author, also in Kohlrausch's *Physical Measurements*. A book of mathematical tables, such as Chambers's, is also necessary.

An example will now make the method of calculation clear. Setting the collimator tube and the telescope tube so that their axes are in a straight line, and illuminating the slit with the sodium flame, having the prism removed from the table, and taking all the precautions mentioned in the above books, we find, for instance, that the reading of the vernier is $27^{\circ} 13'$. The hollow prism is now filled with the liquid—in this example, hydrocele fluid—and the prism set at the minimum angle of deviation for the sodium line; the intersection of the cross-wires of the telescope tube is now made to coincide with the yellow sodium line, the tube clamped, and the reading taken, when it is found to be $51^{\circ} 49'$; hence the angle $i = 24^{\circ} 36'$. The angle A of prism being 60° , we substitute these data in the above formula (1), which now reads:

$$(2.) \quad \mu = \frac{\sin \frac{1}{2} (60^{\circ} + 24^{\circ} 36')}{\sin \frac{1}{2} (60^{\circ})} = \frac{\sin 42^{\circ} 18'}{\sin 30^{\circ}}$$

Looking up the natural sine of $42^{\circ} 18'$ in the *Mathematical Tables*, we find it to be 6730125, and similarly that of $30^{\circ} = 5000000$, therefore

$$\mu = \frac{6730125}{5000000} = 1.3460$$

to four places of decimals, all that is required. But this only gives the refractive index, which is dependent upon the density of the liquid, and therefore on its temperature. The lower the temperature the greater the density, and therefore the greater the index of refraction. In order to compare the refractive energies of different liquids, "a function of the refractive index is required which does not vary with the temperature, and is therefore constant."

Table of Refractive Indices.

FLUID.	μ Refrac. Index.	Direct Reading.	Deviation Reading.	Difference i .	Sp. Grav. or D.	Specific Refract. Energy.	REMARKS.
Urine of case of urticaria.	1.3426	15° 52'	40° 12'	24° 20'	1.030	.3326	
Fluid from ascites.	1.3365	27 13	51 5	23 52	1.010	.3331	
Albuminous urine.	1.3378	27 13	51 12	23 59	1.013	.3334	Recovering from acute Bright's.
Urine	1.3374	27 13	51 10	23 57	1.012	.3334	Chronic Bright's
Urine; chronic bronchitis.	1.3413	27 13	51 27	24 14	1.023	.3336	
Urine	1.3378	27 14	51 12	23 58	1.012	.3338	
Fluid from ascites.	1.3365	27 13	51 5	23 52	1.008	.3338	Hepatic cirrhosis; second tapping. Bright's (recent)
Albuminous urine.	1.3378	15 52	39 51	23 59	1.011	.3341	
Pericardial fluid	1.3417	15 50	40 6	24 16	1.017	.3359	General tuberculosis; no pericarditis. Acute pleurisy.
Fluid from pleura.	1.3430	15 52	40 15	24 23	1.020	.3362	
Hydrocele fluid	1.3404	27 13	51 23	24 10	1.012	.3363	Patient aged 64.
Hydrocele fluid	1.3447	27 13	51 43	24 30	1.021	.3376	Two months' duration; aged 56.
Fluid from pleura.	1.3451	27 13	51 45	24 32	1.020	.3383	First tapping; boy, aged 10.
Ovarian fluid ..	1.3460	27 13	51 49	24 36	1.022	.3385	
Hydrocele fluid	1.3460	27 13	51 49	24 36	1.022	.3385	Second tapping; first 6 yrs. ago.
Urine	1.3438	15 46	40 13	24 27	?	?	Normal.
Urine	1.3421	17 16	41 35	24 19	?	?	Normal.
Pleuritic fluid ..	1.3387	27 11	51 14	24 3	?	?	"Heart-disease"
Pleuritic fluid ..	1.3451	27 13	51 45	24 32	?	?	Several weeks' standing. Congenital. "General dropsy."
Hydrocele fluid	1.3417	15 54	40 10	24 16	?	?	
Urine	1.3382	27 13	51 14	24 1	?	?	
Aqueous of eye of ox.	1.3360	15 31	39 21	23 50	?	?	
Vitreous of eye of ox.	1.3339	15 45	39 26	23 41	?	?	
Vitreous of eye of ox.	1.3347	15 46	39 31	23 45	?	?	
Pericardial fluid	1.3421	15 48	40 6	24 18	?	?	Acute pericarditis.
Cerebro-spinal fluid.	1.3365	15 49	39 41	23 52	?	?	Tubercular meningitis.

Gladstone and Dale have found that if μ be the refractive index, and d the specific gravity, $\frac{\mu-1}{d}$ is independent of the temperature. This formula represents the specific refractive energy of each

substance. In the above case, the specific gravity was found to be 1.022, hence we substitute for the formula

$$\frac{\mu-1}{d} \text{ this, namely: } \frac{1.3460-1}{1.022}$$

or .3385, which is therefore the specific refractive energy of hydrocele fluid.

In this way the calculations in the following table were worked out, of which the first fifteen are arranged in the order of the gradual increase of the specific refractive energy.

It will be noticed that the specific refractive energy of urine is low, as is also that of ascitic fluid, and the refractive index of cerebro-spinal fluid is also very low. The specific refractive energy of pleuritic fluid is higher than pericardial fluid, and that of ovarian fluid higher than either, except in one instance. It will also be noticed that urine of specific gravity 1030 has a lower specific refractive energy than the albuminous urine of specific gravity 1011.

A CASE OF MOLLITIES OSSIIUM IN THE MALE.

By SIDNEY BARWISE, M.R.C.S.,

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MOLLITIES OSSIIUM is such a rare condition, especially in men, that no apology is necessary for recording the following case.

A. M., aged 31, married, an engraver, consulted me on account of pains in his bones. He is an only child, and has no sign of syphilis, either inherited or acquired. When thirteen months old, his mother says, he could walk; he was neither bow-legged nor knock-kneed; as a boy he was a very fleet runner. When three, he had whooping-cough; but his mother never noticed any change in his chest till the last year or two. When six and a half, he had scarlatina; and, whilst convalescing from it, he was knocked over by a dog, and received an injury to his right knee, for which he was taken to the General Hospital; he remained there for ten months, when his leg was amputated, and he left one month afterwards. He became a highly skilled workman, and married when twenty. Seven years ago, he slipped and broke his left thigh, and was again admitted into the General Hospital. He left that institution twelve months afterwards with the

fracture still ununited. A year after this he broke his left humerus; it united in a month, leaving no deformity. Three years ago, he noticed a dull aching in both arms, the least jerk causing severe pains in the muscles and bones. Eighteen months ago, his bones commenced to give way and bend until he assumed his present condition, described below. He has five children, aged 10, 7, 5, 3, and 1. The

three eldest are healthy; the two youngest are markedly rickety, the elder of the two has undergone an operation for bow-legs. The patient's mother is alive and healthy; his father was a man of good bodily health, but grieved so over his son's condition that he became deranged and destroyed himself.

From a photograph taken when aged 5.

At the present time, the patient's body appears to have fallen into his pelvis; his spine forms more than a semicircle, his head resting close to the pelvis. His sternum comes outwards above; it then bends upon itself to reach the chest, on a level with the seventh rib. It is, the man says, crumpled up with sitting so long. The right humerus describes a curve of three-fourths of a circle, curving away from the body. The right radius and ulna are bent at about an angle of 140° towards the ulnar side, three inches above the wrist. The left humerus (the one that was broken) appears normal. The left forearm is bent anteriorly at its lower third. He has an ununited fracture of the left femur. All the bones can be bent by applying slight force. He is a very intelligent man, and very sensitive about his condition.

THE SEQUEL TO A CASE OF GASTRO-ENTEROSTOMY.

By ARTHUR E. BARKER, F.R.C.S.,

Surgeon to University College Hospital; Teacher of Practical Surgery at University College.

IN the JOURNAL of February 13th, 1886, I recorded a successful case of gastro-enterostomy for cancer of the pylorus, and having watched the patient subsequently as long as possible, I am now able to furnish further details as to the subsequent course of the disease, and the effects of the operation. This being a new operation, it is desirable that every item of information regarding it which it is possible to collect should be recorded.

The patient was operated on on January 4th, 1886, at which time the cancerous mass in the stomach was about the size of half a small orange, some few glands being evidently infiltrated in the gastro-colic omentum. She died exactly one year and one week after the operation of generalisation from the cancerous disease. When she left hospital about two months after the operation, she had considerably improved. She was able to walk about a little, which, considering that she had been bed-ridden for six months before she had come under our notice, indicated a considerable gain in strength. I next saw her at her home May 4th, 1886, four months after the operation. She had then still further improved. She walked into the room looking

very well and cheerful, and seemed to have gained flesh since last seen. She said that, with the exception of potato, she could take all ordinary diet in moderation. She suffered from dyspeptic troubles, and required *conf. sennæ* to keep the bowels regular; otherwise she did not complain, and all vomiting had ceased. She was rejoiced when I told her she might go out to walk. I could not detect any change in size or shape of the tumour on manual examination.

After this I saw her at intervals of about a month, and observed no change in her condition until the autumn. Up to then she seemed to eat fairly well, and spoke of enjoying a little beefsteak and roast mutton, with green vegetables. These she was able to cook for herself, and to manage other light household duties. She had occasional attacks of what she called "spasms," which appeared, from her description, to be due to constipation and flatulence. For these she consulted a medical man not far off, who was kindly attending to her. This gentleman (Mr. Lake) tells me that she was able to go to his house, and appeared fairly well. In the autumn, however, she began to get weaker, the characteristic languor of the cancerous cachexia became more and more evident, and she occasionally vomited. At about the beginning of November I found her confined to bed, very weak, and also suffering much pain in the tumour; she was occasionally sick also. The growth was now for the first time sensibly enlarged to the hand. From this time she grew steadily weaker, and suffered much pain, which was relieved by Mr. Lake with anodynes. When I next saw her I found the tumour had become fixed to the abdominal wall, and was coming forward through the latter. On December 2nd I heard from the patient's brother that the tumour had come fully to the surface, and had burst on the day before. After this I did not see the patient, but she was seen by some of my friends, who tried to persuade her to re-enter hospital, in order to have proper attention in her very distressing state. She persistently refused, however, not wishing that any *post-mortem* examination should be made in her case, though very grateful to the end for all that had been done for her. After the external rupture of the growth she lingered on in great weakness and suffering until January 11th, 1887, when she died of exhaustion. No *post-mortem* examination could be obtained, to my great regret.

It is too soon to pronounce upon the position which this operation is to take among regular procedures, but in this case, at all events, there was speedy convalescence, considerable improvement in the general condition for at least nine months, and probably some prolongation of life.

In conclusion, I cannot think that this operation ought to be done in extreme cases, where the patient is quite worn out by disease and suffering. In those instances, however, where the pyloric disease is comparatively early, but where the presence of infiltration of the glands forbids us to hope for thorough extirpation by pylorotomy, it may occasionally prove of great use.

CLINICAL MEMORANDA.

OLD-STANDING VALVULAR DISEASE OF THE HEART.

It was with great pleasure I read Sir Andrew Clark's instructive articles in the JOURNALS of February with the above heading, for my opinions have become much modified with reference to heart-disease during the three years I have been in practice in this Island. It has fallen to my lot here to examine many young and middle-aged men for the army, navy, and naval reserve, among whom I have found much valvular disease. I am sorry now I have not kept a record of all these cases; but I well remember, among the first six examined for the naval reserve, three had systolic regurgitant murmurs; and now, looking over the official reports of the last four months of those presenting themselves for the army and militia, I find, out of thirty-one candidates, I have rejected nine for heart-disease. Now it becomes of interest to notice what is the general appearance and condition of other organs of those affected. They are for the most part strong, robust-looking fellows, who say they have not had a day's illness in their lives; a few own to having had fever when they were young, presumably rheumatic. On further examination, the apex-beat is in the right position, or nearly so, there is no congestion of the bases of the lungs, the extremities are well supplied with blood, and the pulse, as a rule, regular; in fact, otherwise they stand a good chance of passing the severe examination for the army. One point has impressed itself upon me—their deficient chest-measurement. The murmur is generally that of mitral regurgitation, sometimes direct, but rarely have I found the aortic valves affected. The causes of this state of things are not hard to find in the Isle of Man. Rheumatic fever and