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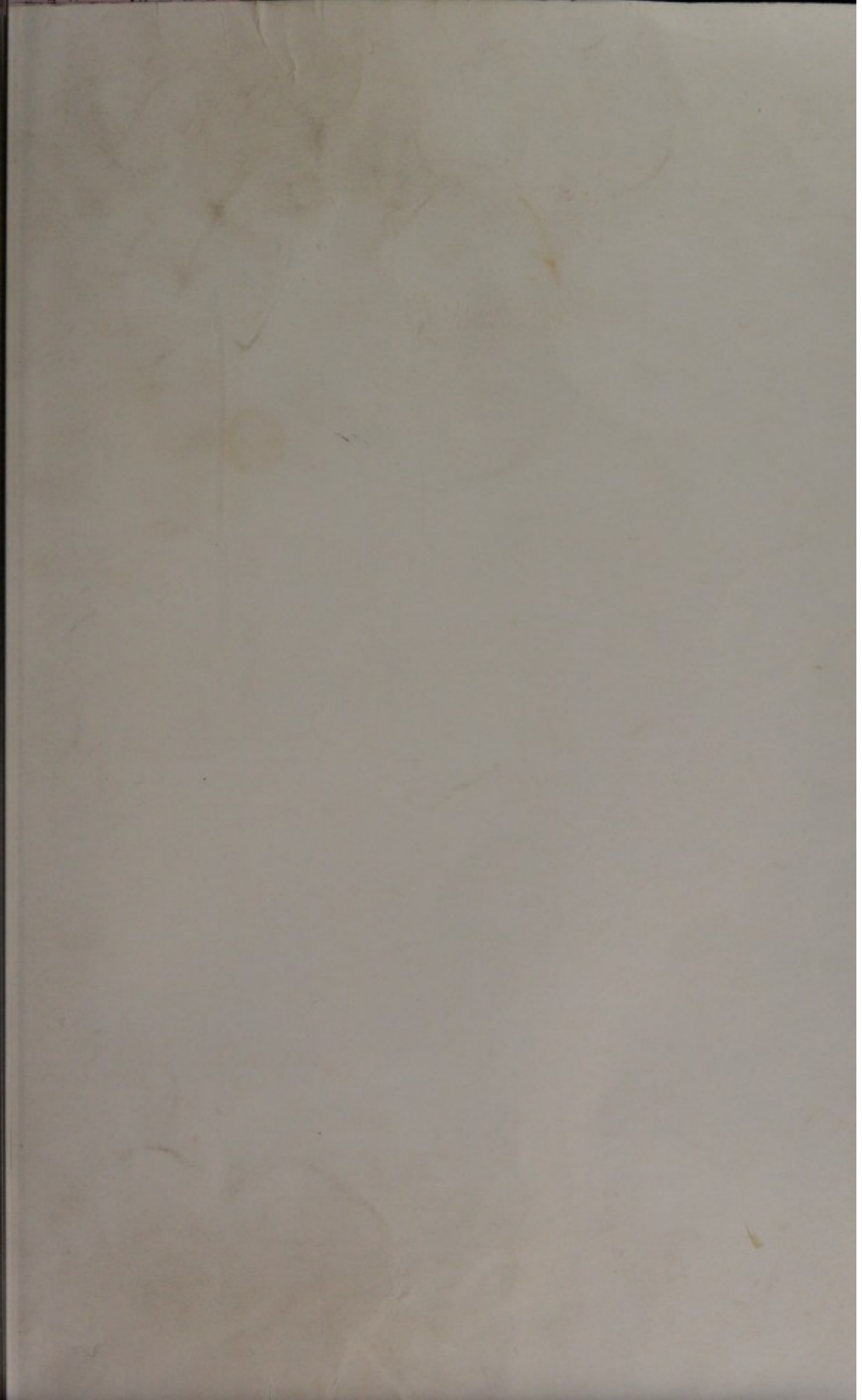
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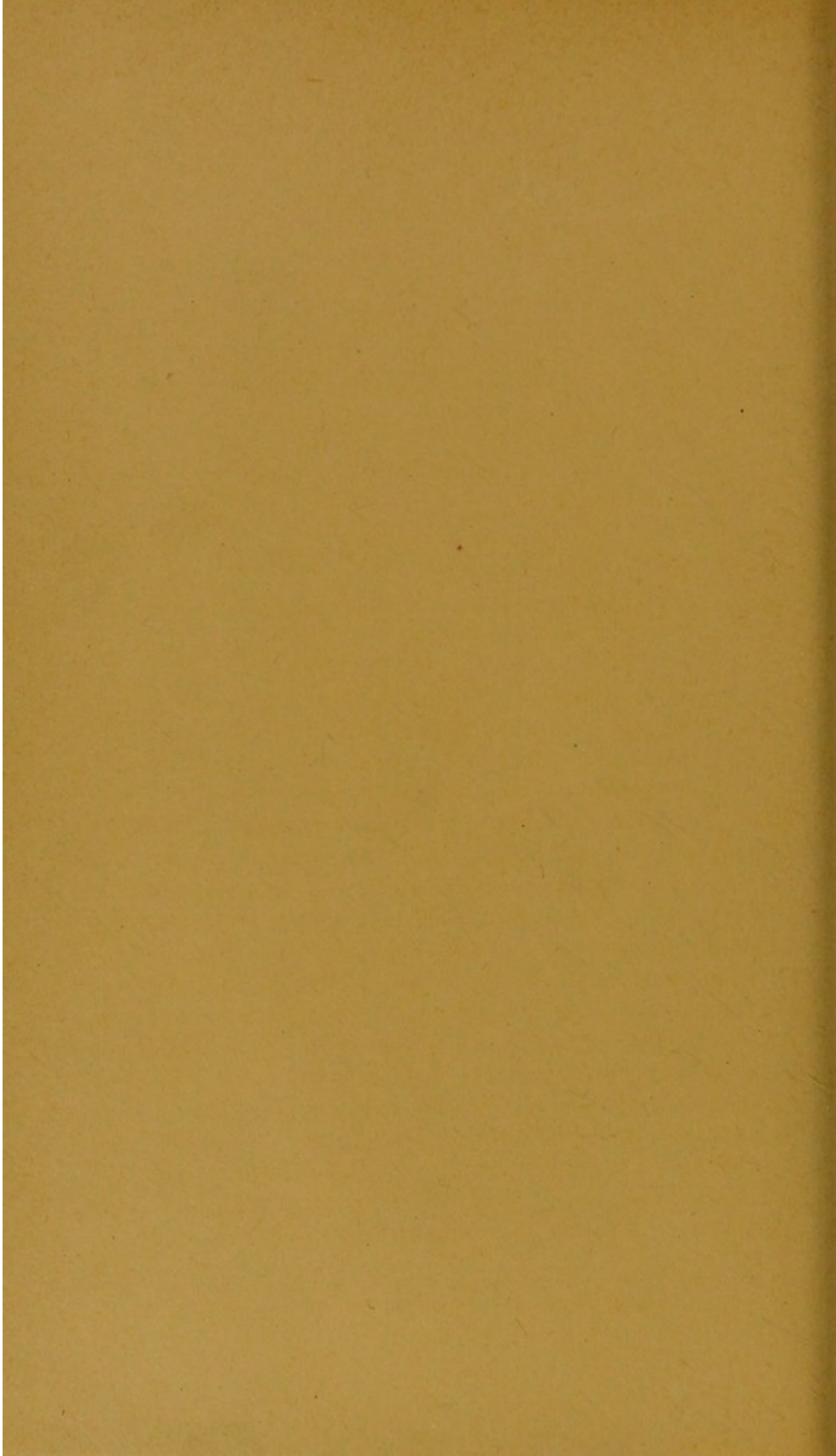


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THE ACTION OF DRUGS ON THE BLADDER AND GENITAL ORGANS.¹

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The Action of Drugs on the Motor Power of the Bladder.—There are two conditions of the bladder, with regard to its motor activity, that you are likely to be called upon to treat. One is the want of power to evacuate, the other the want of power to retain; imperfect evacuation and imperfect retention. Imperfect evacuation is frequently due to want of power in the muscular fibres or want of power in the nerve centres. This power may be strengthened to a considerable extent by the use of certain stimuli, more especially by the use of nux vomica, which seems to be one of the most powerful drugs. Retention, want of power to evacuate, is frequently associated with too great power of the sphincter. Both conditions depend in many, probably in most, cases on derangement of nervous co-ordination. A great number of people who play on the piano can play perfectly well if they leave themselves alone; but if they begin to think whether they are going right or wrong they begin to stumble and make a mess of it. Whenever the higher centres interfere with lower centres that have been already trained, the action of

¹ A Lecture from the course of Pharmacology and Therapeutics, by Dr. Lauder Brunton.—Reprinted from *The Practitioner*, Vol. I, No. 2, February, 1893.

these is checked or hampered. If a man begins to think about his bladder his micturition will very likely go wrong, and you may sometimes find loss of power to retain, or to evacuate, both due to the higher centres. For example, loss of power to retain due to the higher centres is seen in many cases of irritability of the bladder. Where the desire to urinate arises from actual filling of the bladder by the copious secretion of gouty kidneys, it is obvious that the bladder must be frequently evacuated. But sometimes it simply arises from nervousness. An example of this is often observed in students during an examination, and in them it is of a mixed nature, for their nervousness affects both their kidneys and bladder, causing increased secretion of urine, as well as a desire to evacuate the bladder before it is quite full. Another example is frequently found in men who have a good deal of sitting, in whose case the mere thought of evacuation brings on a desire to evacuate. Some men treat this by using a portable urinal; as, for example, judges on the bench. I have seen a judge get up from his seat, evidently, as I thought, to allow the water to trickle down into the urinal. If the old gentleman has a gouty kidney he cannot help himself, but if he only has an irritable bladder, he may soothe it with belladonna, or, still better, train it to behave itself by resisting the calls to micturition, until his judgment, and not his sensations, tells him that it is time to urinate.

Excessive irritability is one form of interference of the higher centres; the other form is spasmodic retention. Thus, when a man wishes to pass water, he is anxious, especially if some one else is standing by and waiting, as in a public urinal, to make water in a hurry; the desire to make water quickly prevents him from passing it at all. This form can frequently be relieved by some such plan as that adopted by Boerhaave. He lived before taps were so common as now, and he used to have a screen in his consulting room behind which was placed a tall footman. When he desired any of his patients to pass water, the footman at a given signal from him poured water from a water-bottle into a basin on the floor, so as to imitate the sound of a person passing water, and this at once had the desired effect. If in the out patients'-department you want to get a specimen of water quickly, in order to examine it, the best

thing you can do is to turn on a tap, and if that is not sufficient leave the patient to himself, and tell him that there is no hurry whatever; as a rule, if there is more than two teaspoonsful of water in the bladder, you are sure to get it by this plan. Sometimes, also, when there is no water running, if the patient only thinks of the sound of running water it will make the bladder act. The introduction into the urinals at railway stations of constantly running water has been of great service to many. Some passengers can now empty their bladder at a railway station who could not have done it before, although it does not occur to them that the constant running of water has anything to do with the evacuation of the bladder; it has, however, a great deal to do with it. Washing the hands with cold water is another help, as also the application of a cold wet sponge or hot water to the perinæum: and making the patient sit down in a hot sitz-bath will frequently enable him to pass water into the bath when he could not do it otherwise.

Incontinence or imperfect retention of urine is a very troublesome thing to treat. You get children suffering from this who are scolded and punished in all sorts of ways, and still they go on wetting the bed. Care should be taken that they have dry food for some time before they go to bed; then when the parents go to bed themselves the children should be roused to pass water. You may treat this affection to a great extent by bromides, but there are two drugs which as a rule are especially useful in incontinence of urine, and they have precisely opposite actions. The first one is belladonna or atropine. Its action seems to lessen the irritability of the fundus of the bladder, so that there is not the same tendency to spasmodic contraction of it. But if you want to get any good out of the treatment you must push the atropine until you get the symptoms of poisoning. I remember once seeing the wife of a medical man who had held a very high position in medicine, and who had seen all sorts of physicians and surgeons about his wife, as she had suffered a good deal from this affection. I asked if she had had belladonna, and was told that she had taken it for years. "But," I said "how far have you pushed it? has she been poisoned with it?" "We did not push it until she was poisoned." I thereupon gave her increased doses, and she took a tremendous quantity, but she

never had the symptoms of poisoning by it, and we stopped the incontinence of urine before marked dryness of the throat, or dilatation of the pupil, or any effect upon the pulse, was observed. Begin with ten drops of the tincture three times a day, and if you find no good from this dose, you must push it until you get dryness of the throat and dilatation of the pupils. There is no harm in doing this, because when you are pushing it in this way, patients will become so disgusted with the dryness of the throat that they will not go past the dose that is dangerous.

Now there is another drug, cantharides, which stimulates the bladder, and in large doses stimulates the kidneys, producing intense irritation of the bladder, and a tendency to pass water every minute or two until only a few drops are passed at a time ;

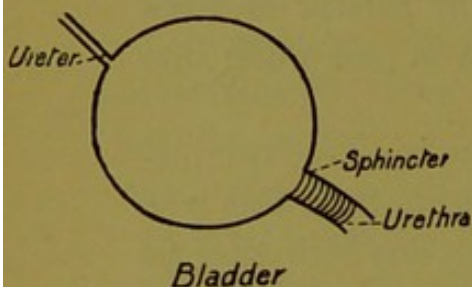


FIG. 1.

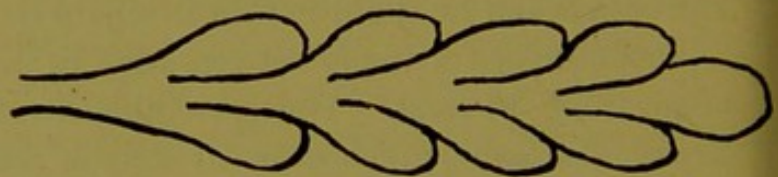


FIG. 2.—Diagram of the seminal vesicles showing the numerous loculi.

it irritates the penis so much that sometimes there is intense erection. At first sight you might think that a drug which stimulated the bladder so much and caused such frequent desire to micturate, would be the very last thing likely to be useful in incontinence of urine. But the explanation of this apparent anomaly is very simple. In the bladder there are two parts, both of which are composed of involuntary muscular fibre, the fundus and the sphincter. If the fundus be stimulated more than the sphincter it will cause evacuation, but if the sphincter be stimulated more than the fundus it will cause retention. In the case of belladonna it is probable that the muscular fibres both of the fundus and of the sphincter are rendered less irritable, but the fundus is more quieted than the sphincter, and so the urine is better retained. In the case of cantharides it would appear as if the opposite were the case, at least with small doses, and you can readily see that the cantharides

may increase the excitability of the sphincter, so that it holds the urine in spite of the efforts of the fundus to evacuate it. In cases where incontinence fails to yield to belladonna, try cantharides. I have never tried the two in combination, but it is quite possible that this may succeed even better. You must be more careful about the patient when you are using cantharides than when using belladonna; watch the urine and see that you are not bringing on albuminuria; if so stop the cantharides at once.

The Action of Drugs on the Urethra.—We have various drugs which act upon the urethra; these are sedatives and astringents, and you generally use them in cases of inflammation of the canal. Gonorrhœa apparently depends upon the presence of a definite organism, but not always. It may depend simply upon irritation of the urethra, and this may be brought on in some cases by mechanical or chemical irritation apart from infection. Thus it may sometimes be brought on by something that a man drinks. I do not say originally, but there may be a récrudescence of it from drinking. I have known a case of gonorrhœa in a man who asserted that it had been brought on by drinking copiously of Bavarian beer. He said that he had had gonorrhœa some time previously, but had been cured, and that he knew of no cause for the fresh attack except free indulgence in beer. I have also known a patient in whom gonorrhœa occurred which was apparently due simply to sexual excess, without any specific infection. Generally, however, gonorrhœa is due to an infective poison, and the pus contains definite organisms: then antiseptics require to be used. The oils and resins are more or less antiseptic, and so the substances that are frequently used in these cases are copaiba and cubebs; these drugs being excreted by the kidneys, and so passing into the urine, tend to destroy any organism that may be present. Besides these we have local sedatives, and opium is very often used by injection for this purpose. In combination with sedatives we very often use astringents. Those most frequently used are acetate of lead and sulphate of zinc. A mixture of these two gives rise to acetate of zinc, which is soluble, and sulphate of lead, which falls in a fine insoluble powder. This is useful because it forms a sort of plug

preventing the irritated surfaces of the mucous membrane from rubbing against each other. Some people use kaolin, or china-clay, for this purpose, but the old-fashioned acetate of lead and sulphate of zinc, mixed together, seem still to retain favour in cases of gonorrhœa.

The Action of Drugs upon the Genital Organs.—It is a great pity that so much ignorance exists about this subject. You will find accounts in the newspapers of all sorts of tragedies from want of a little knowledge on these matters. A lady told me, only the other day, that her sister was engaged to a man who had just gained a position which enabled him to marry, and just as they were going to be married he shot himself. Why? The tragedy very often happens in this way: on the morning of the wedding-day the man fancies himself impotent, and shoots himself because he is so ashamed. There was an old student of this hospital who came to me in a dreadful condition of mind one morning; he said to me, "I was married yesterday, and I am impotent." I just told him to occupy a separate bed from his wife for a week, to explain to his wife his fear of hurting her by connexion, to keep his mind easy and all would be right—and so it was. I have had other cases of the same sort, and the patients have told me that they have been very grateful to me for my advice.

There is another condition that leads to very great mental agitation, especially in young men, and this is what is known as seminal emissions. These are looked upon by many young men who lead chaste lives and have no physiological knowledge as something abnormal, whereas they ought to be regarded simply in the same light as other evacuations. Everybody in health evacuates the rectum once a day, and the urinary bladder as much as three times a day; and the seminal vesicles which become filled with the secretion from the testicles, just as the urinary bladder gets filled by the secretion of the kidneys, must be emptied too; they are emptied, as a rule, once a month or once a fortnight. Sometimes they are emptied just at the end of the month, and generally in this case either in one night or two nights. The two vesicles very often appear to be emptied separately, and in some cases they are apparently only partially emptied at a time, because these

vesicles are not like the urinary bladder—not one big *loculus*; if you will look at the anatomy books you will see that they contain several *loculi*, and apparently these *loculi* can be emptied one at a time (*see* fig. 2, page 4). But usually you get the evacuation of the seminal vesicles in one night, or once in two nights, at the end of the month. In many people this occurs once a fortnight. In some people you get spermatorrhœa, corresponding to diarrhœa, the vesicles being emptied much more frequently; and just as diarrhœa weakens a man, so may spermatorrhœa weaken a man. This condition requires a certain amount of treatment, but one of the most important parts of the treatment usually is to ease the patient's mind, to tell him that it is more or less a natural condition, and that it will pass off without producing any of those awful consequences that are detailed in some of the books sown broadcast over the country by charlatans.

Apparently the reason why the vesicles have this particular loculated shape is in order that the race should be continued. The male must be ready at opportunity for the generative act, and so a continual supply of semen is required in the vesicles. But in order that the race should be continued this must be brought into the female organs, and for this purpose the penis must be rigid; this is effected by dilatation of the penile arteries and interference with the return of venous blood from the organ, so that it becomes erect and adapted for the purpose of intromission. These two things usually go together—erection of the penis and evacuation of semen—and both of these are controlled by a centre in the spinal cord. This centre in the spinal cord will continue to act even after all connection with the higher centres of the brain has been cut off. In a dog in which the spinal cord has been divided, the penis will become erect and the semen be ejaculated upon local irritation, although there is no connection with the brain of the dog, and the animal is unconscious of what is going on. But the centre in the spinal cord is very much affected by the higher centres. It may be either excited or depressed by them. It may be depressed by the higher centres tending to inhibit it, and this is one of the reasons for the occurrences which I have mentioned of imaginary or psychological impotence either before or immediately after

marriage. It is excitement of the higher centres that prevents the action of the lower; the inhibition is of the same nature as that which I have described in the case of the urinary bladder. When the brain attempts to interfere with the spinal centre for the generative act, the brain centres may stop the ordinary action of the genital organs, and may render the man temporarily impotent; but if the brain is quieted down, and the man thinks no more about it, the genital organs will regain their natural functions.

Then the action of the organs may be lessened to a great extent by very high physical training. The ancient Greeks when training for competition in the Olympic games were nearly impotent. The higher training of the motor powers for wrestling, boxing, and running, seems to withdraw all the nervous influence from the genital organs; and so, when there is any excess of irritability about the genital organs, the first thing to be done is to direct the patient's attention to something else. Of course the best diversion would be physical exercise like that of the ancient Greeks; but where this cannot be managed the next best thing is to direct the man to hard work, either mental or bodily, and this will tend to prevent any very great excitability of the genital organs; thus both of these forms of exertion will tend to act as anaphrodisiacs. But there are differences in the class of work; simple walking about does not have this effect to any very great extent. Rowing is sometimes even bad, because the local irritation of the external organs seems to have the effect, in some cases, of exciting sexual desire. A much better thing is the movement of the upper arms in gymnastics, and more especially in fencing, single stick, or boxing. Another exercise that is very useful is the use of tools in carpenters' work, and sawing wood or cutting down trees tends to divert all the nervous energy and the blood to the upper part of the body, and to the arms especially. Everything that tends to divert the blood to the upper part of the body tends to do good, anything that tends to divert the nervous energy to the genital organs tends to augment the irritability and to increase seminal emissions if there be a tendency that way. Thus when we find a tendency to increased excitability of the sexual organs, it is advisable to divert the mind from them, and to avoid anything that would draw attention to them.

Whenever there is a tendency to sexual excitement avoid any local irritation. Sometimes badly-made clothes will tend to cause rubbing over the parts, and that is a thing to be avoided. Care must also be used in regard to the accumulation of smegma under the prepuce. In Eastern countries where this rapidly undergoes decomposition, the consequent irritation is avoided by the practice of circumcision, which obtains so very largely in the East. The whole of the Mohammedans are circumcised, and so are the Jews. The Mohammedans are exceedingly careful in regard to washing, so that when taking a voyage on the Nile or the Suez Canal, it is advisable for husbands to tell their wives that they need not go on deck too early in the morning. The Mohammedans go down to the river or the canal and wash their genitals, as they are enjoined to do by the rules of their religion, and in that way they avoid irritation. The best plan of dealing with such irritation is to treat it like any other cutaneous excoriation. Then there may also be irritation due to a skin affection; for example, there may be a tendency to eczema about the genitals or neighbouring parts. This is apt to come on in warm weather, and sometimes gives rise to a great deal of irritation. The best plan of dealing with it is to treat it like a bed-sore which is beginning to threaten; bathe the part in spirit so as to harden the skin. The same thing may be done in other parts of the body where there is irritation due to the secretion of sweat, and to the parts being in contact with one another. Eau de Cologne, which should be pure spirit with a little scent in it, may be used twice or three times a day for the purpose of hardening the part. By this means you will toughen the skin and prevent any irritation, but if the skin be very irritable the Eau de Cologne should be diluted with a little water. If there should happen to be a crack in the skin, take a bit of cloth and fan the surface during the time that the Eau de Cologne is being applied.

You may get reflex irritation from the inside as well as from the outside, and one common cause of excitability of the genitals is reflex irritation from the bladder when it is too much distended. In the case of persons who suffer from seminal emissions in the early morning, it is advisable to tell them to awake about five o'clock to empty the bladder, and to go to

sleep again. There is then not the same reflex irritation of the genital centres, and so they do not get any seminal emission. A too acid condition of the urine is frequently the cause of irritation of the genitals, and in this case it is best to put the patient on soda, potass, or lithia waters, which generally act well in gouty constitutions. As a rule you would generally prefer potass or lithia to soda to lessen the hyperacidity of the urine in the gouty. Sometimes the passage of drugs into the urine may give rise to irritation, and chlorate of potassium has been said to do this. Cantharides, as I have said, tends to do it very

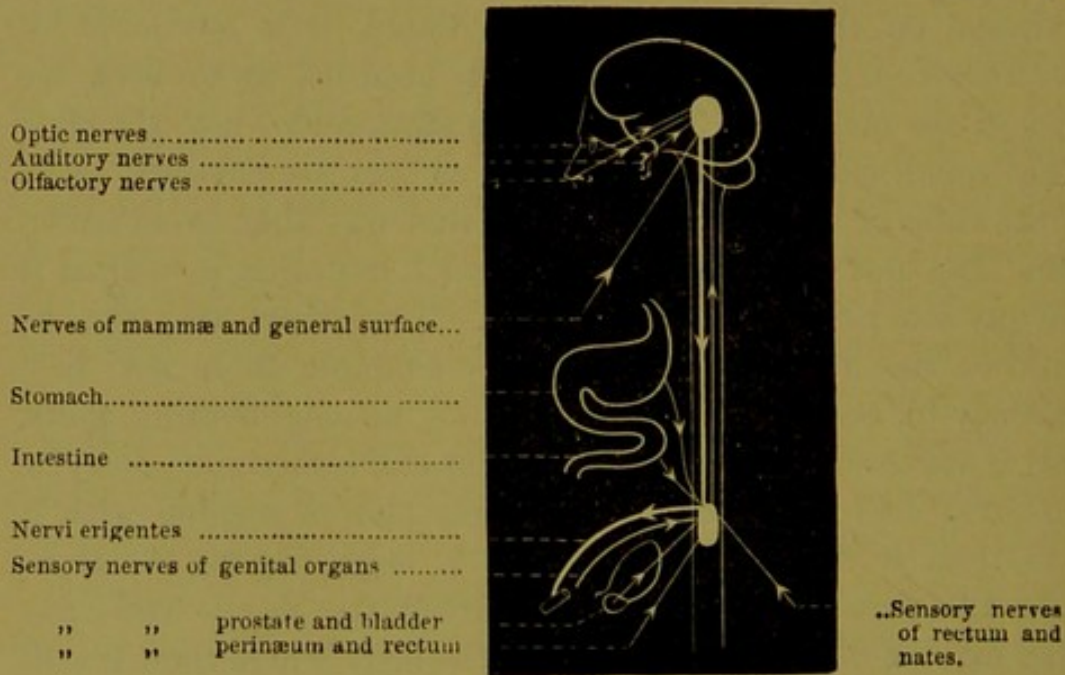


FIG. 3.

Diagram to illustrate the effects on the genital centres of irritation of the stomach or intestine by flatulence, acrid matters, or faecal accumulations. It also shows the nerves through which the cerebral and spinal genital centres may be stimulated.

greatly. There is another source of irritation which you may not suspect, namely irritation from the stomach and intestines. Flatus in the intestine will often give rise to seminal emissions. I had one patient from Singapore who told me that every time his colon got distended with flatus it brought on seminal emissions. In such a case you may lessen the irritability considerably by giving something that would tend to prevent the accumulation of gas in the intestine. I have known cases cured by giving at night some bicarbonate of sodium with a little tincture of nux vomica. This combination cured not only the seminal emissions, but also the painful erection of the penis

which was due to irritation arising from the intestine. The result is all the more strange because nux vomica tends to stimulate the spinal nerve centres, and in some people it will bring on emissions; that, indeed, is one of the points you have to attend to in using nux vomica in cases of debility. You will sometimes find patients tell you that they cannot take nux vomica, that it makes them weaker, and at first you may not understand this. The reason is that in these instances the nux vomica increases sexual irritability and brings on emissions, and so, instead of feeling stronger, as patients usually do on this drug, they feel weaker. Accumulation of fæces has a similar action to accumulation of gas, and patients liable to emissions should have their bowels empty when they go to sleep. Care should also be taken to destroy ascarides in the rectum. Another means of prevention is to make the patient lie on a hard mattress and not on a soft feather bed. In some patients lying on the back tends to bring on excitement. I am not sure of the *modus operandi* of this, but in order to treat it, it is best to get a cotton-reel and tie it round the back so that it lies against the spine; if the patient in sleep should roll over on to his back the reel makes him turn over on the side, and this will tend to lessen the excitability. Large doses of bromide are sometimes given, and its action is assisted by the addition of a little iodide of potassium. These drugs have very depressing effect upon the sexual power; indeed in full doses they remove the sexual desire almost entirely.

Another condition in which sexual irritation seems to depend is disease of the spinal cord. One gentleman from India told me that his life was a perfect burden to him from morbid excitability. In his case the knee-jerks were gone, and though there was no other indication, I regarded this sexual irritability as a symptom of locomotor ataxy. The sexual irritation was in his case taking the place of what is known as lightning pains in this disease. Many other drugs had been tried in vain, but he was relieved at once by antipyrin. The drug acts evidently by removing the irritability of the genital organs in the same way as it tends to remove the lancinating pains in the limbs.

Perhaps I ought also to mention a form of so-called sperma-

torrhœa, which seems to be, to a great extent at least, of mechanical origin. Patients are sometimes greatly frightened because they pass semen when at stool. This so-called semen may sometimes contain spermatozoa, but in many cases it is simply prostatic fluid. Considering that the prostate and the seminal vesicles lie close in front of the rectum with very little tissue between, the wonder is, not that sometimes the fluid is squeezed out of them by a hard scybalous mass in the rectum or by muscular strain, but rather that this does not happen every time a constipated person goes to stool. The fact that it does not, shows that probably the circular muscular fibres of the ejaculatory duct have, like those of the vesical sphincter, considerable power to retain the semen, and, if it really does come away, the seminal vesicles must be treated like the urinary bladder with drugs which lessen the contraction of the body of the vesicle, or strengthen the contraction of the sphincter fibres. Thus belladonna, either alone or with bromide of potassium, sodium, or ammonium, has been found useful; so has its alkaloid atropine, and so has chloral. I do not know how salix nigra acts, but it may have also a sedative action, and at any rate it has been greatly praised for its utility in this condition.

On the other hand, there are remedies which increase the power of the involuntary muscular fibres of the sphincter, such as ergot and digitalis, oxide of zinc, iron, and iron with cantharides. Here again we meet with a drug that we would as little expect to be useful as in incontinence of urine, but the explanation is the same in both cases. Whether belladonna and cantharides together have been tried I do not know. Local tonic measures, such as cold hip baths or cold sponging, may also be adopted. At the same time, the patients must be warned not to strain at stool nor sit too long in the closet, but rather to go back after an interval, if the bowels require it for their complete evacuation. Laxatives, such as liquorice powder, should be given, and instructions to evacuate the bowels once a day, so as to prevent the formation of scybala, and if they have formed, they should be removed by an enema of warm water.



