Original Articles.

ORTHOPEDIC HERESIES ON FEET AND THEIR TREATMENT.*

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Synopsis.

1. *The foot has adapted itself to vicious shoeing conditions and has become a hind-foot or hoof.*
2. *Acute foot symptoms are only a part of general muscular flabbiness and ligamentous relaxation.*
3. *Chronic foot symptoms are due partly to general lack of tonicity and partly to vicious shoes.*
4. *The reason that some cases get well using plates is that they develop muscles trying to get away from the uncomfortable plates.*
5. *Modifications of the plate idea equally bad.*
6. *The fallacy of foot-prints and plaster casts as means of diagnosis.*
7. *Treatment. The education of the patient in standing and walking.*
8. *Right shoeing.*
9. *Cases.*

Continued experience and study in the matter of feet and shoeing fills one thoroughly with the belief that much of the physical future of civilized people lies in the hands of the maker of shoes. Right shoeing must be a beginning in the reform of clothing which may restore natural poise and flexibility to the whole human form.

Since we have come to wear the shoe-machinery product, the welted shoe, with its arbitrary, tilted, unyielding sole, "well-fitting" and arranged in one-fourth sizes, the human foot, figure and gait have undoubtedly changed. Some one has said, "One third of the people in this city are cripples." This is true in the sense that they little know the possible power and endurance of their feet. The horse evolved from a five-toed animal, through the three-toed stage, until he finally bears himself on a single toe nail, a fixed, arched hollow wall or concave shell, balancing on the frog, with heel, or hock, off the ground, the implement adapted from constant running. So in the human foot, there is an evolutionary adaptation to vicious shoeing conditions. Ligaments stretch, joints become stiffened from disuse, and the muscles of the foot and toes atrophy until the foot is left hardly more than a weak and stiff right-angled attachment to the leg. In the shoe as it is made, a gait consisting of a tip from heel to toe, a "hock and hoof" gait, is possible, and the foot becomes more and more of a "hind-foot" and a "hind-foot" only.

This is not a form of evolutionary change to which we need submit. The foot is not merely a "hind-foot," with a fixed arch, but is properly an extremity taking place of both hind and fore feet, retaining characteristics of both. Thus, as the foot is thrown forward in stepping, it comes down on the heel, rolls along its outer edge, the prehensile toes grasp the earth to establish a base; all of this is "fore-footing." The weight shifted

forwards on the metatarsal frog, and the transformed foot pushing out behind makes "hind-footing." One may "hock, arch and hoof" indefinitely and not know how much his powers are limited. He then increases in weight or gets below par in general health, all ligaments or parts which keep up figure and poise become flabby and loose, and the atrophied foot collapses. This constitutes the flat-foot of the orthopedists.

Crude and unphilosophical methods are then adopted to cure this condition. Plates of steel or other material are given, which serve as mechanical braces, which give a push or lift to neutralize a present defect. Such a measure must be inefficient, not only giving no cure but at best only permanent dependence—one error tending to neutralize another for a time. Those who get well after the use of such plates do so because the cause of the collapsing foot was temporary and disappeared. All other cases are permanently enslaved. Walking is changed in form and action to types which perhaps are natural but are not normal.

A tilted or twisted plate does not twist or tilt the foot, but on account of its arbitrary fixity only makes the foot try continuously to get away from it, and causes painful spasm. This leads to the question,

Why do some cases get better wearing plates?

First, because, in certain cases, the feet work so hard to get away from the plates that they develop muscular power and strengthen ligaments. To get a result by this method, however, is indirect and illogical. There is much work and discomfort with little result.

Second, some cases may develop into a fixed conventional type of walking and adapt themselves to fixed attitudes, with the range of foot action diminished. The foot at each step hurdles the plate in hock, arch and hoof fashion.

The use of braces and plates is firmly fixed in the orthopedic mind. Thus, Whitman says, after twenty or more years of experience: "The influence of the modified shoe, the attention to posture and the cultivation of muscular strength may be quite sufficient to cure milder cases of disability if the co-operation of an intelligent patient is assured. In most instances (of flat-foot), however, the tendency towards deformity has advanced so far that it cannot be controlled by the patient, and as cure depends upon the reconstructive changes in adaptation to the prevailing uses and attitudes, the importance of preventing recurrence of deformity is apparent. For this reason a brace is usually an indispensable adjunct in curative treatment. One is often asked how long a support of this character is required and the treatment of the weak, relaxed foot. In early childhood one cannot depend upon anything but the enforcement of attitude and the ordinary changes incidental to growth. This may require many years. In the most favorable cases a period of from three to six months is necessary. In other instances the habitual use may be indicated to hold the unpleasantly deformed foot in a symmetrical attitude."

* Read before the Obstetrical Society of Boston, Nov. 26, 1907.

Ochsner's method of strapping for acute flat-foot appeals to me as being better than providing plates or other direct support. As he says, they relax the muscles, thus securing rest and relieving pain, and they furnish massage to the extremity, with their strapping, and, therefore, favor regeneration of the muscles and ligaments. I feel certain, however, that this measure should be considered only palliation, for it is fallacious to expect to develop muscles or ligaments by doing their work for them, and I have attempted to use this method only when I discover a case which cannot be immediately relieved by a roomy, flexible, balancing-heel shoe.

It is a satisfaction to see, however, that in some quarters the long, wide, steel plate, or the plate with the corrective edge about it, has been largely dropped, but the idea of substituting one fixed plane in a shoe to neutralize another fixed, or incorrect plane, has not been dropped. Thus we find here and there the soft-soled, flexible-shank shoe recommended, but on the inner edge of the heel there is a wedge to permanently cant the heel outwards. Thus Whitman,¹ in a recent article, says, "From the first I have insisted upon the importance and also in the treatment of a particular type, both for children and adults, of the shoe with a well-pronounced, forward twist (right and left). This shape is essential, as it aids in preventing abduction. A second point of importance is to make the inner prop of the sole and heel thicker, or slightly wedge-shaped, so that the foot is inclined toward inversion. This is one of the oldest remedies, one that is constantly discovered, but applied to the uninstructed patient these shoes wear away on the inner side. The principle is also applied by the expert blacksmith and if the shoes were firmly attached to the foot instead of merely containing it, the expedient would be of much greater advantage in the treatment of human beings."

With this opinion I entirely disagree. This wedge is essentially the same as a plate and does not stimulate the muscles and ligaments of the foot to restore themselves to their youthful resiliency. This hump on the inside of the heel only substitutes a club-foot for a flat-foot. With the orthopedist and his plates and humps and wedges there can be no compromise.

Another procedure which has tended to maintain self-deception on the part of the doctor, and hence to perpetuate the plate industry, is the taking of plaster or wax casts. With plaster-of-Paris or wax of varying consistency, one can take scores of different impressions of the same foot and deduce anything one pleases from them. Of one cast of a healthy foot, I have heard the opinion expressed that the front arch was broken down, needing support; of another cast of the same foot that the child was half club-footed and needed operation. Others agree in this belief. Thus Ochsner² says in a recent article that "we must not forget that there is no direct relation

between the sinking in of the arch and the severity of the symptoms or the degree of the disability. A beginning flat-foot may be so painful as to incapacitate the patient from all work and show almost no loss of arch," and he quotes Whitman, saying that this condition is "a compound deformity in which the abnormal relation of the foot and leg, causing the improper distribution of weight and strain and disuse of normal function, is of vastly greater importance than the depression of the arch, which has given the name to the disability."

Casts impress the patient. They have no real bearing on the treatment. Proper walking, the strengthening of the feet, the restoration of foot and balance are accomplished alone by proper shoeing, proper muscular stimulation and mental direction. Right shoeing *allows* one to walk rightly—it does not *make* one walk rightly. Nor can the foot be restored to its proper functions by the physical-culturist or exercise-nurse in the office, for the patient is apt to regard these methods as medicine, to be taken and finished.

The treatment of these cases is very simple. For the acute, aching, collapsed feet following influenza or other acute or exhausting general affection, vibratory massage of the feet, legs and thighs, and the application of static electricity in the form of sparks, or the so-called "waves," will in two or three sittings give entire relief. For these cases, for those less acute, and for the chronic ones, there should be a complete physical examination as to balance while standing and in walking, as to any or every degree of arbitrary stiffness in clothing, wise counsel from the surgeon as to the manner of walking and standing, and providing shoes which are mechanical moccasins to furnish complete freedom and control of balance. As Ochsner says, "If one simply tries to relieve the loss of arch of the foot without treating the whole patient one will be about as successful in treating the flat-foot as was the oldtime physician in giving digitalis as a routine measure, without looking after the exercises and general hygiene of his heart-patients."

Proper walking is the proper exercise for all the waking hours. Proper walking will restore the stiffened feet, and every minute of proper walking is a part of the treatment. Special exercises to restore the feet give the patient the wrong conception of his essential trouble. The foot symptoms are only a part of the general laxity, lack of freedom and lack of balance. In a previous article,³ proper walking was analyzed thus:

1. As the foot goes forward, the weight comes on the rounded heel.
2. As the sole comes to the ground the rounded heel throws the weight along the outer ridge of the plantar region to the distal end of the fifth metatarsal.
3. The toes take the ground in order, beginning with the little toe.
4. As the toes take the ground, the weight leaves the heel and the whole foot grasps the

¹ Royal Whitman: Med. Rec. N. Y., vol. lxxii, no. 9, p. 337, Aug. 31, 1907.

² Edward H. Ochsner: Jour. Am. Med. Assn., Nov. 23, 1907, p. 1744.

³ Crandon: BOSTON MED. AND SURG. JOUR., Nov. 1, 1906, clv, 505.

ground like a hand. Heel and great toe approach each other and every joint in the foot combines in "arching." Thus, the walking foot is not a "hock, arch and hoof," but rather a hand with the heel a grasping talon.

5. All weight lastly rests on a triangle bounded by great and little toe, its apex behind at the ends of the middle metatarsals. From this triangle the final push is given as the foot leaves the ground.

The education of a patient may be outlined thus:

1. This picture (above) of proper walking is made clear to the patient.

2. He is told to get into the way of standing with the feet parallel, spreading his toes out enough to get the requisite broad base for balance. Ochsner wisely says, "There is a false idea prevalent that toeing out is graceful. This common belief has its origin to a large extent, I believe, in the Infantry Drill Regulations adopted by the United States Army, and copied by the National Guards and military schools. This directs that 'the recruit at attention stand with his feet turned out equally and forming with each other an angle of about 60°.'" It would be much better if the instructions read that he stand with his feet parallel.

3. The patient is then told to get Chinese slippers, straw-soled slippers, with soft top on the front, and none on the heel, in which he walks about at all convenient times. To keep this sandal on the foot the foot must at each step flex on itself in a prehensile fashion.

4. He is encouraged, if it is feasible, to walk barefoot on turf or sand.

5. He is not told to do toe and heel exercises, which tend only to stretch the atrophied plantar structures, but rather to practice standing on one foot, the other curled round his standing leg. The effort to balance in this position works every muscle of the foot and leg.

6. He is told to stand, stocking-foot or barefoot, on a rubber door-mat, legs crossed, feet as far apart as possible but parallel, with soles firmly planted on the mat. The leg which is behind is then swung round in front and crossed over to its former position, and so on, alternately crossing one leg in front of the other in a standing position.

7. He is then told to walk in this cross-legged fashion.

These instructions are sufficiently specific to satisfy the patient. These exercises are interesting to the patient and will, therefore, be carried out.

The patient thus educating himself cannot alternate between his moccasins, or wise shoeing, which is superior to moccasins, and his old shoes. Moccasins, or their equivalent are "foot-wear." Shoes, as they are made, are "hoof-wear." A recent case exemplifies this point. A moccasin-wearing Canadian guide comes into the city and wears common shoes with heels, toes and welts curling upwards and is obliged to "hock and hoof" along. He immediately becomes lame.

The shoes have brought pressure on all his healthy foot muscles. The shoes have held his foot in an unnatural position until they are cramped, and from the tire and numbness of this pressure the foot relaxes and slumps, giving an aggravated condition of pronated, collapsed foot. The doctor gives him a steel plate (Fig. 2) and in two weeks he is a cripple.

The converse is equally true. A man, by adaptation well used to "hoofing" along in a shoe of commerce, puts on tennis shoes and spends a strenuous half day in them. This effort is followed by an acute attack of pronated, aching feet. He, too, gets steel plates and joins the list of dependents.

More destructive criticism is necessary before beginning the constructive relief of present shoeing conditions. The present machinery-made shoe not only permits little or no freedom in the mediotalarsal joint, not only allows no approximation in a grasping fashion of front and back of foot, but with the welt and the filling under the inner sole, and the tight fitting upper, fixes the foot in a trough. The foot is forced down into two hollows at each end of the stiff arched shank, and the edges of the foot everywhere are higher than the middle. In this way the first effort of the foot to assume a grasping posture is prevented and the foot is held "hoofed in," put out of action and held out of action. It has no chance. The front of the foot "frogs" together and we have symptoms which the orthopedist classes as "flatness of the front arch." For this he gives a hump of felt sewed into the inner sole (Fig. 17), all with the misconception that the foot has a *fixed arch*, whereas the physiological, intelligent conception is that the foot has the *power of arching*. The corrective arch does not restore arching, but holds up the bones like a crutch, with no curative value.

Machine-made shoes, as we now get them, accentuate and perpetuate a wrong principle, namely, the idea of feet and fixity where only covering and instability should be given. Right shoeing uses gravitation and elasticity to stimulate continuous foot-action whether standing or walking. It provides constant mechanical suggestion and maintains not balance but balancing.

Shoe construction may not be covered in an article such as this, largely because shoe construction is not our business. A shoe can be constructed, however, next to the foot, a nonarbitrary moccasin, giving all freedom and stimulation to complete healthy foot action. Undoubtedly, then, there can be added to the outside of a shoe so constructed an outer or ground-shoeing to look more or less conventional and at the same time not to interfere with the freedom already allowed. Such shoeing stimulates nature's own under-foot conditions by setting gravitation and elasticity to work to control balancing, mobility and flexibility.

At present the constructors of shoe machinery and shoe stores control the situation. Evil shoes are causing and maintaining diseases of the feet, which the orthopedists are attempting to cure.

The logical remedy is to create a demand for good shoeing and possibly to return to the day of the individual artisan-made shoe, that the shoe may be made for the figure and foot-action of the individual. This suggestion is not so extravagant or expensive as may appear. A shoe properly constructed and properly worn has almost no pull or strain or scuffing to endure, but like the moccasin or the barefoot, goes lightly along, and is not quickly worn out.

ILLUSTRATIVE CASES.

CASE I. A nurse who had been twelve years in active practice, after a particularly long and trying case, developed symptoms of collapse of her feet and legs. A doctor took casts of her feet and gave her steel plates. She wore the plates and took the treatment, consisting of the usual bandaging and arch raising, faithfully for two months and then reported again to the doctor. Examination at that time showed a large callus along the anterior internal aspect of the os calcis due to constant pressure of the plate. The doctor then told her that the callus should be excised and that the fascia under it should be cut and cauterized because the scar would tighten up and hold her arch together; that "scarred tissues never stretch." This treatment she declined and went to another foot and shoe surgeon.

This man told her that she needed a soft, light plate, and gave her a sole-leather plane and bunch of curled hair (for \$8.00). This plate crippled her so much that at the end of an hour she took it out of her shoe and put it away. The patient was then provided with shoes which were mechanical moccasins; she was told how to walk and how to stand and was well in four days.

CASE II. A woman of thirty-three years, weighing one hundred and sixty pounds, leading an active life, developed foot and leg symptoms, as part of a general relaxation of some muscles and over-tension of others as a logical sequence of postural defects and arbitrary shoes. She went to a prominent New York practitioner and was provided with a stiff plate, "saddle-shaped," with a long, high, internal flange and a narrow, high, external flange. (See Fig. 4.) Under treatment she adapted her form and action to this plate an increasing length of time each day until finally she was wearing it all day. She became accustomed to hobble about with the plates, but nervous symptoms appeared and increased, amounting to neurasthenia. It would seem that these symptoms were directly connected with the plates because at the end of six months, on arising in the morning, she got into the habit of reaching for the plates behind her back and putting them into her shoes, all behind her and out of sight. If she saw the plates she vomited immediately.

She presented herself for education in Boston, showed a natural foot, atrophied and spasmodic, but perfectly flexible. Right posture, walking and intelligent balancing shoes enabled her to walk without symptoms at once.

CASE III. This woman, aged thirty-three, had never worn corsets. She was a "faddist" on "physical culture" but had had foot and figure symptoms for about eight years. She had had aches between the shoulders, sacral back-ache, got tired very easily, could not walk or stand long without feeling "that sinking feeling" and that her feet would collapse. The worst foot symptom was pain in the front part of the plantar surface, commonly called the ball of the foot. This became so annoying and constant, increasing in intensity, that standing and even walking became an agony. The front part of her foot collapsed and flowed together with the result that there was constant ab-

normal pressure on plantar surface under second, third and fourth metatarsals, with neuralgia.

She went to a surgeon who gave her an inner sole in which was sewed a round hump of felt "to support her anterior arch" and "to cure Morton's toe." (See Fig. 17.) Constant pressure on this hump produced a true pressure paresis. Her general neurasthenic symptoms increased distinctly at this time until she had to be confined to a nerve hospital. She emerged from this little or no better, keeping up remedial gymnastics advocated by the orthopedic specialist. She came under the care of a woman physician, a wise counsellor, who, the victim declared, was the first to make a complete physical examination. This showed the patient to be muscular but unevenly developed, showing, for example, great spasm of back muscles with prominent flabby hips. She wore high, prescription, stiff shank orthopedic "high arch" shoes with elevated heels and, as a last affliction, the inner-sole and hump seen in the illustration. This woman was a type of graduate from the "physical culturist," over-developed and tense in some muscles, relaxed in others; in short, without balance or unity, always conscious of a pose and a desire to rest.

She was told to take off her splints (shoes) and was started in on a course of proper standing, proper walking and, for the first time in her life, learned something of real human co-ordination. Moccasin-like mechanical balancing shoes were prescribed and her whole system was allowed to get back into the normal tonicity of a child. She was well in three months.

CASE IV. A nurse of thirty years, doing active district work, weighed forty pounds more than she had. Most of the muscles were flabby from wearing tight, stiff-shanked, high-heeled shoes. She developed a so-called muscular rheumatism, almost universal. This condition yielded to salicylates, but on getting out again great weakness of foot and legs appeared, together with much pain in heels and knees. A doctor provided her with a steel plate (see Fig. 5), with a small internal flange "to hold up the astragalus," and a wider, high external flange to prevent lateral excursion of the foot. In addition to this she was given a certain amount of harness to press back on the pelvis. No symptom was relieved. The feet became so sensitive that walking was agony. Her feet were so nearly normal and her intelligence so keen, that after a half hour's lesson in right posture and walking, she was able to walk out with a pair of moccasin shoes almost without symptoms. There was some knee and foot ache for about three weeks while the ligaments were attaining resiliency and the muscles their tone. The rheumatic tendency has still to be fought but the feet are well.

CASE V. This boy of three years was observed by his parents to evert his feet in walking and to make his internal malleoli appear unduly prominent. He was taken to an orthopedic doctor who said "his arch is down and it needs support." The child was given a pair of aluminum plates (see Fig. 3) because they were light in weight. The child with these fixed arches was then put into educational orthopedic shoes, so-called, with Thomas heels and prescription shanks, and he was shortly able to stomp round with all the grace so often seen in aged negroes. The only motion allowed in his feet was at the ankle.

This went on for some three years until he presented widely everted feet, knock-knees and a saddle back, all from this unnatural monotony of foot action.

The child was then, under other advice, put into moccasins with balancing soles, a bull-dog was bought for him and he was sent out to play. He was practically well in three weeks and in three months could run

like a deer with the grace of an Indian. This case was a doctor's child and is spectacular.

CASE VI. This woman of fifty-five years had been under the care of the family physician, two of the best orthopedic surgeons, an osteopath and a masseur for fourteen months for foot prostration. She was given the strengthening shoe and the plate shown in figures 19 and 14. This plate was made based on an imprint of her sole in plastic sand. The heel was plunged down first and then the weight was thrown forwards on the toes and the result was a "saddle" impression of the foot in action. On this saddle was cast a steel plate and it was encased in leather to prevent rusting.

She was then handed over to a "remedial gymnastic nurse" who had the patient stand back to the wall, weight on the front part of the feet and alternately raise and lower herself, bending ankles and knees and hips, but keeping the back close against the wall as if scratching it. This resulted obviously in stretching and straining the plantar fascia and the plantar muscles already stretched to a grave degree, the plantar fascia and muscles being held tightly pressed on this saddle plate between treatments. She was told never to go without supports.

The first time the patient stood on the plate she fainted. The first time she went through the gymnastics just described she fainted, and an eight months' course at this resulted in her becoming seriously neurasthenic.

After this she took a course in "Christian Science," and was better in many respects except that she still could not walk. Next she was induced to try a new form of "Psycho-therapeutics." Here at least she got spiritual relief and a certain amount of relaxation by hypnotic suggestion, for she improved enough to be able to return to her orthopedic instruction. The feet got only worse.

Another surgeon who was consulted now advised some bloodless surgery for the hip and sacrum which were declared to be the seats of the trouble. At this the patient and her family rebelled and she went to an osteopathic practitioner who said that the case was not his business but recognized that the woman did not know how to stand or walk, or handle her body in any way approaching normal. She was provided, at his suggestion, with normal under-foot conditions in shoes and boots. She got well, but says that osteopathy did it. She was really cured by simplicity in shoes and instruction in control of them.

FIG. 1. A plate, or crutch, convex on the front end, meant to support the so-called anterior arch.

FIG. 2. This deforming plate was put on a strong, healthy foot during an attack of acute foot collapse and kept the patient a cripple as long as he wore it.

FIG. 3. This aluminum plate was put on a boy of three years. (See Case V.)

FIG. 4. The saddle-shaped plate with a long, high, internal flange, and an inner high external flange. These flanges are supposed to prevent rocking motion of the ankle, a motion which may be shown by casts of any normal ankle in action to be not only normal but necessary to right ankle and foot motion.

FIG. 5. A popular form of prescribed plate. The wide external flange is supposed to prevent lateral excursion of the foot. The small internal flange is to hold up the astragalus, the whole making an absolute preventive of normal foot action.

FIG. 6. A strong foot always runs over a heel of this type. Also note the hoof effect given by this fixed elevation of the heel.

To give the specifications of a good shoe except by series of negations and exclusions is very difficult. It should be light in weight, soft and flexible in all its parts, and the flat heel should be rendered balancing and unstable by making the outer front corner of soft rubber, after the fashion

(and patent) of Small. The construction should be such that in size and shape the shoe shall not pinch the expanded foot bearing all the weight of the body, and the inner sole so made that the foot shall not after a short time sink down in the middle of the plantar region as into a trough.

FIG. 7. In this shoe note that the foot rests in a trough. The outer edge lifted by the welt, the foot squeezes itself, convexes downwards on the cheap filling under the inner sole.

FIG. 8. The athletic shoe. The construction of this shoe is such that the center of the plantar surface slumps down, giving the foot no opportunity for prehensile flexion.

FIG. 9. Note the long, stiff inside counter giving a cradle effect, which prevents ankle motion and lames the heel.

FIGS. 9 and 10. A custom made "arch support," \$18 shoe. The shank contains six layers of the steel "shoe machinery" arches, made like a wagon spring. This shoe could only be worn when it was literally "broken in," and it broke at the only place it could naturally, at the forward end of the shank.

FIG. 11. This shoe embodies some one's suggestion of a lift or elevation under the anterior end of the first metatarsal. This suffices to run over the heel, as may be seen in the effort of the strong foot to overcome this artificial plane, and results in canting the foot to a fixed club-foot position. It causes soreness of the end of the first metatarsal, and spasm of the plantar fascia.

FIG. 12. An ordinary custom-made shoe, so constructed that heel and toe are practically turned up to prevent any effort of the foot toward natural plantar approximation of toes and heel. In other words the grasping effort is prevented.

FIG. 13. A college athlete, 185 lbs., got from a tight shoe an abrasion on the flexor tendon of the great toe. This led to a succession of nervous chills and other neurotic symptoms. He went to an orthopedic surgeon, but did not want a steel plate, because he had had one in the past. The doctor made this leather inner sole and pad. Note that the foot action was able to crumple up this inner sole, because it was a strong foot, but the pad resisted normal arching. The forward end shows how the toes were crushed together and out of action. He was not in any way relieved by this apparatus, but a mechanical moccasin enabled him to walk without symptoms in an hour.

FIG. 14. This long, stiff plate encased in leather to prevent its rusting, shown partly withdrawn, fills up an already close fitting shoe, prevents all plantar mobility of the foot, provides a saddle in the middle of the toes on one end and heel on the other, and in short, so far as possible, prevents any freedom of foot action.

FIG. 15. This is the so-called cast steel arch prop riveted inside the shank — a new form of torture.

FIG. 16. The supportive shoe. Note the vicious strength of splint-like shank. The strong unyielding construction of the Blucher top and of the shank prevents all motion of the foot as far forward as the toes, and here the edge of the shoe tip tightly binds down the toes, bearing on the tendon of the great toe particularly. This prevents arching up of the great toe in grasping motion and injures the toe. The condition resulting from this is often treated for neuralgia.

FIG. 17. This is an inner sole containing a hump of felt sewed under the leather as a treatment for "flatness of the anterior arch" and for "Morton toe." This is like having a pebble in the stocking, and is of value only because it is so uncomfortable that the foot, constantly trying to get away from it, acquires strength and mobility.

FIG. 18. Cast of the inside of a shoe. Here a strong foot has been moulded into this cramped position, convex downwards by the faulty shoe; neither foot nor toes can flex.

The upper should be high enough in front to allow the freest toe flexion and over the middle of the foot to let the dorsum of the foot raise itself as the toes grasp the sole. The counter should be low to allow free motion at ankle and

between astragalus and calcaneum. There should be no "fit," in the usual sense of the word, but yet enough fitness for the particular foot for a loose lacing to prevent slipping at the heel.

This method of instruction in foot-use in standing and walking is not a little matter of orthopedic therapeutics for those suffering from foot symptoms, nor is it only a preventive of foot symptoms. Foot-education, combined with the requisite lib-

FIG. 19. Here the welt and the lip of the inner sole make a fixed everted arch or nest in which the middle of the plantar arch sinks. In this shoe also there has been added at the posterior end of the first metatarsal a leather wedge, which is intended to cant the foot over into a club-foot position, but as a fact only prevents first metatarsal and great toe from reaching the earth effectively. This shoe has a flexible shank, but lacks other good features and, as a result, it buckles down in the middle at the shank and the ends of the foot turn up front and back.

FIG. 20. This plate is supposed to hold up the anterior arch by a convexity where the front rivet is seen. It only becomes bearable when its front edge has cut a hole into the sole of the shoe and the hump has ceased to be potential. The inner flange posteriorly is supposed to prevent the os calcis from making an excursion downwards and inwards, and to assist in buttressing the so-called arch. What it really does is to furnish an inclined plane for the calcis pad to slip back. This chokes the circulation of the arch and produces plate-injury over the posterior rivet. The outer flange is supposed to keep the foot from running over. In reality it furnishes a prop on the outer side of the heel, elevated by cant of the body, heel and shank of the shoe. The only good that this plate can do is that it hurts so much that the patient pulls away from it and thereby gets some muscular activity in the foot. The short flap of leather furnishes a slippery surface to prevent the anterior pads of the foot from getting a grip for proper co-ordination.

FIG. 21. Anatomical shoe, so-called. This shoe perpetuates the arching mistake in its anterior construction; accentuating the welt wall under the margin, turning up the toes, having the same effect as a pointed-toe shoe. A vicious tread forces the foot down into hollow, giving a one-toe or hoof action, defeating dissociate toe action. The fixed inside straight line and broad toe appeal only to the unthinking, for they are purely matters of form without bearing on action or mobility.

FIG. 22. This plate is sold in drug stores and shoe shops, but it has the advantage over many prescribed plates in that the split flange on the inside is bent out of the way by the action of the strong foot.

FIG. 23. A turned shoe — sells for 90 cents. This shoe shows the mobility of a mechanical moccasin having nothing to restrain action of foot or ankle.

erty of foot-action, such as comes with rational shoeing, is universal in its benefits. All the civilized world from childhood to age needs foot-freedom. The moccasin would allow it and be feasible if we could still walk, as in the beginning, on the mould of the forest and the turf of the fields. To accommodate the flexible arching foot to the unyielding planes on which we must walk, the shoe must offer a series of unstable balancing platforms with nothing fixed in position. Such shoeing, to one accustomed to the tight, unyielding leather boxes of present use, makes walking a new function, a revelation of comfort.

ROSENMUELLER'S FOSSÆ AND THEIR IMPORTANCE IN RELATION TO THE MIDDLE EAR.*

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THE object of the following paper is to try to point out an important source of infection of the middle ear, which has heretofore been overlooked. The literature, clinically, is exceedingly meager, consisting of one paper by Dr. Brunk, which appeared in the August number of the *Laryn-*

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goscope. With this timely and excellent paper, I fully agree. The textbooks, as he pointed out, even the latest, have nothing to offer. Notwithstanding this, I shall try to show that in the fossæ of Rosenmüller there is to be found very frequently, in adults, as well as in children, a large amount of degenerate tissue. This is more constant than we have supposed, and is an important factor in causing or maintaining morbid conditions of the middle ear. When present, it can be seen by posterior rhinoscopy in only a small per cent of cases, therefore a digital examination is necessary for diagnosis, and this should be done as a routine procedure.

Anatomically, Kyle says, "The third or pharyngeal tonsil differs little in structure from the faucial tonsils." This tonsil extends from the median line on each side to a well marked depression termed the fossa of Rosenmüller or recessus pharyngeus, which separates it from the Eustachian orifice. The agglomerate glands are most numerous behind the projections which contain the Eustachian orifices (i. e., in the recessus pharyngeus) and are closely grouped together on the upper surface of the soft palate. The term "adenoid vegetations" includes enlargement not only of the pharyngeal tonsil, but also of the closed follicles situated in the mucous membrane of the posterior surface of the vault and the postero-lateral walls of the nasopharynx. Later, he adds that, "pathologically, we really have to deal with four different varieties of enlargement of the pharyngeal tonsil," and says that "there is a soft variety which appears as a smooth semi-fluctuating mass that spreads over almost the entire nasopharynx, which is largely influenced by atmospheric changes and the physical condition of the child." This variety is composed almost entirely of the lymphoid structure, is very friable and is covered with a thin layer of epithelium, with ill-formed basement membrane and submucosa. The structure is so soft and friable, that it can easily be broken up by pressure with the finger. The enlargement seems to be due to an over-development of lymphoid tissue.

In another variety, which may be called edematous or cyanotic, there is very little increase in the actual gland structure, but the enlargement is due to venous stasis and edema produced by leakage from the vessels. This is the variety that is directly associated with intestinal irritation and irregularities in systemic circulation most commonly observed in children who are suffering from some form of intestinal parasites. The structure is smooth and tense, although easily compressible.

In the hard or hyperplastic variety, there is an increase in the lymphoid structure, with a decided overgrowth in the connective tissue element. The mucous membrane lining is well formed, and there are usually several layers of epithelial cells. The surface is more lobulated, although smooth to the touch.

Clinically, it would seem to be the first variety which by retrograde change produces the patho-