Case VIII was one of pain, having its seat either in the abdominal walls or the coats of the intestines, and independent of the uterus. It was at times more an extreme soreness rather than a pain. Here the faradization did excellent service.

My cases are too few and my experience too limited to warrant any great expectations from this agent. It is not a panacea, nor does it work magical cures. I have, however, become convinced that cases of the character of those described in this paper have improved more rapidly than when treated by other methods. These are cases for which I would have applied tincture of iodine and glycerine dressings, and I think the faradization has worked decidedly better. The immediate effects of the treatment have been more favorable. Usually the application has been followed by a feeling of restfulness and quietude of the nervous system, which has lasted for several hours.

I am well aware of the imperfections in my method of applying it. The battery is simple, without any means of indicating or regulating the number of interruptions, and it has been necessarily empirical. I have so far failed to see any harm from its use, and my results have been sufficiently satisfactory to encourage me to make further trial of it.

VALVES IN THE VEINS OF THE HUMAN INTESTINES.¹

BY W. S. BRYANT, A.M., M.D.

HISTORY.

CHARLES ETIENNE described valves in the portal system of man, which he called apophyses, and which he compared to the valves of the heart. Bauer met valves in the short veins which run from the stomach to the splenic veins in man, which Cruveilhier was unable to verify.

Milne Edwards says that among mammals there are no valves in the portal system, but that in some species one meets in these vessels valves more or less numerous.

"Dr. Cresp, of England, has described valves in the splenic veins in some of the inferior animals. In one of the mesenteric veins of the reindeer he showed forty-two pairs of valves." (From the *N. Y. Med. Journal*, 1865.)

Hyrtl, in the *Lehrbuch der Anatomie*, says: "Only in the portal vein of the rodents have I found a very pretty spiral valve of three to eight revolutions."

Sappey has described some valves belonging to the portal system of veins. These were found in the falciform ligament of the liver in very small veins.

Dr. Hochstetter recently, in the *Archiv für Anatomie und Physiologie* (1887), from whose article I take the liberty to quote at some length, because his is the most complete work on the subject, notes the following observations, which I have been able to confirm for the most part. He found that in the newborn infant the venous branches upon the stomach were furnished with valves, one in each minor branch, very rarely two. These valves were bicuspid, and usually placed in those vessels at or near their open-

ings into the main branches. The branches of the coronary vein of the stomach oftentimes appeared to have a relatively small number of valves. In the great omentum the veins had valves at the venæ gastro-epiploicæ, and wherever smaller branches emptied into greater. "With increasing age, the valves become little by little incompetent: first, in the gastric branches of the venæ gastro-epiploica dextra near the pylorus, next along the great curvature in the branches of the venæ gastro-epiploica sinistra and in the venæ gastricæ breves, so that they persist longest in the branches which empty into the communication (if there is any) between the two venæ gastro-epiploicæ. Towards the twentieth year of life no venous branches along the great curvature of the stomach seem any longer to possess competent valves. Comparatively late the valves of the superior branches of the coronary vein become incompetent, and, last of all, usually those in the veins of the great omentum, where I sometimes found, even in very old people, perfectly competent valves."

"The valves become incompetent with increasing years by becoming smaller little by little, so that the two opposite edges of the valves no longer touch when the vessel is completely filled. Finally, only two bow-shaped linear seams, corresponding to where the valves had been attached, remain, and these can disappear, so that no trace of the valves is left." Dr. Hochstetter goes on to state that in many animals valves are found in the gastric veins, and in some they are more numerous than in man.² In the horse, he found them throughout the gastro-splenic veins. He also found them in the main, as well as the small branches of the gastric veins in antelope dorkas, sheep, goat, and in carnivora (dog, fox, cat, and otter). They were most numerous and best developed in the dog and cat. He found valves also as well developed and as numerous in the horse and hog as in the beasts of prey. In the rabbit he found only a very few valves, and these were in the gastric veins; while in the hedge-hog and bat (*vesperugo noctula*) he found none. On a close examination of two monkeys, he found good evidence of valves in the smaller veins, especially towards the great omentum and here and there in the branches of the gastric tributaries of the venæ gastro-epiploicæ, or there were dilatations, indicating the former presence of valves. Dr. Hochstetter says it is not surprising that the valves in the branches of the portal vein become incompetent with age when we consider that many of the valves of the extremities do not last to maturity.

METHODS.

Professor Dwight has aided me with his able supervision in making the following observations:

Last winter, while making general injections of the abdominal veins in dogs, I noticed that the injecting mass rarely entered the small veins of the intestines, and, on close examination, found the obstruction was due to valves. I then made injections of the portal system in several animals and in the infant at birth, and lastly in adult man, with what results will be shown later.

The methods I used were calculated to show only competent valves. A coarse injecting mass that

¹ A Graduation Thesis. The investigations were made in the Anatomical Department of the Harvard Medical School in the winter of 1887-8.

² Henle had already mentioned valves in the branches of the portal vein of mammals. Weigle found them in ruminants and the horse. G. Leising, C. Müller, and F. Müller mention some valves in the splenic vein of the domestic animals.

would not pass through the capillaries, such as gelatine thickened with Prussian blue, was used. If competent valves occurred, their presence was at once shown by the arresting of the mass in the course of the vein. When the mass is thus brought to a standstill, a minute examination is necessary to show the nature of the obstruction, and a microscope of low power is useful.

A number of the valves discovered in this way, with the vessel still distended, were hardened and sectioned with a microtome. The valves were then seen cut at various angles according to the plane of the section.

Figure 1 is from a microphotograph by Mr. G. W. Fitz, of a vessel from the jejunum of a woman, prepared and cut in the preceding way. The section is longitudinal to the vessel dividing the two cusps of a valve.

FIG. 1.

viding the two cusps of a valve.

For a thorough view of the structure of the valves in contradistinction to their position, clear gelatine can be used for an injecting mass. The advantage of this is its transparency, for when a vein having a valve distended with clear gelatine is cleanly dissected, the outline of both its parts can be seen through the walls of the vessel, either with the naked eye, if the valves are large, or with a low power of the microscope if they are in the smaller veins.

OBSERVATIONS.—ANIMALS.

In the search for valves the veins of the intestines in the following animals were injected — guinea pig, rabbit, cat and dog. No evidence of valves was found in the guinea pig. In only one rabbit the veins of the last four or five inches of the large intestine were found well furnished with valves. These valves were placed along the attached border of the intestine in the mouths of the *venæ breves*. Figure 2 shows a portion of that intestine (rabbit), natural size, with the valves diagrammatically represented.

FIG. 2.

The cat was found to have a considerable number of competent valves at varying intervals along the intestine. They were usually most numerous in the vicinity of the cæcum, above and below, and occurred in a double series, one at the mouths of the *venæ breves*, and the other at the mouths of their principal tributaries.

The dog was found to be furnished with a more efficient set of valves than any of the other animals examined. The valves were found the whole length of the intestine with only here and there a spot where the injecting mass had entered the fine veins. In these places there was usually some indications of the presence of an incompetent valve. The valves usually occurred in a double series, more rarely triple or single. The most constant valves were at the mouths of the main tributaries of the *venæ breves*. The next most constant were at the mouths of the *venæ breves*, and the least constant were placed somewhere in the secondary tributaries. In one dog a valve was found in the inferior mesenteric vein a short distance from its lower extremity.

FIG. 3.

Figure 3 represents a portion of a dog's small intestine, actual size, with diagrammatic valves.

MAN.

Infants at birth, children, and adults were examined.

INFANTS AT BIRTH.

In infants, valves were found at irregular intervals along the whole course of the intestines, more numerous on the large intestines than on the small. On the large intestine they occurred in the intestinal veins (*venæ breves*) at or near their mouths, and sometimes in the mouths of the main tributaries of these veins. This was more frequently the case on the cæcum. The number of valves varied with the individual; in the majority of cases more than half of the *venæ breves* of the large intestine contained valves.

FIG. 4.

FIG. 5.

FIG. 6.

Figure 4 is a portion of the large intestine of an infant at birth, one and one-half natural size with diagrammatic valves.

Figures 5 and 6 are from microphotographs by Mr. G. W. Fitz, of the valves themselves of the large intestine, injected with clear gelatine, showing the outline of both cusps of a valve, through the anterior wall of the vein. On the small intestine the venous valves were arranged in somewhat the same way. They were found in the intestinal veins (*venæ breves*) at or

near their mouths, and at the mouths of the superficial branches of these veins. There is a much smaller number of valves here than in the large intestine; however, they are rarely entirely absent and occasionally are found in as many as one in five of the *venæ breves*.

FIG. 7.

Figure 7 is the portion of the small intestine of an infant at birth, twice the natural size, and with diagrammatic valves.

The following table shows the percentage of valves found in a number of the infants examined, taking 100 as the greatest possible number; that is, one at the mouth of each one of the *venæ breves*:

No.	1.	In large intestine, 100%...	In small intestine, 20%
2.	"	100 ... "	" $\frac{3}{5}$
3.	"	90 ... "	" $\frac{1}{2}$
4.	"	87 ... "	" $1\frac{1}{3}$
5.	"	85 ... "	" 12
6.	"	84 ... "	" 4
7.	"	80 ... "	" $\frac{1}{5}$
8.	"	77 ... "	" $\frac{1}{10}$
9.	"	63 ... "	" $1\frac{1}{10}$
10.	"	32 ... "	" 1
11.	"	25 ... "	" 10
12.	"	20 ... "	" 0
13.	"	10 ... "	" $\frac{1}{2}$
14.	"	4 ... "	" $\frac{1}{10}$
15.	"	2 ... "	" 0
16.	"	0 ... "	" $\frac{1}{20}$
17.	"	0 ... "	" 0

CHILDREN.

Only three children were examined. The youngest was about two weeks old. The large intestine had valves in about ten per cent. of the *venæ breves*, and in the small intestine three valves only were seen. The next child was about five months old. In this there were only four valves found which were on the jejunum. The third child was ten years old and quite rachitic. No valves were found on the large intestine. The valves found on the small intestine were most numerous in the jejunum. There were twelve valves in the *venæ breves*, and thirty valves in as many superficial branches of the *venæ breves*. These superficial tributaries arise from the surface of the intestine and empty into the *venæ breves* a short distance from the intestine.

ADULTS.

A number of human adults were examined with the following results. Few valves were found in any one individual, even the youngest, and it did not ap-

pear that age after adolescence had much influence on the number of valves on the intestines. When the veins in the other parts of the great omentum were intact, I noticed that valves were less numerous along the free border in those veins which in the erect position would be nearly horizontal. Also that the disappearance of valves seemed to begin in one or two of the main veins lying near the centre of the omentum, and that the valves disappeared in the direct course of these veins before they did in their tributaries.

In the intestines of most adults there were a few valves remaining in the *venæ brevis*. These were usually on the ileum near the cæcum.

Figure 8 is from a microphotograph by Mr. G. W. Fitz of a valve from the cæcum of an adult. The injecting mass is clear gelatine, and the outline of both the cusps of the valve are seen clearly through the wall of the vessel, frequently on the jejunum. They are most numerous at the mouths of these veins, but there are sometimes two more

FIG. 8.

sets of valves in other portions of the superficial vessel, making in all three sets of valves.

As autopsies were the chief source of material, in but few cases the whole intestine could be examined, and in many only a small portion, so that the table is not as complete as might be desired.

The following table shows the number of competent valves found in the various parts of the intestines of human adults.

No.	On Cæcum.	On rest of Large Intestines.	On Small Intestines.	Total.
			In <i>venæ brevis</i> .	
			In superficial branches.	
1	5	2 on ascending colon.	22 (2 feet examined.)	85
2	Not exam.	6	3	52
3	1	11	18	50
4	1	None in ascend. col.	9 (mostly in ileum.)	47
5	1	3	7	34
6	None.	5 (also 4 non-comp.)	3 (mostly in ileum.)	23
7	"	6	13	19
8	"	None.	"	13
9	"	1	1	11
10	5	None in ascend. col.	3	5
11	None.	"	Not examined.	3
12	"	None.	None.	"
13	"	None.	"	"
14	"	None.	"	"
15	Not exam.	Not examined.	Not examined.	"
16	"	"	None in jejunum.	"
17	"	"	None in jejunum.	"
18	"	"	None (2 feet exam.)	"
19	"	"	"	"
20	"	Not examined.	"	"

The valves of the intestinal veins, like those of the rest of the portal system, are bicuspid. They are also thin and delicate, and in the infant extremely elastic. In man the line of contact of the two halves of the valves, in the majority of cases, is nearly parallel with the course of the intestine.

The number of subjects intermediate between the infants at birth and the adults which were examined is very small, and the conclusions based on them may have to be altered after a wider experience.

CONCLUSIONS.

These observations show that at birth the valves on the intestines are quite numerous in man, and at this age they are more abundant on the large intestine. Also that in a few months the valves either disappear or become incompetent, with few exceptions. In adult man there are usually a few valves, and these are more abundant in the small intestine, especially in the superficial tributaries of the *venæ breves*. These valves are more numerous in the jejunum, and disappear as we approach the cæcum.

Though the valves just described were discovered since Hochstetter's paper was written, his remarks on the significance of valves in the portal system will apply to them. After alluding to the fact that the presence of valves in the branches of the portal vein seems widely spread among mammals, he says: "But only in individual species, as in the beasts of prey, do the valves possess great importance in connection with the circulation. In many species they are to be considered much more as rudimentary organs, which act either only in youth, as in men and perhaps the ape, and later in part or wholly disappear, or for the most part, as in the rabbit, are very imperfect."

Clinical Memoranda.

PUERILE GENITALIA.¹

BY F. B. STEPHENSON, M.D., U. S. N.

ALTHOUGH the subject is mentioned by the ancients, from an examination of modern literature it appears doubtful that reliable data on cryptorchidia exist earlier than about 1720. Since then a great variety of cases have been reported, as given, for instance, by Godard ("La Cryptorchidie," par Ernest Godard, Paris, 1857).

One or both testicles may continue in the abdomen, or be fixed more or less permanently in some portion of the passage to the bottom of the scrotum. Occurring normally at or near birth, complete descent has taken place as late as twenty-five (Godard) and thirty-five years of age (Mayer). When other signs of non-perfection exist, such as a weak voice, delicate structure, thin pubic growth, etc. (showing absence of masculine organism), virility is more than doubtful. The retained (undescended) seminal gland often undergoes a sort of fibrous transformation; or, various degenerations, as fatty, tuberculous, cancerous. An ill-located testis occasionally becomes troublesome, inflamed, from mechanical relations; it has been mistaken for an inguinal gland and for a hernia.

Dissection has shown that, sometimes, one of the

¹Read before the Boston Society for Medical Improvement, May 28, 1888.

pair is absolutely wanting, only rudimentary traces of the cord, etc., being found.

The testimony is rather conflicting as to whether double non-descent causes sterility. Godard, from microscopic examination, decides that where the testes remain in the abdomen procreation is impossible. John Hunter admitted that he had seen one case where they continued in the abdomen, and the person had all the passions and powers of a man. Two cases of undescended testicle are reported (*The Lancet*, June 16, 1877) where other signs of virility (as normal penis) existed, both having offspring. Another case, aged twenty-six, had both partially descended, with diminutive penis. After having seen his future marital companion the parts took on active growth: at twenty-eight years they were of normal size, and the man became a father (Curling, from Wilson).

When the sperm glands are in malposition outside of the abdomen, the ability to perform their office will be variously modified by the relations of surrounding structures, as to pressure chiefly. In any case, the prognosis must depend much upon other signs of adult physiology.

The preceding case resembles that now presented, which may be described as double inguino-scrotal cryptorchidia. The man is twenty-two years of age, generally well formed, of normal, healthy blood connection. The penis is of infantile size, though the patient states that erection has taken place, with the usual sensation on ejaculation, the organ then becoming about double its length when flaccid. Neither testis is in its natural place; the right can be easily pushed down, while the left may be felt near the pubic attachment of the scrotum; both are very small.

Another man, aged nineteen, recently seen, was well formed; had a very long trunk; penis unusually long and thick; right testicle larger than the average; left not apparent in the scrotum or elsewhere. He said that his brothers and sisters had children; that he did not know himself different from other boys; that he first noticed absence of testis when seven years of age. He appeared dull of intellect.

Dr. Marshall, in nearly 111,000 recruits, met with one case only where the two glands had not come down. He found, in 10,800 recruits, one double ectopy, eleven of single displacement (five right, six left).

Cryptorchids may be arranged in three classes:

- (1) Those having neither desire nor power of sexual intercourse.
- (2) Those having power of sexual intercourse, but incapable of fertilizing.
- (3) Those having the desire and capacity for sexual intercourse, possessing normal semen, but who fear to marry because they think the testes useless, not being in the scrotum.

Little is known as to the cause. Some cases are hereditary. The dissection of one case showed no structural impediment to natural descent. Various anatomical abnormalities have been alleged without much logical basis. Lesions of adjacent parts (as gubernaculum) may hinder the usual course. Scarcely more can be assigned in explanation of origin than "incomplete development."

In this connection, it may be said that some observers consider feeble intellectual powers a consequence, or concomitant of such abnormality, but proof thereof has not been found in professional archives.

In regard to treatment, we find the account of one