but these, under microscope, showed the same turgescence and soundness as in younger persons. Haller notes the absence of mesenteric system in advanced years. Spleen small, weighing 2 ounces; capsule tuberculated. Concretions of uric acid abundant in pelvis and calices of right kidney, and in bladder. Right kidney, $2\frac{3}{4}$ ounces; left, $2\frac{1}{4}$; both lobulated, and with numerous cysts scattered over the surface. Ureters much dilated. Bladder hypertrophied with sacculi fasciculated. Lateral lobes of prostate large, like Home's plate 2, in vol. ii. Pediculated growths, size of pea, projected from third lobe into urethra; orifices of ducts large. Testes not to be detected, though epididymis easily recognised by examination through the scrotum. No spermatozoa in vesiculæ seminales or vasa deferentia.

7. A. Melis, aged 104 an ecclesiastic who lived in Sardinia, by Dr. Luigi Berruti, quoted by Rolleston. Good digestion, middle-size, strongly built; fond of pleasures of table and good wine; bled at various periods some hundred times; died of pneumonia in spite of three bleedings. Curly black hair, and teeth in perfect preservation. Body muscular and fat; costal cartilages quite ossified; diploë and sutures of skull disappeared; dura mater beset with bony plates; basilar and vertebral arteries ossified, also incrustations on aortic valves, aorta, and many of its branches. Heart fat, its muscular tissue firm. Splenisation of lungs and bronchitis.

8. Dr. Holyoke, aged 103 (quoted by Rolleston, from his *Memoirs*, Boston, U.S., 1829), a physician who settled in Boston, at the age of 21, in 1749, and scarcely left till the time of his death, and who led a life of the greatest temperance. Costal cartilages ossified; lungs pigmented; fat about heart; cysts in kidneys; widened cerebral fissures and hydrocephalus *in vacuo*, which he had predicted from the sense of fluctuation in his head.

9. Some years ago, I made a hasty examination of a woman, reported to be 103, who died in this town of bronchitis. No certificate as to date of birth was obtainable, but there was incontrovertible evidence of her great age. My attention was directed chiefly to the skeleton. The cartilages of the ribs were soft and yellowish from impregnation with oil. The skull was thick and heavy, weighing $28\frac{1}{2}$ ounces, although only one tooth—a lower incisor—remained, and the alveolar process of the maxillæ were in great measure absorbed. The other bones examined were remarkably light and porous. Thus the thigh-bone, though large for a woman, weighed only three ounces. The skull and thigh-bone are in the museum of the University; and the lightness of the latter is in remarkable contrast with the heaviness of the former. The brain was shrunken, the fissures between the convolutions being wide, and occupied by arachnoid fluid—hydrocephalus *in vacuo*. The density and thickness of the skull which I have observed not infrequently in the skulls of old persons (my *Treatise on the Human Skeleton*, p. 195), and which may be regarded as an ossification *in vacuo*, is probably, like the accumulation of fluid in the subarachnoid spaces, due to a diminished pressure on the tissues and the blood-vessels, consequent on the diminution of the size of the brain, which takes place in advancing years. In some instances, absorption from the exterior keeps pace, or more than keeps pace, with the addition to the interior. Then the skull becomes smaller, and, it may be, thinner as well as smaller. Hence, although in some aged people the skull retains its size, and becomes thicker and heavier, in others it becomes smaller, but of the ordinary thickness, and, in some, it becomes small and extremely thin and light. In some cases, the external absorption takes place unequally, causing especially thinness at certain parts of the calvarium. This is peculiarly the case in the parietal bones on either side of the sagittal sutures; oval symmetrical, or nearly symmetrical, depressions being here formed, as though the outer and middle tables had been planed or chiselled off. In one specimen in the Cambridge Museum, the absorption had extended quite through the parietal bone at one part. I directed attention to these depressions in the parietals in my *Treatise on the Skeleton*, p. 242, and in the *Journal of Anatomy*, viii, p. 136, but never could explain why the absorption should especially affect this particular region. Possibly the pressure of the occipito-frontalis tendon may have some relation to it. I may observe that the neck of the thigh-bone in this old woman forms an angle of 128° with the shaft. Hence there has been none of that lowering of the head and neck which is generally stated to occur, as a rule, in aged people, but which my observations show very often, indeed generally, does not occur.

[To be concluded.]

THE building of a deaf and dumb institution in Berks is one of the latests projects for celebrating the Queen's jubilee.

BACTERIOLOGY IN SPAIN.—A bacteriological laboratory is about to be established at Barcelona, under the direction of Dr. Ferran.

ON THE MANAGEMENT OF PERFORATIONS OF THE MEMBRANA TYMPANI.

By SIR WILLIAM B. DALBY, F.R.C.S., M.B.(CANTAB.),
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If any examples of a morbid condition of the body might be described as having individualities of their own, as exhibiting various moods, or showing a diversity of behaviour under treatment, surely it would be perforations of the tympanic membrane. To those who are in the daily habit of observing how soon they occasionally heal, how for long periods they do not heal (periods to be measured by years, and even by long life-times), how tolerant at one time they are of manipulation and of treatment, how intolerant at others, how susceptible to climate, to diet (especially in the matter of stimulants), they indeed display an "infinite variety."

Occasionally there may be found fragmentary additions to medical literature in which this application or the other is recommended as the best treatment for perforations. Now, although many of these applications are useful under appropriate conditions, I fear it is nearer the truth to say there is no best treatment that may be employed by those who appreciate the interesting variety referred to as belonging to perforations.

To begin with early life. Of all children who during their infancy have a purulent discharge from the ear after a few hours of pain in the ear (the position of the pain being generally unrecognised at the time), how very small a proportion are submitted to an examination of the membrana tympani! When in isolated cases they are so examined at the time of the discharge, is it not almost the rule that the membrane is found to be perforated? The probabilities, therefore, are that in all, or at least most of them, these discharges are accompanied at the time by perforation. I say at the time, for when the membrane is examined weeks or months after the discharge has ceased, it is often discovered to be entire. We must admit, then, that during infant life the membrane is extremely prone to become perforated, and happily equally prone to heal. This view must have occurred to so many that it is only necessary to mention it, in order that either the occurrence of the perforation or its healing should not excite surprise with those who see comparatively little of ear-disease.

What is still further deserving of notice is that the majority of these children, when they grow up, hear well. If this fortunate ending of the affair is occasionally in part due to the fact that there has been no local interference, it does not follow that nothing in the way of management should be done for recent infantile perforations; but I feel convinced that they are better without treatment, if such treatment includes mineral astringents in solution; the sulphate of zinc and acetate of lead lotions, which used to be thought as necessary for a perforation as iron and quinine mixtures and Latin verses are still for the English boy, are worse than useless. Scrupulous cleanliness—not only by removing discharge from the meatus, but by its expulsion from the tympanic cavity, vegetable astringents, and protection from the action of external air—include the routine of treatment under which the perforations are aided in healing. The same will apply to the treatment of recent perforations in adults; and when the perforation has healed, so long as there is undue secretion within the tympanum, if the case is treated as one of catarrh, the best possible results as to future hearing will follow. Why, then, do we find so many perforations which have occurred from simple catarrhal inflammation either permanent, or, if they heal, leaving such considerable losses in hearing? Of course the disorganisation of the tympanic cavity (the result of inflammation) must be taken into account; but, having excluded this element, I cannot but think this is sometimes due to the pardonable anxiety of the patients to (as they express it) "stop the discharge," and so they resort to anything that offers this prospect.

No doubt, for a time, the mineral astringent will do this, but it does more—it stops the healing, and it stops the hearing. For it astringes the tympanic end of the Eustachian tube; it prevents the possibility of expelling the discharge from the tympanum through the perforation; it allows the discharge to collect in the tympanic cavity, and become inspissated; it causes cicatrization of the edges of the perforation—in short, it does not give the lesion a chance of repair. More than this, when the mineral astringent whose motto is, "Stop the discharge," is discontinued, the discharge comes on as before, so it indifferently fulfils its own motto. I suspect that the advertised lotions and drops for the ear which patients obtain and use on their

own responsibility contain mineral astringents in considerable quantities, as they sometimes cause great pain, and excite inflammation as soon as they reach the perforation. If it is thought that the expulsion of the discharge from the tympanum through the perforation tends to keep open the perforation, let it be remembered (and it is a matter of common knowledge) that if a membrane is inclined to heal, nothing of this kind prevents it; of this fact we have ample evidence in the case of perforations made for remedial purposes in cases of chronic proliferous catarrh; and it surely is desirable in the instance of perforation caused by disease that at the time when this happens as little as possible of the products of inflammation should be left within the tympanic cavity.

And now in regard to the tolerance or intolerance respectively which perforations of long standing exhibit to well recognised and useful applications. Take for example the case of alcohol. Many perforations with unhealthy edges, discharging in large quantities from the tympanum, at once become more healthy under the use of alcohol in various dilutions; but to some, alcohol, even extremely diluted, is most painful and irritating. This is especially noticeable if the perforation is of small size. How can it safely be said in a general way that alcohol is a good treatment for perforations? The same may be said of iodoform or boracic acid. What satisfactory results either of these applications often produce in old perforations with bone granulations and a fetid discharge! But the fact that they occasionally set up irritation is enough to prevent me, and probably many others, from recommending them when the patient is subject to pains in the head, especially if these pains are chiefly on the same side as the perforation.

The tolerance and intolerance of all forms of artificial membrane or support which perforations show is so well recognised that it is hardly deserving of mention; and the excellent hearing and improved local condition of the perforation is perhaps better known than occasional intolerance which some perforations show to its employment; but the following case will perhaps illustrate so well what I might term the behaviour of a perforation under treatment that I relate it.

About fifteen years ago, a gentleman had perforations of both membranes after scarlet fever. On the right side all hearing was lost and the perforation healed. It was then found that on the left side (he being extremely deaf with this ear), he could obtain excellent hearing by the use of a cotton wool pad, which he learned to apply to the perforation. This he habitually used during fourteen years spent in active work which necessitated good hearing. Finding one day that the pad did not give the usual result, he tried various applications without avail. Having noticed that the pad was very dry when it was removed, he proceeded, on his own account, to irritate the ear in several ways in order to produce a discharge. Amongst other plans which he tried, one was by dipping the pad into turpentine. This was soon followed (strangely enough, without any pain) by a discharge, and on again adjusting the pad, he heard well for several days. Finally, nothing succeeded; the ear became dry and he was deaf.

When I saw him, I found, as he told me was the case, that the perforation had healed. The size of the old perforation was markedly shown and filled up with new tissue. After I had made an incision into the membrana, and after a great deal of trouble, the new tissue disappeared, leaving the old perforation as before, and he could again use the pad with efficiency, and without the tendency to heal being shown. Could anything illustrate better than this little history the behaviour of perforations? One might almost say that it is necessary to make use of our experience to anticipate their moods, and even then we shall be often wrong in our surmises. What is needed, however, to treat satisfactorily perforations of the membrana tympani, and many other forms of chronic disease, is the intelligent co-operation of the patient, and whoever is the subject of them must patiently learn to manage himself. When it is remembered that by careful management the hearing may frequently be made and kept good enough for the ordinary purposes of life, and, more important still, the patient may be often kept free from the dangers which have a fatal ending, it is not trouble ill-spent.

Of all the many forms of perforation, some of the most troublesome are perforations of Shrapnell's membrane, and the most difficult to treat are those in which there is evidence of caries. The easiest to treat are perhaps those in which the perforation has arrived at a dry state without any discharge, a state which it may retain for many years if not interfered with; then a masterly inactivity, as shown by leaving it alone (it may be permitted to say for this perforation, if for none other) is the best of all treatments.

ABSTRACTS OF THE GULSTONIAN LECTURES, ON THE NATURE OF FEVER.

Delivered at the Royal College of Physicians of England, March, 1887.

By DONALD MACALISTER, M.A., M.D., F.R.C.P.,
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LECTURE I.

AFTER some preliminary observations, the lecturer said that in disorder of the body-heat he recognised the essential, though not therefore necessarily the primary, condition of fever, and then proceeded to sketch the conditions under which the body-heat was maintained in health; the points to be considered were heat-loss, heat-production, and the mechanism which regulated the body-temperature and gave it stability, which was termed the thermotaxic mechanism.

The main channels by which heat was lost were through the skin by evaporation, conduction, and radiation (80 per cent.), and through the respiration (less than 20 per cent.). The blood-supply of the integuments was under the control of the vaso-motor "centres," with their vaso-constrictor (motor), and vaso-dilator (inhibitory) nerves; while the rate of respiration was governed by a respiratory centre, having two sets of nerves, which there were good grounds for regarding as motor and inhibitory respectively. Traube had founded, on facts of this nature, his "retention-theory" of pyrexia, which was that pyrexia was due to a diminished discharge of heat from the surface of the body, and this to a powerful contraction of the arterioles of the skin; this theory rested upon the one fundamental assumption, that the escape of heat from the body was unduly small, and it at once fell to the ground when Leyden and Senator showed that fever was accompanied not by diminished, but by increased, discharge of heat.

Like experiments, the lecturer said, have been repeated in recent years by Wood, of Philadelphia, and by Reichert and Hare under his direction. Their arrangements were admirably designed, the criticisms of 1875 were considered and met, and the work bears every mark of honesty and care. From a physical point of view there seems nothing to which objection can be taken; and the outcome of these last measurements, published only the other day, is the same as that of the older and less perfect ones of fifteen years ago. It is that heat is not abnormally retained in the body during fever; on the contrary, it is excessively discharged; and this is true not of one stage only; it holds for the rise and for the continuance of the fever, as well as for its fall. The lecturer further contended that clinical observation showed that in fever the cutaneous vessels are not in a state of continuous contraction. The cutaneous blood-supply, on the contrary, fluctuates in an irregular manner; now flushing the surface tissues, raising their temperature, and pouring out heat into the air, now reduced to a minimum, leaving the skin pale and dry, and shutting in the heat of the central parts. All this, of course, betokens that the nervous mechanism which controls the cutaneous discharge of heat is notably disordered. There is, indeed, no constant stimulation of the vaso-constrictor nerves such as Traube imagined; there is no continuous retention of heat, but there are marked irregularities in the rate at which it is discharged. One possibility only remains, namely, that the production of heat within the body is abnormally increased.

The next question that suggests itself is this—Is the heat production steady, or is it fluctuating? We have seen that the heat loss, as gauged by the condition of the surface, is subject to wide and irregular variations, not merely from day to day during the course of the fever, but even from hour to hour in the same day. Is there any similar irregularity in the rate of heat production? To answer this question we must again fall back on calorimetry. Thermometrical observations are of no service.

The only recent investigations which have been conducted with a view to directly answering our question are those of Wood and his assistants. An examination of their numerical results shows that in the septicæmic fever of dogs and rabbits the hourly rate of heat-production does vary in a remarkable way, even under uniform conditions as to feeding or fasting. The variation shows in some animals a tendency to rhythm, being usually higher towards the evening. Feeding introduces a marked increase of heat-production in the nor-