three-parts of the eggcupful. This was corroborated by the mother and by the little girl herself, who is quite intelligent and old enough for an independent opinion. It came to over eight teaspoonfuls—roughly 3*ix*. The dose she was taking at that time was *m.v. aquae ad 3j t.d.s.* The liq. strych. hydrochlor. of the *British Pharmacopoeia* contains 1 gr. in 110 minims of water; the regulation dose of the liquor being 2 to 8 minims, and of the alkaloid $\frac{1}{10}$ to $\frac{1}{5}$ gr. The child took at least 45 minims of the liquor—that is, an amount equivalent to something between $\frac{1}{2}$ and $\frac{1}{4}$ gr. of the pure drug.

REMARKS.

There are, I venture to think, one or two points of interest about this case.

First, the practically spontaneous recovery of the patient. I am inclined to think she would have survived without any treatment whatever. It was over two hours before she received any medical aid, and by that time the fits had to all intents and purposes subsided.

Secondly, the comparatively large dose of the poison—at least for a child—though the fact that she had been taking the drug regularly for over a month must certainly have produced some amount of immunity, and this probably saved her life.

Taylor, in his book on *Poisons*, says: " $\frac{1}{2}$ gr. operated as a poison on a child 2 to 3 years old, and caused death in four hours, the symptoms coming on in half an hour." He also quotes Dr. Darwin, who reported a case in which $\frac{1}{2}$ gr. killed a child aged $7\frac{1}{2}$ in half an hour. Taylor considers the fatal dose for an adult is from $\frac{1}{2}$ to 2 gr.

Dr. Husband, in his handbook, gives the fatal dose as "from $\frac{1}{2}$ to $\frac{1}{4}$ gr., but large doses have been taken, followed by recovery."

The *Encyclopaedia Medica*, in its article on poisons, puts down the fatal dose as " $\frac{1}{2}$ gr., which caused death in twenty minutes"; a little over a grain has frequently proved fatal, but recovery has taken place after 10 or even 20 gr.

The sublime contempt in which a certain section of the lay public hold the average doctor's "bottle of medicine," whether it contains a dangerous drug or not, is, I think, also a point worthy of mention.

THE CORRECT ANATOMICAL FORM OF BICYCLE PEDALS.*

By R. A. LUNDIE, M.A., B.Sc., M.B., F.R.C.S. EDIN.

MUCH thought and ingenuity have been expended in trying to adapt the bicycle *saddle* to the body which is to ride upon it. I do not know that the corresponding question with regard to bicycle *pedals* has ever been raised in this country; yet I hope to show that it also deserves to be considered.

My first interest in the subject was an acutely personal one. I had at one time suffered from corns, but by properly-adapted shoes had practically got rid of them a good many years before 1893, when I began to bicycle. Within a year or so corns began to appear in parts symmetrical on the two feet where they had never been before, and in a situation where corns are not very common, namely, at the junction of the sole with the lateral aspect of the foot opposite the fifth metatarso-phalangeal joint. They became gradually but steadily more troublesome; at their worst each of the affected areas had at least three or four eyes, and was often very painful, in walking even more than in bicycling.

Though my previous refuge—modification of the shoes—proved unavailing, it was long before I suspected any connexion between the corns and the bicycle. During 1902, however, I chanced to hear a lady remark that she had never had corns till she began to bicycle. This suggestion put me on the right track. I modified my pedals, and since September, 1902, when I began to use the improved form, the corns have gradually lessened, without any other change in my habits or footgear. Now—January, 1905—the last of the eyes is just disappearing.

Stand on the ground with the feet close together and the toes pointing forward. The transverse axis of the soles is at right angles to the line of the leg (Fig. 1). Place the feet 6 in. apart, but still parallel, and this is no longer the case; the transverse axis of the soles is in the same direction as before, but the line of the leg is inclined to it; in other words, the

foot is slightly inverted (Fig. 2). Pressure exerted through the leg is, therefore, no longer directly downwards, but downwards and slightly outwards. Now this is precisely the position of the foot (if we neglect the movement of flexion and extension at the ankle) on the ordinary bicycle-pedal at the lower part of the stroke; and at the upper part the inversion is somewhat increased. The foot is thus, when pedalling, being constantly pressed downwards and slightly outwards against the shoe.

It was this lateral component of the pressure which gave me so much trouble. How can it be eliminated?

Instead of standing on the ground, sit in a chair or lie on a couch, with the heels supported and the toes pointing upward (Fig. 1). Now separate the feet six inches as before. Being free from constraint, they retain their previous relation to the legs, the soles look a little outward, and there is no inversion (Fig. 3).

Figs. 1, 2, and 3 represent diagrammatically the positions of the feet and legs described. For the sake of clearness, the obliquity is considerably exaggerated.

Fig. 4.—Bicycle (of 1888) with pedals devised to avoid discomfort in ankles and joints of feet.

Fig. 5.—Bicycle (of 1904) with pedals devised to avoid cycling corns.

This at once suggests the proper position on the bicycle and the correct form of pedal. The tread should not be in a plane at right angles to the mesial plane of the machine, but slightly oblique, so that the outer side of the foot is a little higher than the inner (Fig. 5). On a pedal with the correct inclination the foot presses squarely and evenly, as in walking on level ground. I find accordingly that in sloping pedals the usual tabs at the outside, to prevent the feet slipping off, are quite unnecessary.

It is easy, by suitably arranging lengths of board upon the floor, to demonstrate that the position above described is more comfortable than the position on ordinary pedals, *when one is walking with the feet kept 6 inches apart*; and therefore that it should be more comfortable in bicycling.

The pedals I have described are just as easy to make as the ordinary patterns, and, if manufactured wholesale, should be just as cheap. They wear better, as there is much less slipping and grinding of the foot upon the tread. At present, however, any one who desires to try them will have to get a pair specially adapted by a mechanic. No question of loss of power can arise if the slope of the pedal is at the angle indicated. The leg necessarily occupies a position not perpendicular but somewhat oblique to the axis of the pedal;

* Demonstrated before the Edinburgh Branch of the British Medical Association.

this obliquity must be allowed for, and the only question is whether the correction is to be applied in the joints of the rider's limbs, or in the structure of the bicycle; in other words, whether the body is to be adapted to the machine or the machine to the body. Medical men, at least, should have only one answer.

I may point out that in the motor bicycle the separation of the feet is greater, and their inversion on ordinary pedals therefore more marked, than on the common "safety" bicycle. Though the feet are less used for propulsion, I have no doubt that here also the comfort of a more natural position will readily be recognized.

I am not the first to suggest this form of pedal. In the course of my inquiries, I have found that one of what the late Professor Tait used to call those "worst of plagiarists, who adopt our ideas long before we have thought of them ourselves," devised and patented precisely the same thing in the United States sixteen years ago (Fig. 4). I have not been able to trace William E. Smith, of Washington, nor do I know that his patent has been worked; but our common contention, that sloping pedals are the most natural and comfortable, is strongly enforced by the fact that we have arrived at it by quite different paths. He has found, as I have, that lateral slipping of the foot is avoided; but he knows nothing of cycling corns. His dissatisfaction with the ordinary pedal seems to have arisen from discomfort in the ankle and the tarsal joints; for he says that it—

compels the foot to play in a very tiresome manner upon the ankle-joints. . . . By my construction this difficulty is overcome and the rider enabled to propel the machine with less exertion than heretofore.

I think we may go further and say that not only the foot but the whole limb is put in a constrained position when working an ordinary pedal; and that this constraint is greatly lessened by a proper inclination of the tread. Several friends have reported to me that with a sloping tread they "find pedalling easier." Dr. Watteville, Kingussie, writes (after six months' trial):

In addition to the lessening of friction, I find that the sloping pedals give me more power, and fatigue is thus lessened. I am deriving much comfort from them.

Increase of power and of comfort are advantages that should claim the attention of all bicyclists. To the minority who suffer from cycling corns the hope of getting rid of them, as I have done, will make an additional and a still stronger appeal. In the hope that some medical men may be induced to adopt and to recommend an improvement devised on anatomical instead of purely mechanical principles, I desire to bring it under the notice of the profession.

MEMORANDA:

MEDICAL, SURGICAL, OBSTETRICAL, THERAPEUTICAL, PATHOLOGICAL, Etc.

THE LOWERING OF THE BODY TEMPERATURE IN HYPERPYREXIA BY MEANS OF RAPID EVAPORATION OF WATER.

The application of cold water has now become so well recognized as a part of the treatment of typhoid fever that most public hospitals are equipped with arrangements for its routine administration. Many difficulties, however, still face its adoption, while a fairly large staff of nurses is requisite for its systematic use. Again, where ice is utilized the supply often gives out, and in the hot zones of Australia, India, or Africa the difficulties associated with this special method of treatment can be better imagined than described. The scheme which I have improvised for the lowering of body temperature is as follows:

The patient's bed is covered with some waterproof, over which is placed a sheet of towelling. This towelling, the sides of which are cut in a slant, is braided with jaconet. The patient reclines on the sheet, and has, if necessary, a warm bottle to his feet. Over the whole of his trunk another piece of towelling is now placed in one or two layers, hemmed and bound along its sides with jaconet. A cradle is now placed over the bed, to the dome of which is attached a small electric revolving fan surrounded by a wire cage. Affixed to the cradle is a small rose, through which water slowly sprays in fine driplets on to the towelling covering the patient. The fan, revolving with more or less rapidity, affects the evaporation of water so that the degree of cold can be regulated to a nicety. All the nurse has to do after taking the temperature

of the patient is to switch on the electric installation, when it will be found that a rapid evaporation of moisture lowers the temperature. Should there be any surplus of water it will run down the jaconet drains into a receiver at the foot of the bed.

A few large fans in the ward would keep the air pure and cool the atmosphere. This, of course, requires electric installation, but the initial cost cannot be considerable when the set-off in the economy both in labour and material is taken into account.

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PROTECTIVE POWER OF VACCINATION.

The following case supplements that published by Dr. Angus in the *BRITISH MEDICAL JOURNAL*, October 15th, 1904:

Mrs. E. D., aged 37, was admitted to the Basford Sanatorium, Nottingham, suffering from small-pox on June 13th, 1903. Her seven months old baby, which she was suckling, and which had been successfully vaccinated fourteen days previously, was admitted with her. The baby was not weaned

but was nursed by its mother throughout her illness (confluent small-pox) and was handled daily by the other patients, about fifty in number, in various stages of small-pox. The baby left in perfect health. The vaccination marks on the baby's arm can be made out in the photograph by means of a magnifying glass.

Bulwell, Nottingham.

H. J. NEILSON, M.D.

A RARE FORM OF DISLOCATION OF THE ANKLE.

A MAN, aged 56, was descending some stone steps when he missed his footing; his left foot got fixed in a corner, and he fell, twisting it outwards under him. He was taken to hospital in an ambulance, and I saw him about three-quarters of an hour after the accident. He was in great pain, and lying flat on his back. The patella of each knee looked straight upwards, but whilst the right foot pointed straight upwards, the left was lying transverse and flat on its outer side, dislocated at the ankle joint by being rotated exactly a right angle outwards on its vertical axis. It was neither too far forwards or backwards, but simply rotated. The tibia was unbroken, and the internal malleolus projected considerably, stretching the skin over it. But the anterior face of the lower end of the tibia was still more prominent, and stood out very remarkably. The fibula was broken by an oblique fracture extending downwards and inwards in its