, I have satisfied myself that this plan is originally American, and that reliable tradition indicates that the promoter and prophet of it was the late Dr. William H. Van Buren. I shall present citations from a considerable number of authorities on this matter of dosage of the iodides, in order on the one hand to establish the claim that the giving of very large doses is an American idea, and on the other hand to show how little help many of our text-books afford students and practitioners on such a vital question.

In most of the works to be cited the doses advised are

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absolutely too small for successful use in syphilis of the nervous system, and no specific directions are given as to the mode of administering it so as to produce the least gastro-intestinal irritation.

In the first place let us see what the leading authorities on *Materia Medica* and *Therapeutics* say on this subject.

STILLÉ: *Therapeutics and Materia Medica*, Phila., 1874, ii., p. 862, referring to McGregor (*Edinburgh Med. Journal*, xv., p. 309—a mistake) says: "The success of the treatment of tertiary syphilis sometimes depends entirely upon the dose in which the iodide of potassium is administered. Cases which have only become worse or have remained stationary under the usual doses of five grains three or four times a day, will often manifest a decided progress toward cure when ten, twenty, or even thirty grains of the salt are administered at the same intervals."

CHARLES RICE: *Posological Tables*, N. Y., 1879, p. 62. Dose progressively increased from two to ten and to twenty grains.

SYDNEY RINGER: *Handbook of Therapeutics*, 10th ed., N. Y., 1883, p. 158. Five grains three times a day is generally a sufficient dose. Much larger doses, from ten, fifteen, or even twenty grains are sometimes required. For the removal of syphilitic nodes from the membranes of the brain, from five to ten grains three times a day are generally sufficient.

STILLÉ and MAISCH: *The National Dispensatory*, 3d ed., 1884, p. 123, states that the dose of KI varies from two grains upward; and they refer to ten or twenty grains three times a day as "very large doses." They make a bare reference to the practice of some specialists in syphilis who give more — as high or three hundred grains per diem.

R. BARTHOLOW: *Materia Medica and Therapeutics*, 5th ed., 1884, p. 228, gives the dose as varying from five to sixty grains.

H. C. WOOD: *Therapeutics, Materia Medica, and Toxicology*, 5th ed., 1883, pp, 415-417. States that the ordinary dose of KI is ten grains three times a day. In certain forms of syphilis this may be increased to twenty or even sixty grains.

TROUSSEAU et PIDOUX: *Traité de Thérapeutique et de Matière Médicale*, Paris, 1868, ii., p. 335. Dose from fifteen to sixty grains per diem. On p. 324 they quote Ricord as giving the maximum doses.

GUBLER: *Leçons de Thérapeutique*, Paris, 1877, p. 434. Recommends for adults from one to thirty grains (.05 to 2.) a day. "Small doses" for children.

NOTHNAGEL und ROSSBACH: *Handbuch der Arzneimittellehre*, 3 Aufl., Berlin, 1878, pp. 271-83. The dose is .05 to 1. two or three times a day. In syphilis, consider doses of 2.50 to 3. (forty-five to seventy-five grains) a day sufficient, and larger doses, as 15. (or 3 iv.), "as recommended here and there," as not at all necessary.

BINZ: *Vorlesungen über Pharmacologie*, Berlin, 1884, p. 211. Iodide of potassium is best administered in aqueous solution: from .10 to 2. (one and a half to thirty grains) to be given in twenty-four hours.

Let us next see what our principal teachers of practical medicine say about this matter.

A. FLINT: *Practice of Medicine*, Phila., 1884. The index of this work contains no reference to spinal and cerebral syphilis, or to iodide of potassium.

R. BARTHOLOW: *A Treatise on the Practice of Medicine*, 5th edition, N. Y., 1884. On p. 639, speaking of the treatment of syphilis of the nervous system, Bartholow says: "In these affections the most marvellous change is wrought by sufficient doses of the iodide of potassium; no time is to be lost in its administration, and usually the largest doses are required."

A. L. LOOMIS: Text-Book of Practical Medicine, N. Y., 1884. While treating of syphilis, p. 923, Loomis says that the iodide should be increased to the limit of the patient's endurance, or until the lesion yields to treatment. Again, on p. 956, under the heading of "Pachymeningitis Syphilitica": "The iodide must always be given in large doses; from thirty to sixty grains may be given in from four to six ounces of water, three or four times daily until the desired effect is reached, which is the disappearance of the symptoms."

Before quoting syphilographers and other authorities let us go back to the physicians who originally introduced the iodide of potassium in the treatment of syphilis, and get their views.

Dr. ROBERT WILLIAMS, Senior Physician to St. Thomas' Hospital: "Lecture on the Laws and Treatment of Syphilis," *London Medical Gazette*, vol. xiv., 1833-4, pp. 39-45. Dr. Williams used KI as early as 1831 in a case of syphilis which had resisted mercury; he gave it in doses of five and ten grains in camphor mixture three times a day, with surprising results. In another case of extensive nodes upon the tibiæ and digits, with ulceration, doses of eight grains, three times a day, brought about a cure in two months. After this experience Dr. Williams' average dose in cases of periosteal node was eight grains thrice a day. Beyond that dose it purged (!). The mitigating effects of the drug were obtained in from five to ten days.

To Dr. Williams probably belongs the credit of first using and publicly recommending iodide of potassium in syphilis, but the papers of Dr. Wallace of Dublin (*vide infra*), have attracted more attention, and he is often considered the originator of the method.

Dr. JOHN CLENDINNING, Physician to St. Marylebone Infirmary, London: "Observations on the curative proper-

ties of hydriodate of potass. in periostitis and chronic articular rheumatism," *London Medical Gazette*, vol. xv., 1834-5, p. 833 and p. 866. His usual doses were from five to thirty grains, three times a day. The larger doses were given under the direction of Dr. Elliotson¹ with excellent results.

This was in a case of painful node on the cranium (case 2 of paper): as much as 100 grains a day were given with only good effects. Dr. Clendinning advises that KI should be taken well diluted, "on a full stomach and at no other time." Begins by doses of two or three grains, and rapidly increases. Remarks upon certain untoward effects: sometimes heartburn, nausea, flatulence, and diarrhoea, and rarely ptyalism.

DR. WALLACE of Dublin, "Clinical Lectures on Surgical Cases," *Lancet*, 1835-6, vol. ii., p. 5. Also in the same volume, "Lectures on Diseases of the Skin," etc., pp. 743, 688, and 894. In *Lancet*, 1836-7, vol. I., the same lectures are continued on pp. 428, 487, and 553. The observations were made in the Jervis Street Hospital. Dr. Wallace advocates the treatment of venereal disease by the hydriodate of potass or iodide of potassium; he employs a simple solution in water so made as to give the patient about thirty grains [2.] in twenty-four hours. Has never seen any unpleasant effects. Is guided in dosage by the reaction of the urine, and does not deem it necessary to give more than will saturate the urine, *i. e.*, give a deep blue-black color-reaction when tested with dilute sulphuric acid, a

¹ This physician is sometimes (*vide* p. 121) referred to as having been the first to use very large doses of KI., but a reference to the original article, "Lecture on a Case of Scirrhus Uteri," in *Lancet*, 1831-2, vol. i, p. 727, shows that the medicine was not used in syphilitic lesion, but against induration of tissues. The remarks are entitled: "The Hydriodate of Potash; quantities in which it may be safely given." Dr. E. states that it acts as a diuretic, and that he has used it with success in enlargement of the liver, spleen, bronchocele, and cancer uteri. The patient who was the object of the remarks took ʒij. three times a day in weak mint water, for how long a time is not stated. It is interesting, however, as corroborative of our more modern experience that these doses caused no unpleasant symptoms.

small quantity of starch solution, and 1-2 drops of solution of chloride of lime.

In two patients who accidentally took sixty grains a day there were severe symptoms of gastro-intestinal irritation.

In the third place let us consult some writers upon syphilis of the nervous system.

LAGNEAU: *Maladies syphilitiques du système nerveux*, Paris, 1860, p. 179. Considers quantities of 2. (thirty grains) a day as too small, and that this explains the want of success so often reported. He gives increasing amounts up to 8. (120 grains) per diem.

GROS et LANCEREAUX: *Des affections nerveuses syphilitiques*, Paris, 1861, p. 460. These authors condemn small quantities of from 1. to 2. (fifteen to thirty grains) a day as next to useless, and recommend from 3. to 10. (forty-five to 150 grains) in twenty-four hours.

ZAMBACO: *Des affections nerveuses syphilitiques*, Paris, 1862, p. 583. Claims to follow a happy mean between physicians who never give more than .50 (eight grains) a day and still get excellent effects, and those who give from 15. to 20. (250 to 300 grains) in twenty-four hours. His usual limit is 4. (sixty grains); in some few cases 6. (ninety grains) per diem.

FOURNIER: *La Syphilis du Cerveau*, Paris, 1879, pp. 609-610. Begins with 3. (45 grains) per diem and rapidly increases it to 6. and even 10. (90 to 150 grains). Says he has tried the larger doses recommended by "certain physicians," of from 12. to 20. (200 to 300 grains) per diem without any advantage. If the doses he gives are not successful the larger ones will not be (!!).

HEUBNER: Article on "Syphilis of the Brain and Nerves," in *Ziemssen's Encyclopedia of Medicine*. Amer. ed., N. Y., 1877, vol. xii., p. 369. Recommends "large doses" of iodide from 1. (15 grains) the first day, rapidly increased to 8. and 10. (120 and 150 grains) in the twenty-four hours.

DOWSE: Syphilis of the Brain and Spinal Cord, London, 1879. In chapter v. on treatment gives no doses or mode of administration, but says he has used KI in small and in "excessive doses," but is inclined to be disappointed in his results.

E. L. KEYES: Syphilis of the Nervous System, *New York Medical Journal*, Nov., 1870. This able paper is a product of the joint experience of the late Dr. William H. Van Buren and the author, and is the first one that to my knowledge refers to and recommends the use of really large doses of iodide of potassium. The essay should be carefully studied by all interested in nervous syphilis, but for our purposes it will be sufficient to make only a few citations.

First, that in case 30, seen in February, 1870, in consultation with Dr. William H. Draper, the iodide of potassium was given in large doses, varying from ninety grains (6.) a day to 3 ss. (2.) every two hours in an attack characterized by blindness, convulsions, and stupor, with complete recovery.

As early as in 1861, in case 31, Dr. Van Buren gave as much as sixty-seven and a half grains (4.5) three times a day with success.

Conclusion 14 of the essay states our own view of the utility and mode of using KI exactly: "That the iodide of potassium pushed rapidly to toleration, unless the symptoms subside before that point is reached, is the main outline of treatment. That mercury, used at the same time, or alternated with the iodide of potassium, is often of great value in protracted or inveterate cases; and that tonics, change of air and surroundings, frequently influence the effect of treatment in a marked degree, and may become essential to success."

BUZZARD: Clinical Aspect of Syphilitic Nervous Affections, London, 1874, p. 134. "A word as to the dose of

iodide of potassium. After a good deal of hesitation and trial of various quantities in a considerable number of cases, I feel convinced that in syphilitic affections of the nervous system it is often necessary to employ doses of this drug which are far beyond those usually ordered. In several instances I have observed something of the following kind to take place. An improvement up to a certain point has been produced by doses of iodide of from ten or fifteen to twenty grains three times daily. The patient has then remained at this stage, or progress has been very slow, whilst he continued to take this amount. On increasing it, however, by rapid steps, to thirty, forty, sixty, or even ninety grains three times a day, the case has responded immediately and *pari passu* to the additional quantity of the drug. I had two patients in the hospital last year who were striking instances of this effect. In each the dose was pushed gradually to ninety grains three times a day with marked beneficial effects, and I may add that the patients themselves expressed an unhesitating opinion upon this point. There is nothing new of course in the employment of large doses. Forty years ago the late Dr. Elliotson used to give as much as ʒ ij. (8.) three times a day, and with remarkably good results.¹ But of late years, as a general rule, the dose has been so moderate that to many practitioners the employment of ten grains at a time is only gradually arrived at and with some caution. No doubt in a very large number of cases a comparatively small dose is all that is required, and in practice, therefore, it is well to begin with a dose of ten grains, and increase it if necessary. I feel tolerably sure, from repeated experiments, that the iodide may be used, if occasion requires it, as freely as the bromide of potassium, and that the opportunity of doing great good in syphilitic nervous affections is nearly as often missed by the

¹ Not in syphilis, *vide* foot-note on p. 118.

employment of inadequate doses of the former drug as used notoriously to happen in respect to epilepsy from the exhibition of too small doses of the latter.

“I am in the habit of administering the drug simply dissolved in water, and have not found that any advantage is gained by the addition of ammonia or vegetable bitters.” (Time of administration with respect to meals not stated.)

I have quoted thus largely from Dr. Buzzard because he is the only European writer who has had the intelligent courage to disregard tradition and give KI in doses sufficient to attain the results aimed at. He is mistaken in his reference to Elliotson, but was probably misled by some other author or by tradition in London medical circles.

Let us now seek the opinion of syphilographers.

RICORD'S doses, as cited by Trousseau and Pidoux (i., 324), were from 1. to 4. (fifteen to sixty grains) in twenty-four hours.

LANCEREAUX: *Traité de la syphilis*, Paris, 1873, p. 558. Recommends doses of from .50 ($7\frac{1}{2}$ grains) to 4. (60 grains), and even 6. (90 grains), in twenty-four hours. Denies the efficacy of quantities of 10. (150 grains) to 15. (240 grains) a day, as recommended by “some authors.” The astounding reason assigned for this is that the system never utilizes more than a fixed quantity of any medicament (!).

VAN BUREN and KEYES: *A Practical Treatise on the Surgical Diseases of the Genito-Urinary Organs*, N. Y., 1875. These authorities (pp. 569-70) give no limit to doses; they employ (usually) a saturated solution of the iodide in increasing doses until the symptoms yield or the patient can bear no more. They cite a case in which 64. ($\frac{3}{4}$ ij.) were taken daily for two weeks, with the result of checking an ulcer of the throat. They advise giving the drug after meals.

BUMSTEAD and TAYLOR: *The Pathology and Treat-*

ment of Venereal Diseases, fifth ed., Phila., 1883. When speaking of the treatment of syphilitic affections of the nervous system, on p. 712, the authors urge that there is no time for half-way measures. "If the patient has not already taken the iodide of potassium, it may be well to commence with the moderate dose of 1. (fifteen grains) after each meal, for fear that he may be one of those exceptional individuals in whom the iodides exercise a poisonous influence, and if he is found to bear it well, the dose should be rapidly increased. But when his tolerance has already been tested, a dose of 2. (thirty grains), or, in urgent cases, even of 4. (sixty grains) three times a day is not too much to commence with, and it should be increased—say by the addition of .30 (five minims) every other day—until amelioration of the symptoms takes place, or at least 8. (120 grains) for each dose have been reached. At the same time free mercurial inunctions every night should not be neglected."

In their fourth ed., 1879, Drs. Bumstead and Taylor had said substantially the same thing. The iodide is to be given up to 24. (360 grains) in twenty-four hours.

From these citations it is seen that, with the exception of Bartholow (whose extensive clinical experience has given him an advantage), the leading authorities on therapeutics and materia medica do not give the necessary information as to the dosage of the iodides, and that they adhere to the *safe doses*, which are without doubt highly dangerous in a negative way, when administered to a severe case of cerebral or spinal syphilis. What is truly astonishing, however, is to find authorities like Nothnagel and Rossbach teaching *ex-cathedra*, without evidence and argument, that quantities of 15. ($\frac{3}{4}$ ss.), or more, recommended "here and there," are unnecessary or useless.

The practitioner will also obtain only insufficient informa-

tion from the works on the practice of medicine, with the exception of Bartholow's and Loomis.' The latter is especially emphatic: "It should be increased to the limit of the patient's endurance."

Nor with the exception of Keyes and Buzzard, are writers on syphilis of the nervous system more advanced. Indeed, one of the highest authorities, Fournier, denies the utility of massive doses which he "has tried," with a contemptuous reference to the anonymous "certains médecins" who have advocated them. Yet he is an open advocate of the heroic treatment of nervous syphilis.

Our two American authorities on venereal diseases, Van Buren and Bumstead, with their associates Keyes and Taylor reflect the advanced New York practice correctly and give, as does Prof. Loomis, doses limited only by the appearance of improvement or by intolerance.

I have remarked at the beginning of this paper that the personal recollections of some practitioners and teachers in New York, had greatly aided me in determining the origin of the practice. Let me quote the following:

Prof. William H. Draper writes me that from 1865 he has realized the utility and absolute necessity of very large doses of KI. in various forms of late syphilis, more especially ulcerating syphilides of the mucous membranes and skin, and in syphilis of the nervous system. His first knowledge of the practice was derived from the late Professor Van Buren. Prof. Robt. W. Taylor tells me that he has been cognizant of the practice of giving the large doses ever since 1866-7, when he heard Van Buren and Draper teach it at the bedside.

Prof. E. L. Keyes who was the pupil, associate, and friend of Dr. Van Buren, informs me that he distinctly remembers hearing him teach as far back as 1863, that very large doses of the iodide should be administered in nervous syphilis—

doses much larger than those then sanctioned by authorities, and nearly as large as those I am writing about.

It is true that Van Buren never wrote upon this important subject; at least Drs. Keyes and E. L. Stimson who have his literary remains know of nothing. The finger of a reliable tradition, however, points back to the distinguished surgeon named, as the originator and disseminator of a mode of dosage which has rendered much good service already.

In this matter, too, a great deal of influential unprinted teaching has been done by Professors W. H. Draper, Keyes, R. W. Taylor and others, which has disseminated the practice far and wide.

The only European writer of note who has, to my knowledge, taken the same stand, is Dr. Thomas Buzzard of London, whose excellent work is dated four years after Dr. Keyes' *brochure*, which he does not quote.

Certain writers (Fournier, Nothnagel, and Rossbach) assert that doses of 15. 20. or 30. of KI. are useless. A negative assertion is much more difficult to maintain in a matter which can only be studied experimentally, than a positive assertion. The positive facts should first be removed or accounted for in some other way, and this has not been done. Simply to state that they have tried the large doses without success is not sufficient to counterbalance the already large accumulation of successful trials.

The American method of administering KI. was developed empirically, on the firm basis of observation in practice. It was found that certain symptoms did not yield with ordinary large doses 8. or 10. (120 to 150 grains) a day; instead of abandoning the drug it was steadily increased, and it was found that the good result showed itself when the patient was taking 15. or 20., or even more *per diem*.

In another series of cases it was seen that some exceed-

ingly acute or dangerous symptoms, syphilitic epilepsy with coma, acute cranial pain, etc., showed signs of improvement in forty-eight hours when the drug was given in doses of 4. every three or four hours.

Such facts have been often observed by the New York physicians I have named, and by myself.

No one has ever claimed that it is desirable to give large doses in all cases of later syphilitic lesions, and I would consider this an absurd proposition. As stated by all recent authorities, many cases of nervous syphilis rapidly improve and get well under moderate doses of, let us say, less than 8. (120 grains) a day. The vital question, however, is what to do for the exceptional cases; those that exhibit no change from such doses.

Let us now inquire into the indications for the use of large doses. Nowhere, to my knowledge, is this point discussed. It is simply stated, that in severe cases the dose should be rapidly increased to a maximum, — “to the limit of the patient’s endurance” (Loomis). Bumstead and Taylor lay down a rule of increase (*vide* p. 123) which, I must say, would be dangerously slow in some cases. And, in certain cases too, the usual tentative small doses to determine an idiosyncratic susceptibility would entail a loss of invaluable time.

I would state the indications as follows :

1. Given a case of chronic or subacute (as regards rapidity of progress) ulcerative syphilide or of nervous syphilis, the rules laid down by Bumstead and Taylor may be followed, and the patient gradually brought to take the full doses.

2. Given a rapidly extending syphilitic ulcer, the larger doses, of from 10. to 15. per diem, should be given at once, and an increase more rapidly made in the ensuing week.

If the ulcer be in the throat much difficulty may be experienced in swallowing the dose. There are two ways out of

this predicament. One is to use the rectum as has been done by Van Buren and Keyes,¹ which may be done successfully for several days if the solution be not too concentrated. Another way which I now propose would be the passage of a nasal stomach tube, and the administration of the solution through it from a funnel. The ordinary stomach tube passed through the mouth would cause much pain, and might produce laceration.

3. Given a case of extremely acute syphilitic cranial pain, whether strictly neuralgic, or from nodes, or from a deeply placed lesion. I believe, that the successful practice, and the safe practice, too, is to begin by doses of 4. (60 grains) twice the first day, three times the second, and so on. This would give on the seventh day 32. (or $\frac{3}{4}$ i.) of KI.

4. Given a case of cerebral syphilis in coma, or that peculiar stupor so suggestive of syphilis. There may also be convulsions, partial paralysis, and, in my experience, neuroretinitis. No time should be lost in such a case, and my practice is to give at once 4. (60 grains), every three or four hours, doubling the dose the next day.

5. The question of large doses in syphilitic hemiplegia is more complicated. In the premonitory period, sometimes so distinct, in which we have localized numbness or localized epileptoid spasms (Jacksonian epilepsy) there should be no hesitation; mercurials and potassium iodide should be given at once in full doses, as in cases of stupor. But when there is actual paralysis, especially when suddenly developed, the utility of very large doses is less certain. The former symptoms were of irritation, or of impending ischæmia, while paralysis often means that nerve tissue has been irreparably injured, or actually destroyed, by softening usually. Under the older teachings that most symptoms of cerebral syphilis were caused by gummata, or nodes, hope

¹ *Op. cit.*, p. 569, foot-note.

might be entertained at almost any stage ; but since Heubner has shown that very often the lesion consists in obliteration of a large artery (endarteritis) with resulting ischæmia of a cerebral territory and its death or "softening," we must modify our prognosis and treatment. In the moment cerebral tissue undergoes the process termed "softening," it is dead, and no amount of KI. or of any other medicine can restore it. The syphilitic lesion, strictly speaking, is amenable to treatment, but its *residua* are not.

Of course, in nearly all cases, mercury is also to be used with great freedom if the case be an acute one, but the iodide is our chief weapon, and with it we should strike hard, repeated blows.

One word as to the rate of increase of the dose in chronic or mild cases where it is not likely that more than a moderate amount shall be required. Bumstead and Taylor recommend adding five grains (.30) to the dose every other day ; a rate of increase which I consider as too slow even for very mild cases, or for little children. A simple calculation will show that in this manner it would require nineteen days for a patient to progress from 1. (fifteen grains) three times a day to 4. (sixty grains)—a waste of precious time in some cases. I usually increase the dose by .30 (five grains) every day ; in some cases by .60 (ten grains)—that is, in mild, subacute cases.

Mode of Administration.—There is nothing to be found on this point in some text-books, and in none are sufficient details given ; yet, how and when to administer a remedy are most important elements of success. As I have elsewhere¹ presented my views on this subject quite *in extenso*, I will now content myself with a few remarks.

¹ "On the use of a feebly alkaline water as a vehicle for the administration of the iodide and bromide of potassium," etc., ARCHIVES OF MEDICINE, vol. vi., August, 1881. "The efficacy of iodide of potassium in non-syphilitic organic disease of the central nervous system," ARCHIVES OF MEDICINE, vol. ix., June, 1883. Both papers in "Opera Minora," p. 529 and p. 579.

First, the iodide should be administered largely diluted in simple water, in a feebly alkaline water, or in milk (Keyes). This statement would, I think, be acquiesced in by all experienced practitioners, and is in harmony with the teaching and practice of many authorities. It is interesting to recall that Williams, Wallace, and Elliotson usually gave the iodide simply dissolved in mint water or in camphor mixture.

Second, the time of administration. On this point a singular unanimity prevails: give the drug "after meals," or "on a full stomach," say all the authorities. Yet, not one of them gives a reason for this direction, not even those whose ostensible object is to teach therapeutics. And, indeed, no good physiological reason could be given for this rule, which I strongly suspect is nothing more than blind following after example. In days when the physiology of digestion was practically unknown, when experimental therapeutics was not begun, the eminent physicians who were the first to use the iodide for syphilis (Williams, Clendinning, and Wallace) said give it after meals, and so it has continued. Now, I have strenuously contended against the giving of decomposable medicines, more especially the iodides and bromides, on a full stomach which contains a highly acid semi-fluid mass. It is almost a certainty, theoretically considered, that these salts are more or less split up by the hydrochloric and lactic acids of the stomach, and pure iodine or bromine set free.

The inactive stomach, on the contrary, is, we know, in just the condition to facilitate the simple absorption of saline solutions without chemical change. It is empty, and either neutral or feebly alkaline in reaction. It is capable of rapidly absorbing a large amount of simple water, and probably can do the same thing with an alkaline solution of iodide or bromide. Perhaps, also, a quantity of the solution

passes into the upper part of the small intestines and is there absorbed.

Again, as to the results of experience. I find that by giving iodides in this way iodism is very rare and gastro-intestinal irritation almost unknown. Patients, who had been previously iodized by 1. or 2. per diem, given in the usual way, I found could take from 20. to 30. with impunity. Furthermore, in at least two of my patients, digestion improved while using the larger doses of iodide of potassium diluted with Vichy water, (probably because of thorough washing out of the stomach). I repeat, the iodide of potassium should always be given upon an empty stomach, say about half an hour before meals.

In the next place about the dosage for children. Influenced no doubt by the extraordinary susceptibility of little children to opiates, many practitioners give them altogether too small doses of many remedies. This is notoriously true of the bromides, and I am sure is also true of the iodide of potassium. For threatening conditions of cerebral disease, meningitis, syphilis, etc., if we decide to give KI we should administer it almost in adult doses. In cases of basal meningitis with neuro-retinitis and in some other cases, I have given from 4. (60 grains) to 8. (120 grains) three times a day to patients between four and eight years old, not only with good result as regards the cerebral symptoms, but also without iodism or gastro-intestinal irritation.

Lastly, I wish it clearly understood, that I admit that there are rare individuals in whom the iodide produces toxic effects, even in small doses. But these instances become still rarer where the remedy is given in the way I advocate. And, after all, "iodism" is in no wise dangerous, it is only an inconvenience and a drawback to treatment. Atrophy of testes and mammæ, renal disease, dental decay, are not now recognized as results of the long continued use of the

drug. I have a note from my friend, Professor Bartholow, of Philadelphia, in which he tells me of an instance within his knowledge, in which a patient took 32. ($\bar{3}$ i.) instead of 4. (3 i.) at one time, by mistake. "It caused vomiting and acute iodism, but no serious after-effects."

