Two other biologic characteristics of milk were also tested for the effect of heat by Hippus; the bactericidal, including, according to von Behring, the alexins, was found to be weakened by one-half hour at 149 F. (65 C.) or two minutes at 185 F. (85 C.), and destroyed by boiling, while lactoscrum was uninjured by 248 F. (120 C.) for one hour.

THE EFFECT OF HEAT ON CERTAIN BIOLOGIC CHARACTERISTICS OF MILK AS DETERMINED BY HIPPIUS.

1. Present in Woman's Milk and not present in Cow's Milk.

	Unchanged by	Weakened by	Destroyed by
Salol-splitting ferment.	1 hr. at 140 F.	131 F.	149 F.
Amylolytic ferment.	1 hr. at 149 F. ½ hr. at 149 F.	158 F. short time.	167 F.

2. Present in Woman's Milk and present but less active in Cow's Milk.

	Unchanged by	Weakened by	Destroyed by
Fat-splitting ferment.	143 F.	145 F.	147 F.

3. Active in both Woman's and Cow's Milk.

	Unchanged by	Weakened by	Destroyed by
Proteolytic ferment.	1 hr. at 140 F.		Boiling.
Oxidizing ferment.	½ hr. at 149 F. 1 hr. 140—149 F.		1 min. at 169 F.
Bactericidal action.		½ hr. at 149 F. 2 min. at 185 F.	Boiling.
Alexins according to Von Behring.		½ hr. at 149 F. 2 min. at 185 F.	Boiling.
Lactoscrum.		½ hr. at 149 F. 1 hr. at 248 F.	

After a study of the most recent observations of the result of heat on the chemical composition of milk and on ferments and other biologic properties, it seems evident that, if sufficient for the purpose of destroying bacteria in milk, a temperature of not much more than 140 F. (60 C.) should be used. Such a temperature will scarcely alter the chemical composition; it will not injure the ferments existing in cow's milk, and it only remains to discover its efficiency to destroy the bacteria we fear in milk.

The most recent observations made on the thermal death point of the tubercle bacillus, the most resistant species that we fear in milk, indicates that a temperature of 140 F. (60 C.) for twenty or thirty minutes is sufficient to destroy tubercle bacilli occurring in milk, unless they are enveloped in thick mucopurulent material, such as sputum, or are protected by a film formed on the surface of the milk. Such conditions are not likely to occur in sealed bottles of properly handled milk from healthy cows. It has, therefore, seemed to me advisable and safe to advocate the pasteurization of milk at not less than 140 F. (60 C.) for forty minutes. Such milk is unaltered in taste and retains the ferments and biologic characteristics of the milk unimpaired. It is not subjected to chemical change and is certainly much safer than any raw milk at the present stage of the development of dairy hygiene in this country or abroad.

The apparatus for the pasteurization of milk which I devised some years ago I have so modified as to pasteurize milk at a temperature just above 140 F. for forty minutes.

CONCLUSIONS.

1. Milk for infant feeding should be pasteurized so as not to interfere with its biologic properties or chemical composition, but at a sufficient temperature to destroy the bulk of the bacteria present, including the tubercle bacilli.

2. A temperature of 140 F. (60 C.) continued for forty minutes would seem to fulfill this condition.

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POTENTIAL AND ACQUIRED STATIC FLAT FOOT.

ITS ETIOLOGY, SYMPTOMATOLOGY AND NON-OPERATIVE TREATMENT.

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The impression that flat foot is a very rare condition is almost universal, even among medical men. This, however, is erroneous; on the contrary, it is a very common affection, just how common it is impossible to tell, because the patients in only a relatively small proportion of all cases ever come to the physician for treatment, and of this small number probably only a small percentage are correctly diagnosed.

Absolutely conclusive statistics on this point either do not exist, or I have been unable to find them. In Munson's¹ work we find the statement that of 9,901 members of the Illinois National Guard who offered themselves for the United States service in 1898, 33, or 3.3 per thousand, were rejected because of excessive or painful flat foot. All of these had previously passed the physical examination required to enter the State Militia. How many were rejected during this first examination is not stated, nor is there any record of how many of the remaining 9,868 suffered to a minor degree from this affection.

From the Surgeon General's office I was able to obtain the following statistics: During the years 1903, 1904 and 1905, 132,145 men were examined for the United States Army. Of this number 457, or 3.4 per thousand, were rejected because of excessive flat foot. These figures include all men who were examined for re-enlistment and do not take account of those suffering from flat foot who were rejected for some major trouble. For instance, an applicant suffering from hernia and flat foot is, of course, rejected, but the cause of his rejection is given as hernia. In addition, only reasonably able-bodied men apply for examination, as a rule, and, although our statistics tell us that of every 10,000 adult males 34 suffer with painful or excessive flat foot, I believe that, in view of the above defects in the statistics, we are justified in concluding that a very much larger proportion of our population is suffering from this condition. Of the 17,619 surgical cases of the Munich Surgical Polyclinic,² 338 of the patients, or 1.9 per cent., suffered from flat foot. It is, next to scoliosis, the most common deformity coming under the care of the orthopedic surgeon.

ETIOLOGY.

Though never fatal, it causes much discomfort, considerable pain and not a little incapacity, varying in degree from slight temporary functional impairment to complete, more or less permanent disability. The development of flat foot is the consequence of a disproportion existing between the strength of the foot and the strain to which it is exposed. Anything which weakens the foot or which exposes the foot to excessive strain predisposes to flat foot, and if either or both of these features persist long enough or are sufficiently severe they will ultimately result in the production of this condition.

Among the more common factors which cause a weakening of the foot may be mentioned trauma, such as

1. Munson: Military Hygiene, page 32.

2. Hoffa Albert: Lehrbuch der Orthopädischen Chirurgie, p. 789.

sprains and fractures, rachitis, rheumatism, gout, arthritis deformans, paralysis, general muscular weakness due to acute disease or to insufficient or improper exercise, special muscular weakness, such as that of the *tibialis anticus* and *posticus*. The excessive strain may be due to the result of excessive weight-bearing due to obesity or to almost any physical overwork, but especially long-continued standing, as that required of bakers, barbers, bartenders and others, and then more especially if they are in the habit of assuming the "attitude of rest" so well described by Annandale. This attitude places the foot at a great mechanical disadvantage and thus, relatively at least, increases the strain to which it is exposed.

Similar to this is the effect of deformities in other portions of the body, such as scoliosis, *hallux valgus*, corns, ingrown toe nails and knock-knee. The excessive and persistent strain to which most feet are subjected by ill-fitting shoes and stockings must not be lost sight of. John A. Sampson³ has brought this out most clearly in his excellent article. The greatest fault about our shoewear is that almost all of our shoes are too low on the inner side over the instep, and thus constantly tend to force the foot into abduction by lateral pressure and to break down the arch by pressure from above. This is well shown by Figure 1, which shows the normal height of the instep and the height of its corresponding shoe. It is further proven by the fact that a great many people have corns on their small toes because these toes are constantly being crowded against the inner surface of the outer border of the shoe.

There is one factor in the production of flat foot which I feel certain is of very much greater moment than is usually conceded. I refer to the lack of correlation between the strength of the muscles and tendons and the weight of the body which occurs at the time of puberty. F. Peterson⁴ says the body gets heavier at this time, the muscles get longer, but not correspondingly thicker. Stanley Hall⁵ makes the statement that during puberty the different structures grow with different degrees of rapidity. Besides, is it not more than likely that this phenomenon is akin to the breaking of the voice, and here we assume that it is partly due to the lack of adjustment between the nervous system on the one hand and the muscular and osseous system on the other.

SYMPTOMS.

Clinically one can easily trace the appearance of the first symptoms to the time of puberty in a large majority of cases. Statistics naturally differ somewhat, but all those I have seen show that a very large percentage of patients present themselves for treatment about or shortly after puberty. Royal Whitman⁶ says 57.3 per cent. come for treatment between 10 and 25 years of age. Hoffa⁷ says 61.6 per cent. between 11 and 25 years of age, while the same author gives 50.7 per cent. between 16 and 25 years of age. What percentage of those who come for treatment later developed the symptoms shortly after puberty is not stated.

The first change that usually occurs in the development of static flat foot is relative general muscular weakness, accompanied by more pronounced weakness of special muscles, such as the *tibialis anticus*, *tibialis posticus* and short plantar muscles. This throws excessive strain

on the fascia and ligaments, which is followed by their stretching, causing a rotation of the bones with a change of their axis and weight-bearing surfaces, which must sooner or later result in a change of their shape. If now the opposing muscles in their attempt to immobilize the painful member become hypertrophied, rigid and spastic, we have the most troublesome condition, so-called rigid flat foot. If, however, this hypertrophy of the muscles does not occur and the causative factors are not removed, we will get the complete breaking down of the arch, robbing the foot of all of its elasticity. This sequence is by no means universal, but certainly very common, and I have frequently seen all of these stages and have been able to follow one stage after the other in the history of some of these cases.

The correct diagnosis in each individual case is, of course, of prime importance, because unless this is made many patients will necessarily be wrongly, or at best unsatisfactorily, treated. In order to accomplish this, each patient must be carefully and painstakingly examined. The snap-shot diagnoses from across the street, though they are sometimes correct and may appear brilliant to the layman, are not to be countenanced. A diagnosis of chronic rheumatism from across the room is much more apt to be wrong than right. I would not call attention to this matter at all if a considerable percentage of my patients had not given me a history of having been diagnosed as chronic rheumatism, some of them without ever having been asked to remove their shoes and stockings. Rheumatism is responsible for enough human ills without being wrongly accused of a lot of things for which it is not to blame.

The calf cramps so often complained of during puberty are usually nothing more or less than early flat foot pains. Other incorrect diagnoses are neuralgia, bunions, corns, Morton's toe, anterior poliomyelitis, osteomyelitis of the *os calcis* and occasionally even tubercular arthritis. If we will study each case carefully and keep in mind the signs and symptoms given below, mistakes need rarely occur.

One reason why so many mistakes have been made in the diagnosis of this condition is to be found in the faulty nomenclature which has been employed. None of the terms, such as flat foot, weak foot, splay foot, *pes valgus*, or *pes flexus pronatus reflexus* of Henke, adequately express the condition. I have, therefore, introduced the word potential, calling the whole symptom-complex potential and acquired static flat foot.

In the potential and milder cases the patient usually complains of a sensation of fatigue, weakness and discomfort even on slight exertion with a tired feeling, especially on the inner side of foot or ankle and a dull ache of the calf with or without pain in the knee, hip and lumbar region. According to Helbing,⁸ the very first and never-failing sign in flat foot is the outward deflection from a perpendicular of the lower end of the *tendo Achillis* when weight is borne on the foot (Fig. 2). I have always found this sign present in those of my cases in which I have looked for it. Among the other signs and symptoms, coldness, numbness, cyanosis, increased perspiration of feet, atrophy of *tibialis anticus* and *posticus*, the loss of springiness in walking, resulting in the peculiar shambling gait, may be mentioned.

As the cases become more severe we find marked pronation or eversion and abduction with the loss of concavity on the inner aspect of the foot, loss of arch and

3. Proper Foot-wear and the Treatment of Weakened and Flat Feet by Mechanical Devices for Maintaining the Adducted Position.

4. Zum Mechanismus des Platt Fusses. Arch. klin. Chir., lxi.

5. Psychology of Puberty.

6. A Treatise on Orthopedic Surgery.

7. Orthopädische Chirurgie, 1902.

8. Aus dem Gebieten der Ortho. Chir., March 27, 1905, p. 368.

a loss of proper relation between the axis of the leg to the foot. Instead of the axis of the leg striking the foot midway between the malleoli, it passes further and further inward until in some very severe cases it may pass internal to the internal malleolus, thus giving us the extreme prominence of the latter as a very common sign. With the progressive deformity we get muscular rigidity and the consequent reduction in the range of motion of the foot, especially that of normal adduction. Muscular rigidity seems to me to be an attempt of Nature to immobilize the painful foot and, by securing rest, relieve pain, and as the abductors and pronators are now at a mechanical advantage, the deformity must become more and more pronounced the longer the rigidity persists.

We come now to the question of pain, the discomfort in the inner side of the foot, calf muscles, etc., having already been alluded to. The three characteristic points of pain are, first, the inner border of the foot where the tuberosity of the scaphoid and the head of the astragalus make pressure on the calcaneo scaphoid ligament. In severe cases the bursa which forms here may become inflamed and the pain at this point may be excruciating. Second, the middle of dorsum of foot where the scaphoid impinges on the neck of the astragalus. Third, just in front of external malleolus because of the friction between the external malleolus and the astragalus due to the changed relation of these bones. Sometimes in addition there is pain over the plantar surface of the heel and also at the ball of the foot at the metatarso-phalangeal junction.

Well-made imprints of the sole of the foot are often of great help in making a diagnosis and of interest in watching the progress of the condition, but 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. We must ever remember that "flat foot is a compound deformity in which the abnormal relation in 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." A copy (Fig. 3) of the now classic Volkmann flat foot imprint is introduced here, not so much for the purpose of urging its use in making a diagnosis of the condition as to emphasize what has just been said, namely, that a beginning flat foot such as would make imprint B (Fig. 3) may be much more painful than a fully developed flat foot such as would make imprint D (Fig. 3) or even a potential flat foot, the imprint of which may not differ in the least from the normal imprint A (Fig. 3) may cause much more discomfort than a fully developed flat foot.

TREATMENT.

The good old times when every abdominal pain was treated by a liberal potion of blue mass, irrespective as to whether the pain was due to green apples or strangulated hernia, passed never to return about twenty-five years ago. The time when every pelvic disorder was treated with a glycerin tampon ended about fifteen years ago, while the treatment of all cardiac troubles by the routine administration of digitalis has not been in the best repute for the last five years, and we hope the time will soon come when flat foot patients will no longer be sent to the instrument maker or shoe dealer

with the direction to get a ready-made pair of steel insoles.

There is more similarity between these comparisons than one would be led to believe at first sight. The ordinary ready-made flat foot insoles are not even quite as sure to cure flat foot as blue mass is to cure abdominal pain. They may, and sometimes do, improve the symptoms somewhat, but for each case in which they are a benefit there are at least two cases in which they distinctly aggravate the condition. Prescribing ready-made flat foot plates is about as sure an evidence of slovenliness of thought and action on the part of the physician as was the old universal tampon. The comparison goes still further. 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 flat foot as was the old-time physician in giving digitalis as a routine measure without looking after the exercise and general hygiene of his heart patients.

There are many excellent methods of treating flat foot, but I should like to give in detail a method which has given very satisfactory results in my hands and which I have used almost exclusively for the past nine years. The method was very briefly alluded to in a paper which I read before the Illinois State Medical Society six years ago.

To begin with, it is very important to look after the general hygiene of the patient, since flat foot is the expression of a disproportion between the strength of the patient and the strain to which the foot is exposed. If the strain is excessive it may be necessary to reduce the weight of the patient or to change his occupation for a time at least. If the subsequent directions are carefully followed it will only rarely be necessary to change the occupation permanently.

The general muscular development usually requires our first attention. This can be best accomplished by prescribing appropriately selected, definite physical exercise. Simply telling the patient to take more exercise is about as useless as telling a patient to take medicine. Unless the direction is definite as to the kind and amount of exercise, the patient makes a few unsuccessful attempts and then gives up in despair. If the directions are exact I have found the patients very willing and glad to follow them to the letter, more especially as they soon experience great benefit from them. For this purpose it is well to give them some definite outline. There are many excellent guides for this purpose. I have found a little book by Schreiber very convenient and useful. The next important point is to train the special muscles, especially the tibialis anticus and posticus. For this purpose I have employed the special exercises recommended by Hoffa and others. They can usually be made a part of the general exercises mentioned, and fifteen or twenty minutes a day devoted to these exercises will be sufficient in any case of flat foot.

In this connection one must never forget to teach the patient how to walk. If one will teach a flat foot patient to walk and stand with the feet parallel or nearly parallel, half of the battle is won and many of the simple cases will derive marked benefit from this procedure alone, because it overcomes to a great measure the tendency to eversion and abduction. There is a false idea prevalent that toeing 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 consequently copied largely 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 sixty degrees," while it would be very much better if the directions read that he stand with his feet turned out equally and forming with each other an angle not to exceed sixty degrees.

This would give the soldier the privilege to use his feet to the best advantage. I remember very distinctly

Fig. 1.—Showing how shoes tend to force the foot into abduction by lateral pressure and thus break down the arch. Dotted line, outline of foot; solid line, outline of shoe.

Fig. 2.—Showing one of the first signs of flat foot: The outward deflection of the lower end of the tendo Achillis when weight is put on the foot.

while compelled to take military drill at our state university that it was a distinct hardship for me to try to walk with the feet thus everted, and I am very glad now that I never made any great effort to accomplish it, as it distinctly favors the production of flat foot. I have watched very carefully and so far have never come

across a patient suffering from flat foot who habitually stood and walked with his feet nearly parallel.

Careful attention to the kind of shoes worn is of the greatest importance. As above stated, the greatest fault with our shoes is that they force the foot into abduction, and in people with high instep many shoes make a continuous pressure over the instep, thus directly tending to destroy the arch of the foot. This can be avoided by having the shoes made over a special last made after a plaster-of-paris model of the foot. The model should be made with the foot held in slight adduction and supination. The extra expense is slight and the money expended for this purpose well invested.

I now wish to call especial attention to the method of strapping which I have used in all my cases during the past nine years. I go into considerable detail at the risk of becoming tedious, as I am thoroughly convinced that the success of the method depends very largely on the accuracy with which it is done. The following directions have but one object in view and that is to use the adhesive plaster to the greatest advantage. A system of strapping which utilizes say 95 per cent. of the adhesive quality of the plaster is many times more efficacious than a method which utilizes only 75 per cent.

First I select a good make of zinc oxid adhesive plaster in twelve-inch rolls, I then measure the patient's leg

Fig. 3.—Reproduction of the Volkmann flat-foot imprint showing varying degrees of arch destruction, from slight at B, to extreme at D.

and mark off the adhesive straps according to the size of the extremity. For the purpose of strapping an adult male patient's foot of ordinary size I mark off seven strips $\frac{1}{2}$ inch wide by 32 inches long with a cross line at its middle, sixteen strips $\frac{1}{2}$ inch by 8 inches, one piece $3\frac{1}{4}$ inches by 13 inches, one piece $3\frac{1}{4}$ inches by 12 inches, one piece $3\frac{1}{4}$ inches by 11 inches, and four pieces $3\frac{1}{4}$ inches by 8 inches (Fig. 4). I do this as a matter of convenience and also to prevent the unnecessary handling of the adhesive plaster after the facing is once removed. Plaster can easily be robbed of one-half of its adhesive strength by handling a few times with perspiring, oily hands or by sticking onto a dusty wall or by allowing its adhesive surface to come in contact with particles of cotton.

The heel of the patient's disrobed foot is now placed on a chair, with the knee flexed and with a short hard roller bandage looped around the foot I direct the patient to draw the toes upward, thus placing the foot at a little less than a right angle to the leg, at the same time having it moderately inverted and adducted (Fig. 5). I find that the patient himself can do this much better than any assistant.

I now put the middle of the middle of the thirty-two by one-half inch strap over the bottom of the heel about

one inch from its posterior border, place one-half up the outer surface of the leg without tension and the other up the inner surface of the leg, applying this as taut as I can. I then place one of the short, narrow straps on the inner surface of the foot parallel with the sole and one on the outer surface. The remaining narrow straps are then applied in the same manner, each one slightly overlapping its predecessor. When these are all in place I cover them with the remaining seven straps, beginning at the upper end of the leg, as illustrated in Figures 6 and 7.

These straps will remain in place and be effective for

and German adhesive plaster is universally bad. It does not stick and is very irritating to the skin, consequently not adhesive plaster strapping, but the adhesive plaster they used, and possibly their mode of application should be blamed for the poor results they obtained. I am very glad, indeed, that I had employed the method over a year before the first of these articles was published and several years before they came to my notice, otherwise I might have been deterred from developing it. I have proven to my complete satisfaction that it is a very valuable method, and in the nine years that I have used it it has almost never failed me. All cases which have

Fig. 4.—Showing how the zinc oxide plaster is marked off preparatory to cutting strips for strapping an adult male patient's foot.

from four to eight weeks, when they may be removed in the evening with benzine, the foot washed with soap and warm water, carefully dried, and the foot restrapped the next morning. This can be repeated until a cure is obtained, which may require from two to ten strappings. The relief is almost immediate, and I have had more than one patient shamble and even hobble into the office who walked out much more sprightly and greatly relieved.

I do not wish to be understood as claiming anything new or extraordinary in this method of treatment, as I am well aware that Drenkhahn⁹ mentions the use of

Fig. 5.—Showing method of having patient put traction on the foot preparatory to strapping.

adhesive plaster as early as 1899, and Shanz,¹⁰ Breyer,¹¹ and Whitman¹² since then.

The first three give it as their opinion that adhesive plaster strapping in flat foot is ineffective. The only way I can explain this is that they were all Germans

Fig. 6.—Showing arrangement of the one-half inch strips.

persisted faithfully have been greatly or completely cured.

I do not want to be understood as claiming that the method above outlined will cure all cases of flat foot, but I do believe that it will relieve all or nearly all cases of static flat foot and that in many it will not only effect a symptomatic cure, but if not too far advanced, a more or less perfect anatomic cure. I did not believe this myself until one day a young man with a double

9. Ztsch. f. Orth. Chir., 1899.

10. Ztsch. f. Orth. Chir., 1900.

11. Ztsch. f. Orth. Chir., 1900.

12. Royal: Amer. Orth. Jour.

flat foot which had completely disabled him for work, after having worn the straps for six weeks, walked into my office with the statement, "Doctor, I feel much better and I am getting an instep again." On making new imprints and comparing them with the first ones made I was able to demonstrate that his arch was actually beginning to be re-established. Figure 8 is a reproduction of the imprints of two flat feet, the upper two imprints having been taken before the treatment was begun and the lower two after the first strapping. In the lower two imprints the arches are beginning to be re-established.

Just exactly how the adhesive straps accomplish this is a little difficult to say. They undoubtedly support the arch, as can easily be demonstrated by applying them to a case with marked flat foot. They tend to supinate and abduct the foot. They relax the muscles, thus securing rest and relieving pain. Besides being elastic, they furnish massage to the extremity with every step and consequently favor the regeneration of the muscles and ligaments.

Fig. 7.—Showing arrangement of the $3\frac{1}{4}$ -inch strips over the narrower strips.

As illustrating some of the points previously brought out, I wish to give a brief history of a man who placed himself under my care three years ago:

History.—He was then 33 years old, a merchant, 5 feet 10½ inches tall, weighing 190 pounds, who two years previously began to be troubled with his feet. He consulted numerous physicians and was favored with numerous diagnoses, among which may be mentioned neuralgia, rheumatism, flat foot, weak ankles and obesity. In spite of all these diagnoses, he obtained no relief, and when he came to my office it was almost impossible for him to walk. He wore steel insoles attached to braces extending within a few inches of the knees. He gave a history of having been at three different water cures for rheumatism, of having spent \$1,000 at these and for medical treatment and of having lost several times that amount because of inability to properly supervise his business.

I removed the braces, applied the straps, and he went home and went to work, his home physician changing the straps occasionally for the next six months. He has not lost a day or a dollar because of his flat feet since the first strapping.

This is but one of the many similar histories, any one of which would illustrate one or more of the points that I have tried to bring out. The time has come when we can no longer rest content by relieving suffering and occasionally prolonging life; we must, if we would do our full duty, prevent disease and increase the capacity for work. If we can increase the working ability of one of these patients 50, 25 or even 10 per cent. we have done much for him, his family and the community, and unless we do this we have not performed our full duty. At the present time there is much just criticism of quacks and quackery, but not until we learn to diagnose correctly and treat effectively these and similar simple cases will quacks and quackery be eliminated.

This subject presents so many points of interest that it has been impossible to even refer to all of them. I have been compelled to confine myself to the consideration of potential and acquired static flat foot, without even referring to the other though less common forms.

SUMMARY.

In conclusion; permit me to repeat a few of the things which I have endeavored to emphasize in this article:

1. Flat foot is a very much more common affection and causes much more discomfort and disability than we are inclined to believe.

Fig. 8.—Reproduction of imprints of two flat feet. Upper two imprints taken before treatment; the lower, after treatment. Showing beginning re-establishment of arch.

2. It is more apt to be caused by general muscular weakness than weakness of special muscles or parts.

3. The earliest symptoms occur at the time of, and are caused by, the changes occurring at the age of puberty, and this is the time when the proper treatment is most effective.

4. The correct diagnosis is not made as often as it should be.

5. The treatment which I have outlined is simple and effective and can be applied in the individual case in a much shorter time than it has required here to describe it.

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