tion, is itself the type of organic bases (alkaloids), among which are such beneficent substances as quinine, and such destructive bodies as strychnine and aconitine. Trimethylamine, a base which may be regarded as ammonia in which the three atoms in its molecule have been replaced by three groups of the atoms collectively spoken of as methyl. The class of bases formed on the ammonia type, by substitution, are termed *amines*. But not only may the hydrogen atoms of ammonia be thus replaced by such groups of atoms as methyl, but even the fourth atom of the ammonia molecule, nitrogen, may be also replaced by an atom of a different character. Thus by substituting for the nitrogen atom in ammonia and compound ammonias (amines) an atom of arsenic, a series of basic substances is obtained, termed *arsines*. In this way we have the well-known deadly gas arsenuretted hydrogen (arsine *par excellence*), which is a compound of one atom of arsenic with three atoms of hydrogen, just as ammonia is a compound of one atom of nitrogen with three atoms of hydrogen. Numerous arsines can be prepared by the chemist, and they are frightfully poisonous substances.

During the last quarter of a century, attention has been drawn to the occasionally poisonous character of substances obtained by putrefaction. Panum first obtained from these a poison which acted as a ferment. The present writer, in conjunction with Dr. Fagge, also showed that various dead animal substances extracted with alcohol acted as poisons. Bergmann went further, and described, under the name of sepsine, an alkaloid generated by putrefaction, which acts as a septic poison producing a kind of blood-poisoning or pyæmia.

Still more recently the subject has been developed, chiefly by the labours of Professor Selmi of Bologna; and numerous alkaloidal products of decay have been obtained and made the subject of physiological experiment. To these alkaloidal products of putrefaction and decay the terms "cadaveric alkaloids" or "ptomaines" (πρωμα, a corpse) have been applied. Some of these bodies are poisonous, whilst others are innocuous. Unfortunately, the descriptions of these bodies given by foreign writers are usually vague, and the doses employed appear to have been indefinite. MM. Gautier and Étard have, nevertheless, endeavoured to elucidate their chemical composition, and have endeavoured, with some success, to show the analogies between the cadaveric alkaloids and the basic substances obtained by acting artificially upon albuminous substances with baryta and the alkalis.

Naturally enough, the well-known analogies existing between the amines and the urosines—bodies, as we have already seen, formed on the same ammonia type—led to the supposition that arsenic, when absorbed into the system, and arsenic when present in putrefying animal matters, might give rise to poisonous arsines; and Professor Selmi's researches point to the formation of such bodies. This observer examined the urine of animals whilst they were being poisoned with arsenic, and found in this secretion arsenic, not only in the ordinary form of an arsenite or arsenate, but also as a volatile basic compound of arsenic—an arsine, in fact. Selmi has, moreover, found in the corpses of persons who had died from arsenical poisoning, as well as in anatomical preparations preserved by means of arsenic, poisonous arsenical bases, one of which, though volatile, is stated to have a strychnine-like physiological action.

The existence of these volatile arsines may serve to throw light upon the anomalies attending the use of arsenical wall-papers. It is well known—and has hitherto not received any satisfactory explanation—that some highly arsenical wall-papers have been used without manifest injury to health; whilst others, on the other hand, though containing much less arsenic, have produced distressing results. It may be that in the one case volatile arsenical bases have been formed, and not in the other. The fact that the frequenters of dissecting-rooms, where bodies are injected with preparations of arsenic, do not suffer from arsine-poisoning is, however, adverse to the theory of the formation of these bodies under the influence of putrefaction, unless in very exceptional cases.

Our readers have doubtless heard tales of secret poisoners in the Middle Ages; and how aqua tofana was employed by these persons for their nefarious purposes. Possibly, the formation of the arsenical ptomaines may throw light upon the constitution of this well-nigh fabulous liquid, the potency of which toxicologists of the present age have been prone to doubt. It is a matter of tradition that aqua tofana was prepared by sprinkling white arsenic upon pieces of pork, and collecting the liquid that drained from these; the juice of a kind of toadflax being also added. Now, the volatile arsenical ptomaine which Selmi has described as acting like strychnine was prepared in this very manner. We can, then, well understand how from arsenic a liquid may have been prepared,

highly poisonous, yet totally differing from arsenic itself in the symptoms resulting from its administration. Selmi's discovery needs confirmation and further elucidation; but it may be that the Italian professor has rescued aqua tofana from the category of myths, and that, in a not distant future, toxicologists may have to deal with a whole class of new alkaloids. It need hardly be said how important the ptomaines are from a forensic point of view; but it does not fall within the scope of the present article to point out how they may be recognised under circumstances in which their presence might be mistaken for that of the poisonous natural vegetable alkaloids.

ON THE TREATMENT OF SPINAL CURVATURE BY RECLINATION IN ITS EARLY STAGES.

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I HOPE to exhibit, at the forthcoming meeting of the British Medical Association at Liverpool, a form of couch for the treatment, by reclination, of spinal curvature in its early stage, and weakness of the muscles of the spine, which embodies in its action a principle of treatment for such cases too frequently overlooked.

In the excellent method of treating curvature of the spine advocated by Dr. Sayre, at the time of applying his plaster-of-Paris jacket, he very properly insists upon having the spinal column elongated to its utmost, and its curves corrected as far as can be done, while the jacket is being fixed. He also recommends repetition of the process from time to time, so long as the jacket is in use, by a mode of self-suspension which the patients, in favourable cases, soon learn to use for themselves, from the conscious benefit which they experience from it.

In this act of self-suspension, as Dr. Sayre has styled it, one important condition is observed—namely, the weight of the head with its attendant downward pressure on the spinal column is, for the moment, entirely neutralised, and the chief cause of the persistence of the spinal curvature is corrected. This is done by raising the body off the ground by means of a leather apparatus, which encloses the skull from the chin to the occiput, and the weight of the body itself when so suspended, certainly that portion of it represented by the pelvis and the lower limbs—draws down the spine, thereby straightening and lengthening it. Dr. Sayre's effort in applying his fixing jacket under these conditions, is to preserve this restored position of the spinal joints—i.e., to correct the deformity for which it is employed. All other forms of spine-supports, such as the steel girthings and supporting apparatus, fail to effect this object with any certainty, because they are made to act upwards from the pelvis as a fixed point, and they do not lift and support the weight of the head, a constant factor ever influencing and intensifying, in the vertical position, these spinal curves. Such steel supports as are commonly employed in the treatment of lateral curvature of the spine, if they really elongate the spine when they are worn, do so, partly by acting on the movable shoulder-girdles of the scapulae and clavicles, with their surrounding muscles, by pressure acting through crutches placed in the axillæ, and partly by means of lateral or dorsal pads made to press directly on the curves, and, for the time, to obliterate them, or at least to conceal their existence. On the system practised by Dr. Sayre, reliance is placed exclusively upon forces acting on the entire length of the vertebro-cranial axis itself; and the upper limbs, as appendages attached to the trunk, are left free and untouched, by the pressure which is then applied.

The couch which I have to recommend, and which will be shown at Liverpool, is designed to carry out by reclination the same principle of treatment as operates in the method of vertical suspension, only in a more gradual and prolonged manner. I have called my couch a "slippery couch," and I think the construction and mode of action will justify the term. I have used it with marked benefit during the last few years, in more than thirty cases, in private practice. It is made in this way. A piece of wood is prepared, of suitable thickness, and about six feet long and eighteen inches wide. At about four inches from one end, a hole is cut through the wood, of circular form and six inches in diameter, with its margin on one surface of the wood slightly bevelled inwards. This end of the piece of wood is to be the upper or higher part, when it is fixed at such an inclination by means of a block or cross-piece as to raise it about one foot at the higher end. It is well to have four wooden legs screwed on, one at each corner, the upper pair being longer than

the lower in the same proportion; and to still further influence the angle at which the couch is to be used, by means of extra screw holes in the wood; the longer pair of legs being brought nearer to the foot of the couch, a greater elevation can be secured. The flat piece of wood being so prepared, is covered with several folds of soft thick blanket to about two inches in thickness, the blanket being just the size of the wood on one surface only; over this a piece of well polished black horse-hair cloth is stretched, and being turned tightly over the edges of the board, is nailed underneath, so as to produce a smooth, somewhat soft, but yet slippery, almost polished surface. Where the blanket crosses over the hole already described, it must be cut across in two directions, longitudinally and transversely, and the horse-hair cloth should be left loose over the same spot, so that, if pressure be here applied, an indentation will be quickly made.

Now, if a couch be prepared in this way, and placed at such an angle of elevation as I have here described, about one part in six of its length, a person lying upon it on his back will soon find, unless he make some effort to resist, that he will quietly slide down towards the lower end of the couch; and if his attention is otherwise absorbed, he will have his feet over the end of the board, as he is sliding beyond it. By a very simple device, this tendency to slide or slip downwards may be very beneficially utilised for the object we have in view.

A small, firm, cylindrical pillow is prepared, about the diameter of the wrist, and a foot in length, and this is attached by strong tapes, one at each end of the pillow, and fixed to each upper corner of the couch, the length of the tapes being such as to place the pillow transversely on the board immediately below the lower edge of the hole in the wood. With this pillow in position, and the patient so placed that the pillow may be received into the recess of the nape of the neck, the projection of the occiput falling into the depression made by the hole in the wood, the body is retained in position, and the sliding down is prevented, but yet there is a constant gentle dragging action on the spinal joints from the weight of the pelvis and lower limbs, which will act most favourably in the required direction.

It is desirable, when a patient uses this couch for the first time, that he should try it without the pillow; and, if needful, the elevation of the couch should be adjusted until the peculiar sliding movement is experienced. Then, with the help of the pillow, and the back of the head falling into the recess prepared for it, the patient will be aware of the principle upon which the couch is intended to act, and be more likely to continue its use.

All other couches, such as the Ikley couch, and couches with a double angular bend to support the knees, or with a foot-piece against which the feet can rest, are entirely opposed in principle to the plan of this "slippery couch." Using them, the patient may feel rested, and experience some temporary relief; but I know of no way, by reclination, to secure a certain degree of spinal extension, better than to fix the upper segment of the vertebro-cranial axis at one spot, and allow the weight of the lower part to induce direct "self-extension."

PERFORATING ULCER OF THE FOOT, AND ITS CONNECTION WITH DISEASE OF THE NERVOUS SYSTEM.

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CONSIDERABLE interest attaches to perforating ulcer of the foot, owing to the fact that, in many instances, it is found associated with locomotor ataxy. Four well-marked instances of this affection have recently come under my observation; and, from a comparison of them, I think we are justified in dividing cases of this nature into three distinct classes, as follows.

CLASS I.—*When the Ulcer is entirely due to Local Causes, e.g., suppuration of a bursa beneath a corn.* When suppuration occurs in this situation, the pus may penetrate the thickened epidermal tissue, and discharge through the centre of the corn; in other cases, failing to pierce the thickened epidermis, it may, making its way in the direction of least resistance, find an exit at some other point, often on the dorsal surface of the foot. Under these circumstances, a condition is produced, which, though generally spoken of as a perforating ulcer, should perhaps be more correctly described as "suppuration beneath a corn." In many instances, this condition is associated with disease of the neighbouring bone or joint. In un-

complicated cases, with rest, scraping the sinus, and stimulation, the ulcer will often heal; but when, as is so often the case, the bone or joint are involved, amputation of the toe will be required. Under these circumstances, the stump usually heals readily, and no recurrence of the disease takes place.

CASE I.—Charles W., aged 60, presented himself at the out-patient room, in March 1882, with what is usually described as a perforating ulcer, situated on the outer aspect of the phalangeal joint of the great toe, the history of which pointed to the fact that it had commenced as suppuration beneath a corn. On examining the toe and exploring the sinus, the phalangeal joint was found to be diseased; there was no evidence of locomotor ataxy, and the condition of the foot itself was in all other respects perfectly normal. Amputation of the toe was performed at the metatarso-phalangeal joint; the wound readily healed; and, when last seen, twelve months after the operation, the patient was in all respects perfectly well, and there had been no recurrence of the disease.

CLASS II.—*When the Ulcer occurs in connection with Locomotor Ataxy, and apparently independent of any Disease of the Peripheral Nerves.* Under these circumstances, the ulcer may, as Ball and Thibierge have shown (*Trans. Internat. Med. Congress*, vol. ii, page 52), occur, in some instances, as an early or premonitory symptom; in other instances, as a late or terminal symptom, when the disease is well established. The following cases illustrate these two conditions.

CASE II.—Thomas W., aged 40, sustained a slight contusion of the right foot, six years ago. Some weeks subsequently, an ulcer appeared on the joint of the great toe; and, as it would not heal, amputation of the toe was performed. Two and a half years ago, a similar ulcer formed on the great toe of the left foot, for which he was admitted into the hospital, and the toe was removed; at that time, no symptoms of locomotor ataxy were present. Twelve months ago, he began to experience shooting pains in the limbs, and suffer from attacks of vomiting; shortly afterwards, symptoms of ataxia appeared. Six weeks ago, the right ankle-joint suddenly became extremely swollen and oedematous. The patient was again admitted into the hospital, and, under the influence of rest in bed, the joint-symptoms gradually subsided. At the present time, the symptoms of locomotor ataxy are well-marked; the patient presents the characteristic ataxic gait, and is unable to stand with his eyes shut; there is absence of patellar tendon-reflex on both sides; the pupils are unequal, and present the Argyll-Robertson symptom. There is marked loss of sensation in both feet. There has been no recurrence of the ulcers, and the stumps of both great toes remain firmly healed.

In this case, the ulcers appeared on the one foot five years, on the other foot one and a half years, before any ataxic symptoms showed themselves. The affection of the ankle was, no doubt, an example of the benign variety of arthropathy described by Professor Charcot.

CASE III.—Edward S., aged 48, was first attacked about twelve months ago with shooting pains in both legs, pains about the abdomen, and dimness of vision; subsequently, he began to experience a gradually increasing difficulty in walking. Six months ago, ulcers appeared over the little toe of the left and great toe of the right foot. At the present time, ataxic symptoms are well-marked, being very similar to those described in Case II. The ulcer on the left foot has closed, but that on the right is still present, and obstinately refuses to heal.

In this case, the ulcers appeared at a much later stage than in the preceding, and when the ataxic symptoms were well established. The relation which perforating ulcer bears to locomotor ataxy is somewhat obscure; for in this affection the morbid changes are usually limited to the spinal cord and posterior nerve-roots, the latter structures only becoming implicated in the later stages of the disease. Recent investigations, however, show that, in certain cases, atrophy and sclerosis of the nerve-fibres of the sciatic nerve is present, while in others a diseased condition of the terminations of the sensory nerves has been observed. It is quite possible, therefore, that further research will reveal the fact that, in cases of locomotor ataxy, complicated by perforating ulcer, disease of the peripheral nerves is also present; otherwise, we must regard the local affection simply as an example of a tropho-neurosis dependent upon changes in the nervous centres.

CLASS III.—*When the Ulcer occurs in connection with Disease of the Peripheral Nerves, without any evidence of Locomotor Ataxy or other disease of the central nervous system.*

CASE IV.—Charles W., aged 40, presented himself as an out-patient, in the summer of 1881, both feet being affected with perforating ulcers, which had first shown themselves in 1877. Two toes