tint. It was semi-transparent, fluctuant and somewhat wrinkled on the surface. It became tense when the child cried. On looking through it, several striæ were seen passing over its internal surface. On March 27, 1872, it was tapped with a grooved needle, and about three ounces of a fluid resembling cerebro-spinal were drawn off. The child did not suffer; and, as the fluid continued to exude, the opening (which was made upon the right side towards the top) was closed by means of collodion. On April 1 the child was in fair condition, had no diarrhœa, took the breast well, and was in all respects healthy. On April 2 the tumour was again tapped, and about two ounces of fluid were drawn off. After the tapping the fontanelle was depressed, but by night it was again normal. The child continued well, and no leakage took place. The tumour was dressed with a small piece of oiled lint. On April 5 the tumour was tapped with a small trocar and cannula, and half its contents were drawn off. About two drachms of a solution of iodine in glycerine were slowly injected, and the tumour was dressed with oiled lint. The child suffered a little from shock at first, but soon recovered. It continued well during the day, taking the breast well. The fontanelle was for a time depressed. At night the tumour was half filled, and the fontanelle was nearly normal. The lower limbs on examination were found to be quite normal, as regarded colour and temperature. On April 6th, the tumour was about three-fourths of its former size. The contents were thicker; but no distinct coagulation had taken place. The child continued well. On the 8th, slight ulceration was observed over the top of the tumour. It was diminished in bulk, and was now only about half its former size. The child had complete power over the lower limbs, and was well. The tumour continued to diminish; and on the 16th consolidation had taken place at the upper portion, and the other parts felt firmer than formerly. The ulceration had not increased, but there was slight discharge of pus from under the seat that covered it. On the 25th the tumour was nearly on a level with the surrounding skin, and only distinguishable from it by its livid colour. Over its centre there was a small triangular depression, from which a small slough was taken by Dr. Morton. The child was in all respects healthy, and had complete power over its limbs.

On the 6th April last, in the BRITISH MEDICAL JOURNAL, there is an account of the first and only other case which I have treated in the manner here noted, so that both have been successful. The composition of the iodine solution will also be found there stated.

The procedure adopted may be shortly re-stated thus. 1. Two tentative tappings are made with a grooved needle, with an interval of four or five days between the two. 2. The tumour is tapped with a small trocar and cannula, allowing about half the contents of the sac to escape, and about a drachm of the iodine solution is injected; rather more was used in this case, but, I think, less might have sufficed. The after-treatment may be said to consist in dressing with some bland substance as oil or lard, cleanliness and care, so as to avoid local injury or irritation.

Prevention of the complete escape of the cerebro-spinal fluid I believe to be of the greatest importance; hence the use of collodion in this case, which answered the purpose admirably. The presence of this fluid is essential to the functional, if not the structural, integrity of the spinal cord and brain, and when it is allowed to drain away the child speedily succumbs. On this point I can speak from some experience; besides, soon after treating the case already published, a child was sent into the infirmary having a similar tumour in the dorsal region, which was punctured by the grooved needle, but not injected; the spinal fluid continued to exude, and from this alone the child sank and died. The idea of using the collodion did not occur to me till too late, but this mishap caused me to direct my assistant to watch the case now given, and use the collodion if necessary, and it forms an apt illustration of the success of such a mode of closing the puncture. After the second puncture the collodion was not required.

To my mind, the satisfaction attending the success of this case is enhanced by the circumstance of its being the second of two cases treated in precisely the same way; and these the only two that have been treated by injection with the glycerine solution, which I was induced to adopt, as being less diffusible than either a watery or spirituous solution.

How far this mode of treatment may be applicable to the cases in which the congenital defect exists above the lumbar region, I will not at present endeavour to define; but surely it is not too much to say that if by it we can save lives, when we have a lumbar tumour to deal with, we are not to be debarred from attempting to deal with those in the dorsal or cervical region, provided the extension of our line of operations be prudently conducted.*

* This case was made the subject of some clinical remarks; and the child was shown to the Glasgow Medico-Chirurgical Society on the evening of May 3rd.

ON THE CAUSATION AND SIGNIFICANCE OF THE CHOKED DISC IN INTRACRANIAL DISEASES.

By W. H. BROADBENT, M.D., F.R.C.P.,

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THE ophthalmoscope, thanks to the efforts of Dr. Clifford Allbutt and Dr. Hughlings Jackson, may be said fairly to have taken its place in English medicine; and it is scarcely possible to overstate the additional interest it has brought into the study of the diseases of the nervous system. It has removed causes of confusion and error; it has opened absolutely new sources of information as to the state of the intracranial circulation, and has thus given new zest to the pursuit of precision in diagnosis, which will eventually conduce greatly to decision in treatment. It has also, or rather the far-reaching vision of the men who have forced it upon the attention of the profession, widened the horizon of pathological research by stating new questions of various kinds for solution.

The problem of the causation and significance of the choked disc in intracranial diseases is one of primary importance. It has been most ably treated by Dr. Allbutt in his work on the *Ophthalmoscope*; but all who are patiently endeavouring to follow in his footsteps will be glad that he has returned to the subject and discussed it in the columns of the JOURNAL, affording an opportunity for stating difficulties and seeking the special information needed by different individuals. It may also elicit the experience of other observers, and possibly some contributions of value. I think a difficulty very generally experienced is the discrimination of the choked disc. This difficulty is mentioned by Dr. Allbutt in his communication, and is attributed to coexistence of congestion-papilla and neuritis proper. Either, however, these mixed forms of affections of the nerve and retina are disproportionately frequent, or I personally fail to estimate fully the distinctions. No doubt this is in some measure due to the fact that I have only very imperfectly mastered the direct method of ophthalmoscopic examination, and have been unable to bring it to bear in the cases of meningitis in which my uncertainty has arisen. The one point with respect to which I most distrust my observations or inferences is as to the elevation or swelling of the disc. I had in several cases concluded, from the appearances seen, that this swelling was present. The retinal vessels have seemed to emerge from a depression in the centre of the elevated disc, to run down a slope and curve from its base to the retina. A slightly varying focussing of the lens has been required to see them with equal clearness in the different parts of their course. With this, the proper vessels of the disc have been visible, and its margin imperfectly defined; and yet, after death, no elevation of the disc existed. In all cases, I have removed the back of the eye myself in the way recommended by Dr. Allbutt, and have carefully avoided traction on the nerve, lest the appearance which I desired to see might be disturbed. I should have been disposed to think that the swelling disappeared at death, like the redness of the choroid, had not the contrary been found.

Accepting, as I think we must, after the confirmation afforded by Dr. Allbutt's prolonged and careful investigation, the distinction drawn by Von Gräfe between the choked disc due to obstructed venous return and neuritis propagated by continuity along the nerve from the meninges, the questions as to the causation of the former condition appear to be—1. Whether simple venous obstruction, with or without the multiplying action of the sclerotic ring, is an adequate cause; 2. Whether general increased intracranial pressure, producing its effects in the direction of least resistance, may not be, at any rate, one mode of causation; and, if so, whether differences in the origin of the compression, intraventricular or extraventricular, etc., and consequent difference in the direction of the compressing force, may not have some influence in the production or non-production of this particular result. 3. Whether distension by fluid of the lymph-space between the outer and inner sheath of the nerve may be a link in the causation by compression of the nerve-bundles and vessels. This is a new point raised by Dr. Allbutt; and the further question arises—how the effusion in the nerve-sheath is produced.

I do not propose to discuss in detail these possible modes of causation. The first is acknowledged to be insufficient to account for all cases. The second is the one which best satisfies my judgment; and I have adopted it as a provisional hypothesis and basis for investigation, the establishment or overthrow of which cannot fail to be instructive, and to bring us one step nearer to the true explanation. For the present, I wish simply to contribute some observations bearing on this and on the third question—the influence of hydræ vagina, an ex-

ample of which I exhibited at the meeting of the Pathological Society on April 16th.

I have to confess that my acquaintance with recent German work on the subject of the ophthalmoscope is at second hand, through Dr. Allbutt; and I had not seen the observations of Manz, Stellwag, and others, which he now enumerates; while the case of Manz, quoted in the appendix to Dr. Allbutt's work, had escaped my attention. Accordingly, the bulbous enlargement of the optic nerve just previous to its entry into the eye, which I had found, was new to me; and I hesitated to found any conclusion upon it till I had learnt from Messrs. Brudenell Carter and Hulke that it was not a known physiological variation, or till I had had the opportunity of examining it microscopically after due hardening. A few days later, I came upon a second example, in which the bulbous enlargement was more considerable, and was obviously due to fluid within the nerve-sheath, the swelling being quite translucent. I now remembered the lymph-space between the inner and outer sheath of the optic nerve, an account of which by Schwälbe was epitomised in Dr. Allbutt's work, and the experiments showing that it was continuous with the arachnoid space. The two cases may be here given briefly; but first I should state that the escape of this fluid in the nerve-sheath does not seem to me to be so easy as is supposed by Manz and others. They speak of the outer sheath being found wide and flaccid—of the necessity for tying the nerves before dividing them, etc.; but in my cases the displacement of the fluid did not occur readily or on moderate pressure; and I am persuaded that, if the optic foramen be broken through as well as the roof of the orbit, and the nerve be dissected out from the canal, to which it adheres very firmly, no escape of fluid will occur. The nerve-sheath here seems to embrace the nerve more closely, as well as to adhere to the dura mater of the foramen. If the nerve have been placed in a hardening solution without the enlargement having been observed, then a loosening of the sheath may easily be the sole evidence of pre-existing distension.

CASE I.—A servant-girl, aged 19, was admitted into the London Fever Hospital on April 12th. The only account of her illness which could be obtained was, that for a fortnight she had complained of headache, and had appeared dull; and for two days she had been unable to do her work, and had been in bed. She vomited in the cab on her way to the hospital. On her arrival, she gave her name and age, but could tell nothing more about herself or her symptoms. She seemed drowsy, and put her hand to her head as if in pain. Next morning, she was unable to speak, and she lay on her back taking no notice; eyes half-closed; pupils large and sluggish, but responding to light. The mouth was open; there was no facial distortion. The left limbs were motionless and rather stiff; the right limbs moved at times. There was much more movement when the sole of the right foot was tickled than the left; and a pinch was obviously less felt on the left half of the body. *Taches cérébrales* came out well. Pulse 72; respiration tranquil; temperature 98.2 deg. The optic discs were of medium size, well defined, of dusky pink colour, striated by vessels, a pale spot in the centre. The retinal vein was large; the artery small. The appearances were very similar on the two sides. She died within thirty-six hours after her admission. The necropsy was made forty-three hours after death. There was much turbid fluid beneath the arachnoid, and opacities (old) in this membrane over the convexity of the hemispheres; also injection of the pia mater. The optic commissure and the interpeduncular space were completely concealed by turbid fluid beneath the arachnoid, which extended over the pons to the medulla, and was very abundant along the confines of the fourth ventricle. There was not much effusion in the fissures of Sylvius. The pia mater was here injected. There was adhesion of the two hemispheres below the rostrum of the corpus callosum. The brain-substance was soft. There was much pink fluid in the ventricles. The septum was softened. The soft commissure was ruptured, and the surface was marked by pink dots. The venæ Galeni and vessels in the ventricular wall and roof were large; the velum interpositum and choroid plexuses were injected. The only naked-eye evidence of tubercle was the presence of minute inconspicuous granulations in the membranes over the interpeduncular space. Vessels were seen ramifying on the surface of the optic commissure and nerve; and the cut surface had a pinkish tinge. The nerves, followed to the back of the eye, exhibited large superficial vessels quite to the eyeball, close to which they expanded into a bulbous enlargement, the constriction at the nerve-entry being very abrupt. The swelling had not a translucent appearance, and it did not disappear on slight traction or pressure. The optic discs were not very well defined; there was no elevation. The retinal vessels were distinct—arteries as well as veins.

CASE II.—A youth, aged 16, who had six weeks previously had scarlet fever, was admitted on March 28th, 1872, complaining of headache, pain in the back, and general feverishness. A little albumen

was found in the urine. His aspect was good. The headache continued. On the 30th, he had nausea and retching, and next day vomited bilious matter. The bowels were confined. On April 2nd, he was listless and drowsy; questions had to be repeated, and he answered with hesitancy and in an undertone. When roused, he complained of headache and pains all over. On April 4th, he had a dull vacant look; his bowels were confined; tongue coated; breath offensive; temperature 102.4; pulse 96. On the 8th and 9th, his arms were constantly in motion, and he did not sleep; there was much wandering and muttering. His urine was passed in bed; the bowels were not open. On the 10th, he slept a little, and was more quiet. The urine was still passed involuntarily; the bowels were confined; the abdomen retracted. *Taches cérébrales* were well marked. The pupils were large, equal, sluggish; an occasional squint was observed. Pulse 96, full; temperature 101.8. On the 11th, he was semi-comatose. The head was turned to the right. The right limbs only were moved; the left were lax and motionless. Bowels open; pulse 120; temperature, A.M. 101.4, P.M. 102.2. On the 12th, albumen reappeared in the urine. Pulse 26; temperature, A.M. 101, P.M. 101.7. On the 13th, he was more conscious; he put out his tongue and gave his name. The urine and fæces were still passed in bed. The left limbs were paralysed and relaxed; the foot was cold; the head was turned to the right. The eyes were bright, and turned equally well right and left. Sensation was apparently diminished in the left half of the body. Pulse 132; temperature, A.M. 101.8, P.M. 102. The ophthalmoscope was used for the first time, the right eye only being examined, and with extreme difficulty, on account of the movements of the head and eye. The disc was largish, well defined, but of much deeper pink than usual; the centre was pale; the upper edge appeared to project somewhat. The retinal vein was remarkably large and dark; the arteries invisible. On the 14th, he had slept; was much brighter. He tried to answer questions. The left limbs, previously paralysed, moved freely. A systolic murmur was heard at the apex of the heart for the first time. Temperature, A.M. 101, P.M. 102. On the 15th, he was much the same; he put out his tongue, which was dry, and attempted to answer questions. Albumen was present in the urine. There was a systolic mitral murmur, and tenderness over the heart. Pulse 144; temperature, A.M. 101.2, P.M. 101.8. Both optic discs had a swollen appearance, were striated by numerous vessels, scarcely differing in colour from the rest of the fundus of the eye, and imperfectly defined. The retinal veins were large, the arteries small; the large size of the vein in the right eye being very remarkable. Examination was very difficult. On the 16th, he was in about the same state up to 7.45 P.M. At 6 P.M., he recognised his brother, and took drinks very well. At the time first named, he began to perspire; the respiration became embarrassed, and deglutition difficult; and he died at 10 P.M. On *post mortem* examination, scattered tubercles were found in the lungs. There was recent lymph on the mitral valve; and the kidneys were large and congested. The surface of the cerebral hemispheres was generally minutely injected; so also the pia mater in the sulci, but not to any very great degree. The veins were large and full. At different parts there were recent opacities of the arachnoid over the sulci. On the outer aspect of the left occipital lobe, numerous scattered patches of yellow firm exudation lay beneath the arachnoid, and a few similar patches near the posterior end of the right Sylvian fissure. There was not much fluid on the convexity; no marked flattening of the convolutions. An enormous quantity of fluid escaped from about the base and out of the posterior cranial fossa, over the posterior aspect of the cerebellum and at the opening of the fourth ventricle. The optic commissure was hidden by yellow exudation-fluid, immediately beneath the arachnoid, but round the commissure and tracts firm and solid, embedding and adhering firmly to them. The pia mater in the fissures of Sylvius, but especially in the left, was thickened, firm, matted together, studded with yellow spots quite to the extremity of the fissures. A similar condition of the membranes was observed in the first part of the great interhemispherical fissure, where there were also yellow granulations. The pons and medulla were not covered by yellow substance such as that in the interpeduncular space, but were surrounded by much fluid; and the pia mater in the great transverse fissure round the crura cerebri was firm, infiltrated, and dotted by yellow granulations; as were also the velum interpositum, choroid plexuses, and pia mater over the top of the cerebellum. There was enormous distension of all the ventricles by turbid fluid. The septum lucidum and soft commissure were torn. The fibres of the corpus callosum at its posterior part were macerated, and looked like fine threads; and a transverse fissure was seen on the upper surface, as if the fluid in the ventricles had separated the fibres. A natural fission of the brain-substance had also occurred along the outer side of the posterior cornu of the lateral ventricle on both sides, forming another cavity alongside of it. Appa-

rently the lining membrane of the lateral ventricle had given way, and the fluid had macerated the corpus callosum, and performed the natural dissection above described—a dissection which I at once recognised, from having repeatedly made it in hardened brains. The optic commissure and tracts were embedded in solid yellow exudation, but apparently normal when extracted. The right optic nerve near the eye was expanded into a bulb of considerable size, evidently formed by distension of the outer sheath by fluid; it was quite translucent. The disc was fairly defined, not papillated, not so pale as usual. The retinal vein was extremely large and distinct, issuing from the centre of the disc. The left optic nerve had no bulbous expansion, and no appearance of having been distended. Longitudinal vessels of considerable size were visible on its exterior. The disc was not well defined, but had a sort of halo round it. The retinal veins were rather large; the arteries small, but distinctly visible. Both vessels were concealed in the disc and for a short distance beyond its margin, apparently by exudation. It is noteworthy that, in this case, the distension of the nerve-sheath, usually bilateral, was present on one side only; and this was not due to accidental displacement of the fluid on the other. The difference in this respect coincided also with a marked difference in the degree of change in the intraocular termination of the nerve, the congestive or inflammatory process having gone further in the eye, the nerve-sheath of which was not distended.

It appears to be a disputed point, whether the fluid in the vagina nervi is formed on the spot, or is forced along the lymph-space from the arachnoid cavity. It has been shown that injections can be made to pass from the arachnoid space into the nerve-sheath; and in my opinion it is in this way that the sheath is distended in these cases of meningitis. The fluid and the pressure are present; and it is unnecessary to seek another cause for an effect which they are proved to be competent to produce. On this view, the dropsy of the nerve-sheath is simply another example of intracranial pressure, producing its effects in the direction of least resistance, tending to confirm this hypothesis as to the mode of production of the choked disc, and affording an illustration of the difference in the results of pressure having different sources of origin. According to my experience, while some degree of hyperæmia of the disc is common in tubercular meningitis, well marked choking of the disc is rare; and I have never seen an extreme example, such as I have met with in cases of cerebral tumour. If my experience on this point be borne out by that of other observers, and if, as I expect, hydrops vaginæ nervi be found to be much more common in tubercular meningitis than has been supposed, the occurrence of marked congestion and swelling of the disc in cases of cerebral tumour, and the less frequent and less pronounced occurrence of this condition in tubercular meningitis, in which the general intracranial pressure is apparently as least as great, would be capable of a satisfactory explanation. Tumours are not usually accompanied by much fluid in the arachnoid cavity; and the increased pressure will act in the obstruction of return of blood from the orbit into the cranial cavity, while at the same time the force required to carry the blood through the vessels of the brain when subjected to pressure would tend to distend the capillaries of the disc, on which no adequate counterpressure is brought to bear. On the other hand, in tubercular meningitis the fluid in the arachnoid cavity is, at any rate, one source of pressure; and it is to be expected that it will find its way along the sheath of the nerve, and distend it at its weakest part. This fluid pressure also, though it will obstruct the return of venous blood from the orbit, will compress the arteries carrying blood to the eye; but more particularly it seems to me that the compression exercised along the whole length of the nerve by the fluid within the nerve-sheath would have the effect of neutralising in some degree the transmission of pressure along the minute vessels of the nerve from the cranial cavity, and so tend to diminish the force brought to bear on the vessels of its intraocular termination.

NOTES ON THE ACTION OF MEDICINES, OLD AND NEW.

By JOHN KENT SPENDER, M.D.Lond.,
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Two of the most pleasing and instructive papers which ever came from the pen of the late Dr. Symonds, were on the medicinal treatment of some common diseases of the throat and lungs. These diseases were the text for certain therapeutic lessons: in learning to cure the diseases, we learn at the same time the scope and power of our medicines. The ideas are perfectly distinct. We may study diseases in order to see how they are affected by drugs, or we may study the substances called drugs in order to find out how they can abolish or relieve diseases:

each plan has its merits and its advantages. In the one or two papers which I propose to contribute on the action of medicines, drugs will be the text, and disease will be the comment. We are supposed to be in the possession of certain things—animal, and vegetable, and mineral—alleged to have the power of doing good to man: it is our province to examine and certify that good, determining the conditions which call it forth and regulate its operations.

Our code of therapeutics, extensive and valuable as it is, will never be exhaustively complete. Human anatomy may be pronounced to be perfect, or very nearly so. The knowledge expressed by these words is comprised within defined and visible bounds: there is a finite quality about it, so that it can be explored within a finite time. But until every element and compound in Nature has been scrutinised, which can never be done by any wit or wisdom short of the Infinite, we cannot declare that any phase of human suffering is absolutely irremediable. New elements will always be discovered; new compounds will incessantly be formed; there is no limit to the things which the animal and vegetable kingdoms may reveal, or which mineral chemistry may produce. Any or all of these unknown substances may be endowed with antimorbid virtues, entitling them to a special place in our therapeutic codex. Our privilege and our duty is to welcome every new product of Nature which can be proved to have healing properties for man. Few may have the time or the opportunity to discover these products, but all can help to verify what has been discovered by others; and this may be said without denying the difficulty of training oneself (especially after a certain age) to the use of new medicines. We prefer the old tools, however blunt and imperfect, to the new instruments, apt and ready for their work. We have tested the old medicines in many ways; we have individualised each dose as a separate force in the conflict with disease, and we know its precise value and power. If it fail to produce the usual result, there is an honest search to find out the cause; but when a new medicine glances off its goal, we may be in doubt where the fault is—in our own want of familiarity with the medicine, or in a shortcoming in the medicine itself. The duty, however, is not the less clear and peremptory to try, and master the application of, all new methods of treating disease which science has put into our hands.

A new remedy has sometimes to clamour itself into notice before it is largely used—before it finds a place in the public and private materia medica. The process of becoming known is often slow and difficult. The new remedy is forgotten when it is most wanted; it is prescribed at first with such experimental caution, with such tentative timidity and even fear, that its characteristic medicinal properties are hardly developed. It lies hid under a “bushel” of prudential restraints; and other remedies are probably harnessed with it, as in the event of failure the old tried means may do the duty of both. And it is long before the new power is handled with promptness and precision. It lags behind other things possessing inferior virtues, but which are familiar by long and perhaps conventional use. Possibly, too, the authorised expounders and preachers of the new remedy proclaim its worth with an uncertain and even dissonant note. And so it has to make its way through months and even years of doubt, until its utility is attested by the confederate testimony of many impartial observers. It then assumes its rank with the drugs of historic name and fame; and the remaining functions of the critic are—to formalise the specific virtue of the new medicine, and to describe its so-called “contra-indications.” We may point to chloral as a fine and recent example of all these “phases of faith.”

Now, what we desire about chloral, and about every other new drug, is an honest narrative of what it can do; and that the whole story of its therapeutic action shall be told with the conscientious accuracy of a scientific observer. There is an artistic completeness about the picture, when a fresh medicine is said to unlock an old therapeutic problem, or to relieve a long-felt necessity; and the ardent disciple of the medicine may refuse to listen to any drawbacks and shortcomings alleged against it. We are all apt to be garrulous about our successes, and judiciously reticent about our failures. The fact is, that our failures seem to reflect upon our own competence; to record a non-success looks like confessing that the wrong agency has been chosen, and that more skill might have selected something which would have done the required work better. And so the moral courage deserves praise which tells everything about the good and the ill which a medicine can do; in no other way can a proper history of Therapeutics be written.

Elsewhere* I have tried to show that a drug may fulfil various purposes according to the doses in which it is given, and according to the times at which it is administered. A small quantity may do one sort

* The Administration of Medicines in comparatively Small and Frequent Doses. (*British and Foreign Medico-Chirurgical Review*, January 1872.)