gubernaculum blended with its extremity, and were, by means of the plica gubernatrix, closely connected with it, and were, the lecturer thought, chiefly accountable for its formation, and also for the ultimate passage of the testicle into the scrotum.

The structure of the gubernaculum was next considered, and it was said to consist, whilst the testicle lay in front of the psoas, of two different elements; first, of a central band of unstriped muscle-fibre; and, secondly, of a number of striped elements prolonged upwards, behind the peritoneum, from the abdominal wall. As the gubernaculum brought about the migration of the testicle, these ascending striped fibres were, as John Hunter pointed out, drawn down to become the greater part of the cremaster, but not the whole of that muscle, because long before the testicle had arrived in the inguinal canal the muscular fibres of the abdominal wall might be seen in microscopical sections looping downwards towards the scrotum.

Fig. 12.—Infantile hernia, to show band of fibres passing upwards from back of testicle to hernial sac. T. = testicle; S. = hernial sac.

Various theories which were supposed to account for the transition of the testicle were referred to. The lecturer divided the phenomenon into two stages: first, the apparent movements within the abdomen, due to growth of surrounding parts; and, secondly, the actual migration down the inguinal canal into the scrotum, due to the traction of the muscular fibres of the gubernaculum. The recent revival of an old theory was mentioned. The migration of testicle into the scrotum had lately been considered to be of the nature of a perpetuated hernia (Bland Sutton, *An Introduction to General Pathology*). But it was pointed out that the term hernia was used in two different senses. Sometimes it implied merely an anatomical condition, namely, the escape of organs from their containing cavities; at other times the word Hernia was used to connote a pathological change; but used in its pathological, and not in its anatomical, sense, it was clear that the word hernia ought not to be used in explaining the transition of the testicle, for the simple reason that the pathology of hernia was quite undecided. The question still remained to be settled whether inguinal hernia was due to (a) a defect in the abdominal walls; (b) an elongation of the mesentery; or (c) to a general defect of the peritoneum. The lecturer then pointed out the closeness of the attachments of the peritoneum to the front walls of the abdomen, and its exceeding looseness posteriorly. The influence of this condition in facilitating the locomotion of the peritoneum of the back of the abdominal cavity, and, at the same time, the locomotion of the viscera contained in the various reflections of the serous membrane, was commented upon. After discussing the completion of the processus vaginalis, and the passage of the testicle and its mesorchium down its posterior wall, the mode of closure of the processus was mentioned. The absence of any sort of adhesion was urged; more particularly the absence of any adhesion capable of becoming the sac of an encysted

hernia. The various specimens included under that heading belonged to the infantile variety, and were similar to the case described by Hey. The formation of the sacs of infantile hernia was attributable to the action of that part of the gubernaculum which is contained in the plica vascularis, because muscular fibres recognisable as a part of that prolongation were, in many specimens, found attached to the extremity of the sacs of infantile hernia. (Fig. 12.) Without doubt all the sacculations found at the back of congenital hernial sacs were not attributable to this cause. A specimen was shown to demonstrate the existence of numerous recurrent branches of the spermatic artery to the peritoneum, and these were considered as affording evidence that the vessel must have moved downwards to a greater extent than the serous membrane. The presence of these recurrent branches upon the walls of hydrocele sacs and of hernia was mentioned, and a specimen was shown in which a recurrent branch was thought to have influenced the formation of a pouch upon the posterior wall of a congenital funicular hernia. Other structures, in addition to those which had been mentioned, accompanied the testicle in its descent. It was not unusual in fetuses to observe that the subperitoneal fat had also migrated with the testicle and cord from the abdomen. An overgrowth of this fat was considered to account for the not infrequent occurrence of lipomata of the spermatic cord.

The inferior attachments of the gubernaculum were then referred to, and their variations at different periods of intra-uterine life considered. At the sixth or seventh month, fibres could be seen piercing the lower part of the abdominal wall, and extending into Scarpa's triangle; others were attached to the pubes and root of the penis; and others, rather later on, to the bottom of the scrotum. Moreover, at the eighth month, sections through suitably prepared fetuses demonstrated that many of the lowest fibres of the gubernaculum passed into the perineum, and ended over the tuberosities of the ischium, or by blending with the sphincter ani. These dispositions of the fibres of the gubernaculum were supposed to account for the occasional passage of the testicle into Scarpa's triangle or into the perineum. In the latter case, it was usually found that the organ was attached by a band either to the tuberosity of the ischium or to the sphincter ani.

In conclusion, the lecturer begged to thank a great many friends for their kindness in sending him material for investigation; and also to thank Dr. Vincent Harris for the use of his department, and for generous aid and advice; and Mr. D'Arcy Power for facilities for obtaining and preparing specimens.

POST-MORTEM EXAMINATIONS OF CENTENARIANS : WITH REMARKS.

By G. M. HUMPHRY, M.D., F.R.S.,
Professor of Surgery in the University of Cambridge.

(Concluded from page 565.)

ONE of the most interesting features in advancing age is the lessening size and weight of the cell-multiplying and blood-producing organs, the spleen, the lymphatic glands, and Peyer's glands—coincidentally with the lessening of nutritive activity and therefore of the demand upon the blood factors. These organs are, as we should expect, at their maximum in early life, when the growing and reparative work of nutrition is at its height, when the body is most increasing in size, and is most active in function. The thymus gland fades soon; its special contribution, whatever it be, to the blood-compound, ceasing, as we may infer, to be required a few years after birth. The lymphatic glands are large in childhood and youth, and are easily excited to inflame, to enlarge unduly, and to take on other morbid conditions. As age advances, they become functionally and pathologically less active, and they are at their minimum in the centenarian.

It is not a little remarkable that, whereas the greatest appreciable wasting is in the spleen and other organs which have relation to blood-making, the greatest increase is in the heart, which has relation to blood-propelling, and which is, indeed, the chief agent in that work. This increase in the heart is not a little due to the accumulation of fat which often takes place upon it in advancing years, as well as to some thickening and other changes which affect its valves and fibrous tissues. Moreover, although the volume of the blood may be lessened in old age (and it does not appear that it always is so, for twenty-four of our centenarians are reported as full-blooded³ the thickened, less elastic condition of the arteries, with the less perfect smoothness and evenness of their interior, renders the circulation of the blood a more laborious task for the heart, and causes some hypertrophy of its muscular structure.

³ See table and remarks appended to the JOURNAL, December 11th, 1883.

The slight increase in the weight of the lungs observed by Boyd in males is probably due to some thickening of their mucous and other tissues, associated with the lowered respiratory capacity which is caused, in great measure, by the diminished elasticity of the thoracic walls and of the lungs, and a consequent limitation of the respiratory range. This is evinced by the measurements of the chest girth of our centenarians, which, on the average, do not show more than half an inch difference between inspiration and expiration (see table and analyses and remarks with JOURNAL of December 11th, 1886).

The degenerative changes in the arteries—a substitution of fibrous, atheromatous or calcareous matter, for the elastic and muscular tissue, attended with thickening, dilatation and roughening—are less than might be expected. Though marked in Holyoke and Miles, and spoken of as a cartilaginous condition in Keill's case, they were confined to the commencement of the aorta in Rolleston's, and are not mentioned by Harvey. Of 28 returns in our table, the arteries are reported "knotty" in 6, "even" in 18, and appear to have been large, tortuous or visible in 15. The loud systolic *bruit* in No. 13 of the table indicated a roughening of the aorta, which was unattended with any obvious ill-effect; and the arteries were even, though tortuous and visible, in this person. There was nothing of the kind in the other two persons (12 and 23) whom I examined, and it is not mentioned in any of the other cases reported in the table, which possibly may be because attention was not specially directed to this point.

The cartilages of the ribs were ossified in Miles and Holyoke, but were as soft as natural in the cases reported by Harvey, Keill, Rolleston⁴ and myself. The brain was found shrunken, with widened cerebral fissures; "hydrocephalus *in vacuo*," in Holyoke, also in the woman aged 103 examined by me. It was firm and hard in Parr and in Keill's case; and the convolutions were rounded and, to some extent, atrophied in Rolleston's. This shrinking of the brain, common in old age, and observed also in persons wasted by long illnesses, in habitual drinkers, and some others, is to be associated with the inability to maintain active and strong bodily and mental exertion, which, as our tables show, is commonly first manifested by fatigue, by weakening of memory for recent events, and is further manifested by impairment of control over emotions and thoughts and impulses as well as over bodily movements, and may go on to complete imbecility,

⁴ With reference to this, Rolleston (p. 153) remarks: "Old age causes very opposite changes to take place in bone; possibly it may act upon cartilages in equally differing ways."

with or without tremor or loss of muscular power, the latter being usually first observed with regard to the urinary bladder.

The kidneys were cystic in Parr, Holyoke, and Pratt, and contained grains of sand in the last and in Keill's case. In Pratt the bladder was fasciculated, the prostate large and its ducts large, and pediculated growths projected from the third lobe. It will be observed that, out of 33 returns in the table, the micturition is reported to be natural in 25. It is also stated to have been so in most of the cases which I have since received (BRITISH MEDICAL JOURNAL, March 5th, p. 502); and it is not reported to have been difficult or painful in any. All this is confirmatory of the statement that the prostatic and vesical affections, which cause the larger proportion of urinary troubles of advancing years in men, commonly manifest themselves in those who are predisposed to them about or before 70, and do not, for the most part, permit the sufferers to attain to great age.

The following are taken from Dr. Boyd's tables of the weights of the human body and internal organs.⁵

He states (p. 261) that the average height of the adult male varies from 67.8 to 65 in.; of the female, from 63.2 to 61.6 in. The average weight of the adult male varies from 112.12 to 91.5 lbs.; of the female, from 95.2 to 76.9 lbs.

The examinations were made in 2,086 cases in the St. Marylebone Infirmary, and in 528 cases in the Somerset Lunatic Asylum; and he says they show a preponderance in the insane male of 6 lbs., and in the female of 8 lbs., as compared with the sane. (This is probably due to quiet and good feeding in asylums.) Mr. Roberts, in his letter in the JOURNAL of January 1st, states that "the average stature and weight of English men and women of all classes is 5 ft. 7½ in. and 155 lbs. for males, and 5 ft. 2½ in. and 123 lbs. for females.

From these tables it appears that, in persons above 80, the height and weight of the body remaining nearly the same (though in women, from whom the greater number of measurements were taken at above 80, there is a diminution in height and weight), the cerebral and the abdominal organs, including the kidneys, have wasted, whereas the thoracic organs have gained in weight; and the contrast between the wasting of the spleen, which has relation to blood-making, and the increase in the heart or blood-propelling organ, to which I have already alluded, is very marked.

⁵ Philosophical Transactions, 1861.

Tables of the Average Weights of the Human Body and the Internal Organs.

	Sex.	Weight.	Height.	Encephalon.	Lungs.		Heart.	Stomach.	Liver.	Spleen.	Kidneys.	Pancreas.
					Right.	Left.						
From 30 to 40 Years	M	Lbs. oz. 98 5	Ft. ins. 5 6.5	Oz. 43.2	Oz. 28.47	Oz. 24.29	Oz. 11.36	Oz. 5.72	Oz. 58.11	Oz. 7.12	Oz. 11.35	Oz. 3.47
	F	87 0	5 2	43.09	18.74	17.64	9.45	5.34	53.61	6.13	10.34	3.05
Number examined, 103 males, 85 females.												
Upwards of 80 Years	M	99 0	5 6.7	45.34	30.46	24.30	12.1	4.99	41.01	4.27	8.25	2.83
	F	79 8	5 0	39.77	18.22	15.23	10.27	4.49	34.64	3.46	6.86	2.37
Number examined, 24 males, 75 females.												

PAROTITIS AFTER INJURY OR DISEASE OF THE ABDOMEN OR PELVIS.¹

By STEPHEN PAGET, M.A., F.R.C.S.,
Assistant Surgeon to the Metropolitan Free Hospital.

AMONG Graves's Clinical Lectures, there is one on the "Connection between the Diseases of Various Organs." "You are aware," he says, "that some organs, when labouring under disease, are apt to implicate other organs, giving rise to various deranged conditions, which are developed sometimes simultaneously, but in general consecutively, and in sequence. It is of the greatest importance to study each link in this morbid chain, and to ascertain the nature of its connection, so as to have a distinct conception of the whole." To illustrate his meaning, Graves gives four cases of acute arthritis, followed by jaundice, and this again by urticaria; and three cases where chronic disease of the spleen was followed by superficial ulceration of the legs

¹ Read before the Medical Society of London.

—a sequence noted long ago by Aretæus. He adds that, if we bear in mind such sequences as these, we may, as he himself did in two cases, "predict the appearance and form of disease, and inspire the patient with confidence."

But, apart from their clinical interest, these sequences in disease have great pathological interest; for they demonstrate relations between distant organs which are not visible in health. For example, abscess of the kidney and abscess of the heart are much more common in pyæmia due to acute necrosis than in pyæmia due to amputation. I have collected and arranged some hundreds of cases of pyæmia, and I find that in 18 cases of pyæmia from acute necrosis, 10 had abscess of the heart and 1 had endocarditis, and 11 had abscess or infarction of the kidney. On the other hand, in 140 cases of pyæmia from amputation, only 1 had abscess of the heart, and a few others had slight changes in it, and not one had abscess of the kidney. That is to say, in pyæmia from acute necrosis, abscess of the heart and abscess of the kidney each occur in 61 per cent. of the cases; but in pyæmia after amputation they occur only in 1 per cent., or even less often than this.