

FOOT TROUBLES

Benjamin M. Fadden

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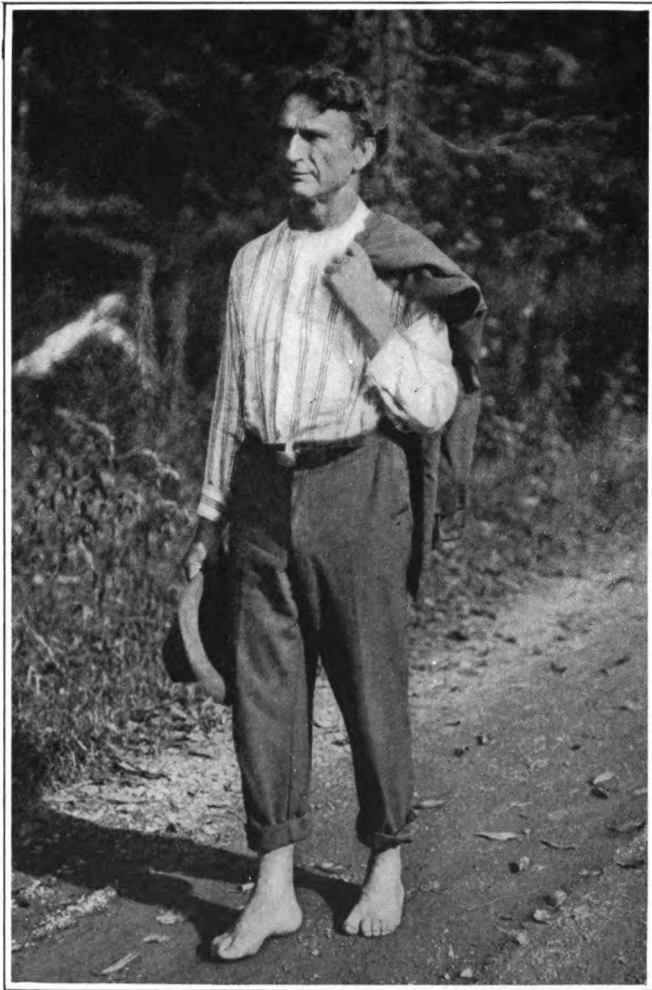
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Foot troubles,



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Photograph by Underwood and Underwood

The Author out for a walk.

FOOT TROUBLES

BY

BERNARR MACFADDEN

**AUTHOR OF MACFADDEN'S ENCYCLOPEDIA OF PHYSICAL CULTURE,
STRENGTHENING THE NERVES, STRENGTHENING THE EYES, HAIR
CULTURE, CONSTIPATION, TOOTH TROUBLES, MIRACLE OF MILK,
DIABETES, HEADACHES, STRENGTHENING THE SPINE, AND OTHER
WORKS ON HEALTH AND SEX**

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PREFACE

AMONG adults of either sex it is practically impossible to discover feet that are anatomically and functionally normal. The prevalence among civilized peoples of weak feet, flatfoot, hallux valgus, bunions, hammer toes, clubbed toes, overlapping toes, corns, calluses, blisters and chilblains—defects that detract from efficiency, health and happiness—is appalling.

Yet we are born with perfect feet. A half million years of evolution have supplied man with feet that will carry his body in an upright position without discomfort, pain or awkwardness. Why, then, are feet that were faultless in infancy deformed and limited in usefulness at maturity? The mechanism of the foot was evolved without the intervention of shoes; and shoes, dictated by blind fashion, and not by comfort or a knowledge of anatomy, are the chief cause of the foot troubles of civilized man.

PREFACE

If from the beginning of life one wore shoes that were commodious and permitted free action of the muscles, one would avoid practically all foot ailments. But throughout childhood the feet are squeezed, pinched and tortured, until at the age of adolescence they are impaired, distorted props instead of the graceful instruments of locomotion that Nature intended them to be. Beyond adolescence, females especially, in their desire to attract the opposite sex, comply with the false ideal of beauty that finds expression in small, high heels and narrow, pointed toes, and still further deform their feet.

The use of such foot-gear can never be sanctioned; but were it possible to secure shoes of such design made of yielding materials the feet still would receive some degree of healthful muscular activity during walking. However, such flexible or freely yielding material is not used. Patent leathers, calf and other stiff calf leathers are used almost exclusively, and these unfortunately, are generally chosen in sizes far too small, holding the foot structures as firmly as if clasped in a vise.

Until one has carefully compared the un-

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shod foot of the country boy with that of the modern woman, he cannot realize how far the average adult foot has deviated from the normal. What a difference between the muscular, flexible foot of this boy, toeing straight ahead and giving a spring in every step, and the limp, immobile foot of a modern woman, toeing out in pointed, high-heeled pumps! He can run, jump, climb hills, traverse rough ground or walk many miles with ease and benefit; but she can slowly cover only short distances over smooth pavements with difficulty and discomfort.

Since the foot is essentially a muscular structure, exercise is necessary to develop it and to keep it strong. Full and unrestricted movement of the foot and calf muscles is impossible in shoes that do not meet the structural and functional requirements of the foot, and the wearer of such shoes is inclined to do but little walking. The wrong type of shoes, then, as it affects exercise, may again be indicted as the main source of the foot maladies of humanity.

But stylish shoes are not the only factor in civilized life that predisposes to slack, under-

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developed foot muscles. The increasing number of those whose occupations are sedentary, the dependence of the majority on railroads or street cars for necessary transportation, and the substitution of the automobile for more active forms of recreation, are further relaxing and deteriorating influences.

The individual who, under the present conditions, follows the path of least resistance—accepts the prevailing mode of shoe without question and permits walking to be crowded out of his life by other forms of locomotion—cannot escape the common foot infirmities.

Yet in spite of fashion, sedentary habits of living and the suggestive example of the majority, one can avoid pedal weakness and deformity, or to a large extent he can correct such weaknesses and deformities in case he has failed to prevent their development. To do so he must acquire a little knowledge of the fundamentals of foot structure and motion so that he will have a guiding standard for the selection of shoes, and an understanding of the mechanics of the foot to adapt exercises to his needs. And he must understand the effects of walking, not only on the foot itself, but on

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digestion, circulation, elimination and the mental faculties; for if one appreciates the need of the body for this one system of exercises and realizes the value of it as a preventive and corrective measure in abnormal conditions of the entire body as well as of the feet themselves, he will the more eagerly make use of this form of activity and put his feet in condition to permit of it.

Bernarr Macfadden

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Foot Troubles

CHAPTER I

Evolution of the Foot

PLANTS secure their nourishment in a stationary position, but animals, who cannot do this, find movement necessary for existence. The fish effects this movement chiefly with its tail, which, struck to the right, causes motion obliquely forward to the left; to the left, motion obliquely forward to the right; and from right to left in rapid succession, motion straight ahead. The main purpose of its lateral fins is to keep it from turning over, which the preponderance of weight in its back inclines it to do, and which it does when dead. The bird performs such movement with wings, its legs laid back against its body to avoid hindrance to flight. To prevent the upstroke of the wings from offsetting the advantage of the downstroke and the weight of the body

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from bringing the bird to the ground, wings are concave below and convex above. The inner section of the wing elevates and supports the bird, the outer section propels it through the air, and the tail acts as rudder. The animal, which accomplishes its movement not through a medium as fish and bird, has four weight-lifting, weight-supporting and weight-carrying devices known as legs. It progresses by extending two feet,—the two at the front, the two on one side, or one front and the alternate back foot—and lifting the body forward over a new centre of gravity.

Each of these three forms of locomotion is capable of great stability and speed, and Nature could not improve upon them in these directions. What could be surer or swifter than the motions of the salmon, eagle or deer? As long as swiftness in attack or flight was the paramount factor in survival, it is not surprising to find the quadruped the predominant type among the animals, for four legs serve this purpose better than either more or less than this number. But Nature had a higher ideal than mere stability and speed of locomotion. And evolution worked through

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the animal species, rather than the fish or the bird for the attainment of this ideal, because the earth as a habitat has many advantages over the sea or the air.

The change from quadrupedal to bipedal locomotion was the most momentous in the whole course of evolution and made man, the only true biped, king over every creature of the earth. Many alterations took place in the two feet that were now required to do the work of four. The foot lengthened and the heel projected to check forward and backward tipping of the body and to provide a fulcrum and lever for the leg muscles to act upon. The longer the foot, the better this combined purpose is served, but the more progression is hindered. Man's foot is obviously a compromise between one long enough to produce the least muscular effort in standing and short enough to interfere least with locomotion. Most of the body's weight is borne by the tarsus or heel bone of one foot shortly after the beginning of the step and all the weight is borne by the ball of one foot while the other foot is off the ground. Concentrating so much weight on one point, in the absence of shock-absorbing arches,

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would mean much jolting. So we find that evolution has protected the body against the discomfort, awkwardness and injury of such jarring by a longitudinal and a transverse arch. And in the place of diminutive toes or hoofs, there were developed separated, spreadable toes to prevent rocking of the body from side to side in standing, but especially in running and at the end of the step in walking. Many muscles are needed to abduct, adduct, flex and extend these toes, and the human foot, in contrast to that of the animals, is essentially a muscular structure. And so is the human leg. Owing to the greater number and wider range of its muscles, the lower leg of the biped is much larger than that of the quadruped. Powerful muscles which flex and extend the foot and toes, rotate and turn the foot, lift the entire weight of the body and aid in maintaining its upright posture by means of slender tendons passing through the ankle, are located in the lower leg (calf) where there is plenty of room for them.

The advantages of bipedal over quadrupedal support are numerous. His erect position raised man's level of vision above that of

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every animal of equal size and made possible the congregation of great numbers within a limited space for counsel or for battle. In making a biped of man it seems that Nature foresaw the packing requirements of the New York City subways, baseball stadiums and prize-fighting amphitheatres.

But the chief advantage of requiring two of the limbs to do the work of four lay in releasing the other two from all duty as supporters and propellers. The human legs are hind legs which have developed to perform the duties of four limbs in bearing and in moving the body; the human arms are forelegs, which, freed from the obligation of sustenance and locomotion, have developed at their outer extremities into hands. And hands not only differentiate men from the animal, but they have played the principal role in the origin and growth of civilization. The foot is simply a carrier, while the hand is a grasper. The animal uses only the aggressive and protective devices of its own body—teeth, claws, horns, etc.—in its battles for survival; man, by virtue of his hands, employed progressively stones, javelins, arrows and guns. The animal has

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for food only those creatures weaker than itself and the wild offerings of nature; but man, by virtue of his hands, has any creature that he chooses as well as the products of agriculture.

With its opposable thumb the hand can hold and utilize weapon, tool and pen; it can turn about and examine the objects of the natural world; lay them beside each other and compare them; and with its tactile fingers rear the structure of sensory experience. The foundations of society—its safety, its food, its architecture, its knowledge, and its communication of feelings, thoughts, and ideals—may all be traced to handwork. Man's chief point of contact with other persons, as well as with the material world, is his hands. The clasp of friendship, the caress of love, and the healing touch of the manipulator are instances of the spiritual significance of the hands. The whole of civilization exists by virtue of the hands, and the whole body, including the feet, is merely a servant of the hands. From the halving of his legs the grovelling, helpless animal became the handy, star-gazing man, bending to his use every creature, material and

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force of sea, air and land and speculating on the inhabitants of distant planets.

Though the loss of two legs in the course of evolution entailed a tremendous sacrifice in the stability and speed of bodily movement, the acquirement of two hands which this sacrifice made possible, transformed the animal into man.

It was the necessity, then, for using two of the limbs as hand-bearers, in the fierce struggle for the domination of the fittest, that has occasioned the development of a human foot so different from that of the animal. And an understanding of its evolution should inspire respect for its distinctive features — its muscles, its shock-absorbing arches, and its spreading toes.

CHAPTER II

Anatomy of the Foot

THE foot is really a wonderful structure. When we observe its grace as the toe-dancer or the aesthetic dancer trips lightly before us we realize that the foot is something more than a "mud hook." We are charmed with its positive grace and beauty. When we observe a giant of strength lift his hundreds of pounds, with the feet supporting the combined weight of his own body and whatever he is lifting, or the pole-vaulter as he lands with terrific impact from a height of twelve or more feet upon his comparatively small feet, we appreciate the tremendous strength of those small platforms upon which they, and we, balance. And when we see a sprinter dash down the hundred yards in less than ten-seconds we marvel at the combined strength and flexibility and the absolute perfection of the feet for the work they are designed to do.

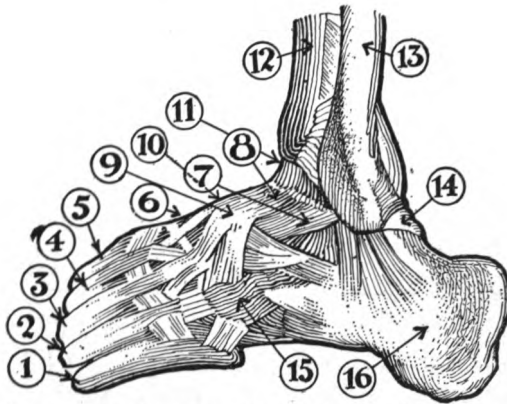
ANATOMY OF THE FOOT

It is the very strength of the feet that makes them so troublesome when they are mistreated, or when they for any reason get out of order. If they were designed by nature to be only soft cushions they would have been supplied with internal structures suitable to that sort of a foot, and there would be little to get out of order and not a great deal of damage done when they were out of order. But the foot is a remarkably complicated structure, designed to be a powerful ally when one hunted his game and carried it to his cache—or ran from his enemy. **It is made for action, speedy action, and for almost unlimited endurance—but it is made to be free, and should be so as much as possible.**

Bones. **Twenty-six bones form the skeleton of the human foot.** Their number, shape and arrangement — the framework alone — suggests at once the complicated character of the foot's structure. At the beginning of its anterior half, forming the front part of the longitudinal arch, are the five metatarsal bones lying side by side, forming the broad area of the foot and the rear attachment for the bones making up the five toes. The toe

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bones are fourteen in number, called phalanges, two for the great toe and three each for the four lesser toes—just as in the hand there are two phalanges for the thumb and three for each of the other fingers. In shape, also in their simple end-to-end articulations, these bones conform with the common conception of what bones are like—comparatively long and slender, with base, shaft, and head. Such is the fore part of the foot.



Ligaments of outer side of left ankle joint: 1, 2, 3, 4 and 5—Fifth to first metatarsal bones, respectively; 6—Tarsometatarsal articulations; 7—Anterior fascia; 8—Astragalus; 9—Scaphoid; 10—Tarsal articulations; 11—Ankle joint; 12—Tibia; 13—Fibula; 14—Posterior fascia; 15—Cuboid; 16—Calcaneus.

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But the posterior half of the foot is formed of bones much different in type, and much fewer in number. The bones of this portion of the foot are called the tarsus, and number seven. These take their names from their shape and are the cuboid (like a cube), navicular (like a ship or boat), internal, middle and external cuneiforms (like a wedge), talus (one of a set of dice), and calcaneum (referring to the heel-calx). They are extraordinary in their very irregular size and clustered arrangement, also in their multiple articulations with each other, with the bones of the leg and with the metatarsals. They form an arch, or rather a dome, which has considerable width (that of the foot) as well as length (from the heel to the beginning of the toes). The seven bones have between and among themselves and with leg and toe bones, twenty-eight points of articulation, these all being necessary to preserve the contour of the arch; and a partial examination of these relations shows that every mechanical advantage of curve, sinuosity, angle, concavity, convexity, obliquity, and level has been fully utilized.

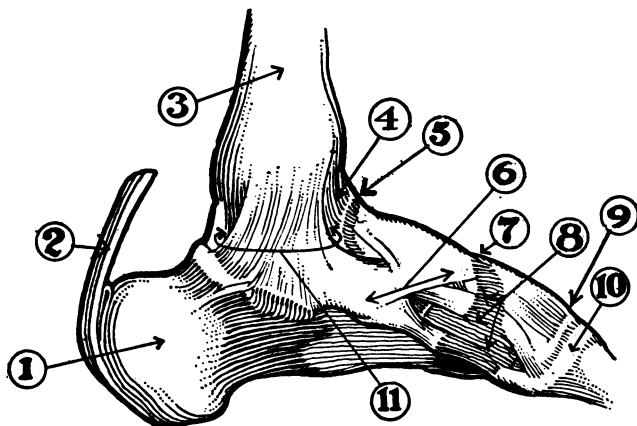
The calcaneum is of interest, because it

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forms the heel, being very large and irregularly shaped. The head of this bone projects forward underneath the talus and forms the posterior part of the arch, a large posterior projection forming the heel. **Beneath this bone is a rather heavy layer of fat, to help reduce jar of walking.** The talus is above the calcaneum, closely attached to this bone by ligaments between the two, and attaches to the two bones of the lower leg to produce the ankle joint. It is not directly concerned in forming the arch of the sole of the foot, but below and to its front it meets the navicular, which is at the summit of the arch on the inside of the foot. These two bones form the bony prominence that is felt just above the arch slightly back of the middle of the inner side of the foot. The cuboid is just opposite, on the outer side of the foot, immediately behind the bony knob on that side made by the base of the fifth metatarsal, which, in the normal foot, is barely above the floor whether the foot is resting gently or supporting the body weight. The hard part of the top of the foot in front of the ankle joint is formed by the three cuneiform bones. Owing to the heavy fascia, liga-

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ments, muscles and fat under the arch of the foot none of these bones can be well outlined by touch from the sole of the foot, except by deep (and not pleasant) pressure. The illustration, however, will help you.



Ligaments of inner side of left ankle joint: 1—Calcaneus; 2—Tendo Achillis; 3—Tibia; 4—Anterior ligament; 5—Astragalus; 6—Scaphoid; 7—Articulations of tarsal bones; 8—Internal cuneiform; 9—Articulations of tarsometatarsal bones; 10—First metatarsal.

Sloping down from the cuneiform bones toward the toes may be felt, from the top of the foot, the metatarsals—one for the attachment of each toe. In the “bony” foot they stand out quite prominently. At the inner

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surface of the beginning of the great toe and at the outer surface of the beginning of the little toe may be felt, or seen except in fat feet, bony knobs. These are the distal ends of the two outer metatarsals and the near ends of the first phalanges—or the first joints of the great and little toes. They form the forward extremities, respectively, of the inner and outer horizontal arches—sometimes spoken of together as the horizontal arch.

The shapes and arrangement of the bones, with their various articulations and ligamentous and muscular supports, are all designed to produce a foot of great power capable of withstanding great strain, yet at the same time a foot that is flexible and capable of bending and yielding to and resisting movements as necessary to maintain equilibrium or balance under varying conditions. Lateral, forward and backward, and up and down motions, also combinations of these movements of the bones are possible, and yet stability is insured by the peculiar forms of the bones and the close binding together by muscles and powerful ligaments. These conditions of the posterior bones of the foot, permitting a balancing of inward

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and outer pressure, make it possible, also, to have a narrow heel without sacrificing lateral stability of the foot. High heels, by shifting the position of the bones, placing weight where it does not naturally belong and removing it from where it does belong, impose a great stress upon the ligaments, muscles and muscle tendons—many times when the bones alone or mainly should bear the stress. This cannot but weaken a foot and give rise to one or more of a variety of foot troubles.

It might be of interest to show one of many ways whereby nature provides always for the best service of any anatomical structure. The middle cuneiform is the shortest of the three cuneiforms, making it necessary for the second metatarsal to extend farther back into the foot than the first or third metatarsals and its base articulates with all of the cuneiform bones. This inequality in the length of the cuneiforms with the consequent dovetailing of the second metatarsal gives to the foot a lateral strength that it could not have if the joints of the cuneiforms and metatarsals formed an unbroken line across the foot. It is much on the same principle as that used by the mason who over-

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laps the bricks he lays, and does not put them directly one above the other; by this method he builds a strong wall, whereas otherwise it would be very weak indeed.

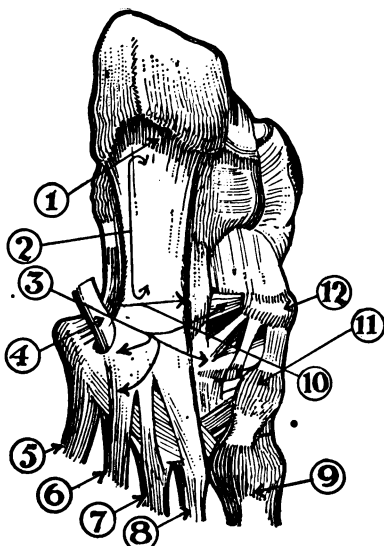
Ligaments. Though the shape, articulation and grouping of the tarsal bones are such as to secure, insofar as possible, the longitudinal arching of the foot, strong ligaments are needed to hold these bones together and make their peculiar jointings effective.

Ligaments unite bone to bone, some being immediately between the bones, others on the dorsal or top side of the bones, and still others on the plantar or sole side. Perhaps two of the four ligaments joining the heel bone and the cuboid (the keystone of the foot arch) deserve particular attention. One of these, known as the short plantar, is a broad, strong ligament sustaining the arch at its central region; the other, known as the long plantar, is the longest and most powerful ligament of the foot. It extends as a broad band from the under, outer surface of the heel bone to the under surface of the cuboid, then sends forward fan-like extensions that go to the second, third and fourth metatarsal bones. This liga-

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ment, being stretched beneath the rear and front ends of the longitudinal arch on its outer side, gives it substantial support; also, its anterior fan-like offshoots firmly join the tarsals and metatarsals.

Other ligaments between and on the upper



Ligaments of under surface of right foot: 1—Calcaneus; 2—Long calcaneo-cuboid ligament; 3—Plantar ligament; 4—Tendon of peroneus longus; 5, 6, 7, 8, 9—Fifth to first metatarsal bones, respectively; 10—Cuboid; 11—Internal cuneiform; 12—Scaphoid.

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and lower surfaces of the metatarsals hold these bones from spreading beyond a certain distance and also unite them with the tarsals. The transverse metatarsal ligament, which passes beneath the forward ends of all the metatarsal bones and binds them together, is an important factor in maintaining the transverse arch, which will be described later in this chapter.

With one exception, the ligaments of the foot are inelastic. Material that unites the articulating extremities of bones must be flexible to permit motion at the joint, yet inelastic to prevent dislocation of the bones. The one exception in the foot is a ligament attaching the head of the heel bone to the under surface of the navicular bone of the tarsus, just above which rests the talus—the bone that connects with the two leg bones and directly receives the body weight. This ligament contains a large amount of elastic fibre that gives the ligament considerable power in itself to restore the arch to its greatest height after the weight, which has been borne by the arch, is removed. The function of many of the ligaments beneath the arch is similar to tension

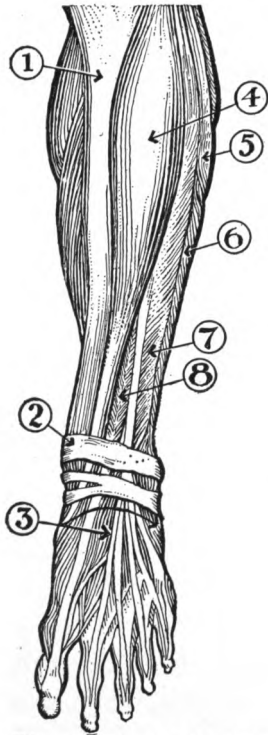
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rods attached to the rafters of a building: they prevent spreading of the connected structures.

Muscles. There are thirteen muscles of the lower leg, and all but one act upon the foot or toes. All arise from one or the other or both of the lower leg bones, except the *gastrocnemius* (the main calf muscle), which arises from the thigh bone. Four of these muscles originate at the outer forepart of the leg, become tendinous as they approach the ankle, run down the foot above the foot bones, and three are attached to the upper part of the foot or toes—one of them dividing into four tendons which attach to the top surface of the second and third phalanges of the four lesser toes, one is inserted into the base of the end phalanx of the great toe, and a third going to the base of the outermost metatarsal bone; the fourth of these muscles is attached to the inner and under surface of the inner cuneiform bone and the base of the metatarsal of the great toe.

The other eight of these twelve leg muscles that act upon the foot or toes start at the back of the leg. Three of them (that form the bulk of the calf of the leg) stop at the heel bone.

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The front of the leg, showing: 1—Tibia (shin bone); 2—Annular ligament; 3—Extensor brevis digitorum muscle; 4—Tibialis anticus; 5—Peroneus longus; 6—Peroneus brevis; 7—Extensor longus digitorum; 8—Extensor proprius hallucis.

Two of them (the gastrocnemius and the soleus) deserve special mention, since their tendons unite to form the Achilles tendon—that thick, hard tendon between the calf and the heel—the strongest tendon in the body; it is capable of supporting not only the weight of the body, but that weight during running, jumping from a considerable height, or when increased by several times the body weight, as in the lifting of very heavy weights. The other five of the eight posterior muscles pass behind the ankle, run beneath the bones of the foot as tendons, and are attached to the un-

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der surface of some of the tarsal and metatarsal bones or phalanges of the toes, forming an intricate network of strong tendons that fairly cover the sole of the foot.

The action of a muscle, when it contracts, is to draw nearer together its two points of attachment. It will be readily understood that for the most part those muscles on the front of the leg are for flexing or raising the foot or the toes or both, and those on the back of the leg (the calf) are for extending the foot or the toes or both, or for lifting the body on the toes when standing. Elevation of the inner and outer borders of the foot, side to side, rotary or twisting, and diverse combination motions are also done by all these muscles, but in varying combinations the complexity of which need not concern us here. The muscles on the front of the leg, that raise the foot or toes, are permitted to contract and perform their work without springing forward from the ankle because of a powerful annular ligament which crosses the front of the ankle to bind the muscle tendons down.

There are also a number (twenty) of intrinsic foot muscles—originating in the foot itself,

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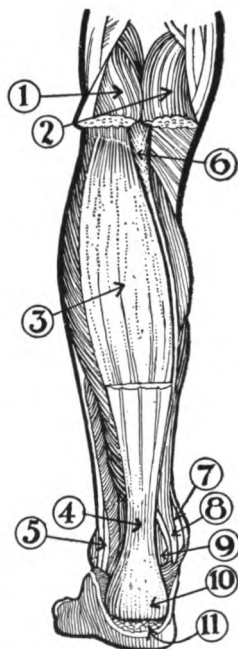
and connected solely with the foot and toes; their action is mainly upon the toes—bending or straightening them or pulling them to one side or the other. One of these muscles is on top of the foot and some are between the metatarsals and phalanges, but the arch of the foot is literally filled with these muscles (also with tendons of some of the calf muscles and with ligaments) so that a pad of some thickness is found at this point. This pad has some slight passive effect in maintaining the arch, but as these muscles contract to produce action upon the toes, especially downward action, they tend to shorten the long arch and raise it.

These muscles mainly, but to some extent the other (extrinsic) muscles also, are capable of unusual training, and they may be to a considerable extent individually trained or trained in specific groups much as can the muscles of the hands and fingers. If one were never to walk upon his feet or to encase them in non-yielding shoes, the independent action of some of the toes could be easily developed. If the feet are not encased, even though they be used to support the body, the independent action of the great toe may be retained, and its

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potential power greatly developed.

Some Australian savages use the grasping power of the great toe to assist in climbing trees, and it is a constant habit with them to pick up fighting weapons (spears) or other objects with the foot. Chinese boatmen are said to use the great toe in pulling an oar, and Nubian horsemen guide their horses by holding the reins with this toe. Even such fine movements as writing, using scissors, or threading a needle have been performed by the great toe by persons who have been born without arms or hands or by those who have lost these early in life; Hindoo tailors very



Superficial layer of muscles of back of leg: 1—Outer head and 2—Inner head of gastrocnemius; 3—Soleus; 4—Tendo Achillis; 5—Tendons of peroneus longus and brevis; 6—Plantaris; 7, 8, 9—Tendons of tibialis posticus, flexor longus digitorum, and flexor longus hallucis, respectively; 10—Calcaneus; 11—Pad of sub-calcaneal fat.

FOOT TROUBLES

frequently do needle work with the toes. Eating, combing and brushing the hair, putting on collar and tie, and similar actions ordinarily done by the hands and fingers have been done regularly and faultlessly by the feet. That our feet are the clumsy things they usually are is due to our barbarous confinement of them in non-yielding, non-porous leather, with stiff soles and hard heels, and heels so high as to jamb our toes still more closely into the narrow end of the shoes and also to shift the pressure of the body weight in such a way as to weaken every structure of the foot, especially the arch and the toes. But we could still retain the greatest beauty and grace of the foot if we gave it more freedom and permitted the anatomical structures to develop and function more nearly normally.

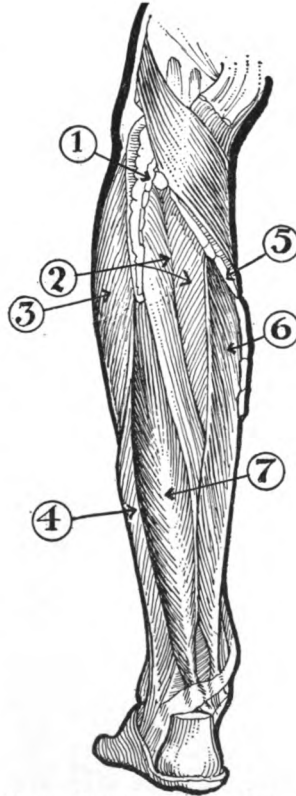
That walking in the erect position is a comparatively recent accomplishment is indicated by the fact that it is learned with such difficulty. The height of the foot arch is by many people considered as a sign of "pure blood"—much as is small size of the ankles; this belief may be well founded since the high arch is one of the indications of complete adjustment to

ANATOMY OF THE FOOT

the upright posture and to moving about in that position.

THE LONGITUDINAL ARCH

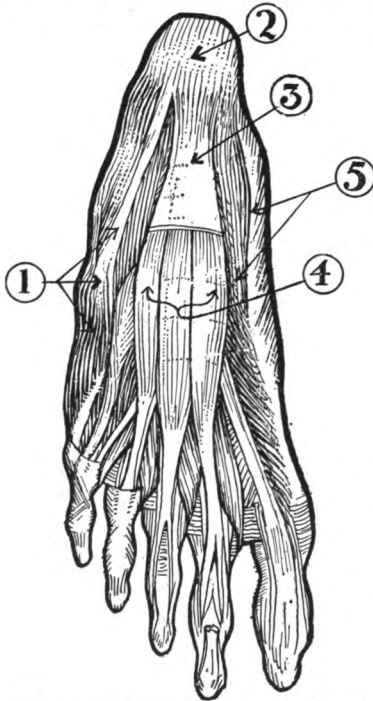
The rear pillar of the longitudinal arch is the base of the heel bone and its forward pillars are the metatarsal-phalangeal joints of the first and fifth toes. This arch is like a tripod, with its back leg (the heel bone) broadened, and its front legs (the roots of the great and little toes) lengthened. Its dome formation is maintained by the bones, ligaments, muscles and tendons. The bones, as I have pointed out, conserve



Deep layer of muscles of leg: 1—One origin of soleus (cut); 2—Tibialis posticus; 3—Peroneus longus; 4 Peroneus brevis; 5—One origin of soleus (cut); 6—Flexor longus digitorum; 7—Flexor longus hallucis.

FOOT TROUBLES

the arch, insofar as possible, by virtue of their shape, size, arrangement and articulation. Every ligament binding the bones of the tarsus together strengthens the arch,



First layer of muscles of sole of right foot: 1—Abductor minimi; 2—Calcaneus; 3—Central portion of plantar fascia; 4—Flexor brevis digitorum, with a tendon to each toe; 5—Abductor hallucis.

some having a more pronounced effect than others. One ligament, it will be remembered, has a number of elastic fibres which enable it to help draw the bones of the arch back into place when weight has forced them apart. Its office, then, is an important one—that of securing the inner portion of the arch at its highest,

ANATOMY OF THE FOOT

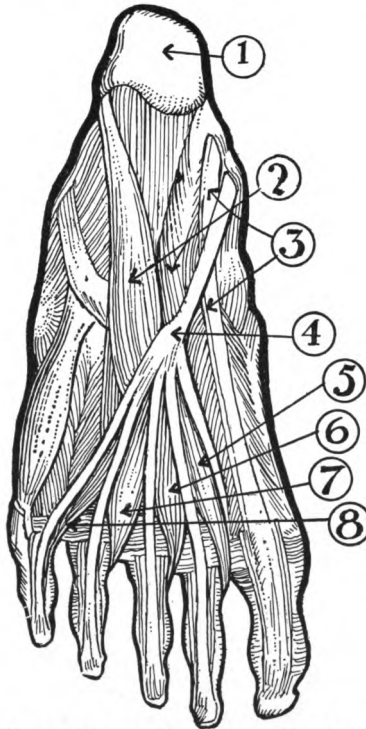
weakest point. This special elasticity, not found in any other ligament of the foot, allows this ligament to function to some extent like a muscle. But the muscles within the foot, and the tendons of the powerful leg muscles which descend into the foot and serve as active binders of the bones, are the chief supporters of the arch.

The muscles on the under side of the foot, being attached to the lower surfaces of the bones, raise the arch when they contract and, when they are well developed, they also act as a check to the flattening of the arch, simply by the interference of their bulk and, to some extent, by their more or less constant tension in some degree.

One of the four muscles arising at the outer forepart of the leg and passing downward in front of the ankle, is inserted into the under surface of the foot—as is the case with no other muscle of this group. As it is attached to the under and inner surface of the internal cuneiform and the base of the metatarsal of the great toe, and as it pulls upward, backward and outward, the tendon of this muscle is an active agent in bearing up the inner portion of the arch.

FOOT TROUBLES

The five muscles which give the most assistance to the longitudinal arch are those descending the back



Second layer of muscles of sole of right foot: 1—Calcaneus; 2—Flexor accessorius; 3—Tendon of flexor longus hallucis; 4—Tendon of flexor longus digitorum; 5, 6, 7, 8—First, second, third and fourth lunbricalis, respectively.

of the leg, entering the foot behind the ankle and passing beneath the bones of the arch, to be fastened to the body of the foot and to the toes. The tendons of two of them, which assist in extending the foot and give the final spring to the step in walking, strengthen the arch particularly at its inner border; while the other three, which are attached to body of the foot,

ANATOMY OF THE FOOT

pull the forepart of the foot downward, draw the ends of the arch together and increase its height. One of these three has an oblique course across the sole and keeps up the central portion or dome of the arch. But the main factor in maintaining this arch is another one of these three muscles, which has two main divisions and smaller offshoots that attach to the under surface of several of the tarsals and metatarsals.

Four bones compose the inner border of the arch, while only two form its outer border. The inner border is more elastic, because of the greater height of the arch, the greater number of joints, and the special ligamentous and tendinous support; but the outer border has greater solidity, because of the slight elevation, the one joint, and the short ligaments binding the ends of this border on the under side.

THE TRANSVERSE ARCH

The transverse arch curves crosswise beneath the ball of the foot. Its two extremities are the forward extremities of the longitudinal arch. This arch is formed by the natural

FOOT TROUBLES

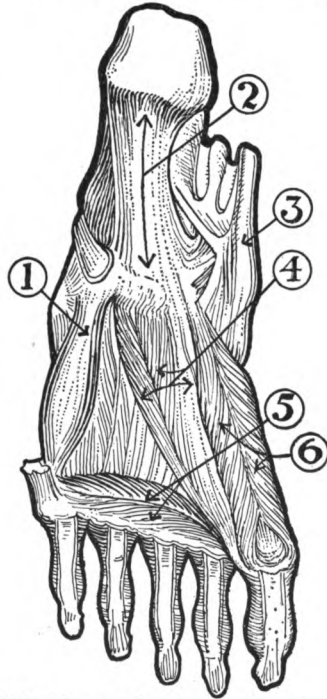
arching upward of the bases of the metatarsals in their articulation with the tarsals, and is preserved by ligaments and muscles. Ligaments bind the involved joints at the sides and beneath, and one ligament connects them all by spreading out beneath the other lower ligaments. The tendons of two muscles of considerable size and strength are attached to the bones taking part in the formation of the arch, and these lend stability to the arch. One foot muscle exerts an oblique inward pull upon the inner side of the base of the great toe. Some of the muscles confined entirely to the foot are arranged so as to pull the metatarsal bones toward each other. These have much to do with strengthening the arch. But the mainstay of the arch is a muscle attached to the distal ends of the metatarsals and the first phalanx of the great toe, running directly across the foot in the region of the arch.

The longitudinal and transverse arches give flexibility to the foot, diffuse shocks, and act as springs. It is lack of these arches that makes the walk of bear or bird so clumsy; it is their obliteration that reduces the locomotion of the flatfooted human to such an awk-

ANATOMY OF THE FOOT

ward performance; and it is their perfection that makes the gait of the normal-footed so graceful and easy. The longitudinal arch gives spring to the first part of the step; the transverse arch, to the second part; and the big toe, to the end of the step.

It would appear, from this study, that the very complexity of the foot mechanism would render it difficult to bring about an approximation to normal in case the foot be damaged, especially in its longitudinal arch. But the natural strength of the parts comes to one's assistance in



Third layer of muscles of sole of right foot: 1—Flexor brevis minimi digiti; 2—Long plantar ligament; 3—Tibialis posticus; 4—Adductor hallucis; 5—Transversus pedis; 6—Flexor brevis hallucis.

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correcting these defects, for with a little daily effort the muscles and ligaments will be strengthened and, toned up sufficiently to draw back into place the displaced bones, and the arches will be restored.

CHAPTER III

Flatfoot—Longitudinal Arch

THE term flatfoot is employed generally to designate not only genuine flatfoot but also many cases of weak foot, where the arch is normal in height or even accentuated during relaxation or rest but during activity assumes a position of arch-depression that endangers the permanence of the arch. For most cases that are now termed flatfoot the term weak foot is preferable, as it is more nearly correct; for it is only in an extreme case of weak foot that the arch is permanently flattened, in rest as well as in activity. Sometimes weak foot is termed “flexible foot” or “flexible arch,” because of the depression of the arch during relaxation. In true flatfoot the arch is obliterated or practically so—for there are different degrees even of true flatfoot—with the imprint of the bare foot showing no thin line at the outer border, as is seen in the imprint of the



Footprints of a flatfoot and a foot with a normal arch (different men). The flatfoot print shows that during rest this foot has a somewhat raised arch. Frequently the great toe print meets the foot print. The flatfoot is the one at the left, the normal foot the one at the right. One can test his own feet by wetting them and stepping on a dry board, or by using smoked glass.

FLATFOOT—LONGITUDINAL ARCH

natural foot with normal arch; in fact, there may even be a wider impression made by the middle of the foot than is made by the toes, which are normally the widest portion of the foot.

Causes of Flatfoot. Regular alternation of complete rest and utmost contraction is needed to develop fully a muscle. Now the elevation of the longitudinal arch, as I have already pointed out, is due partly to the special articulation of the tarsal bones and the inert binding of the ligaments, but chiefly to the active binding of the foot muscles and the tendons of the leg muscles. Then the main causes of flatfoot must consist of anything that weakens these muscles or conflicts with their free action and normal development.

The wearing of shoes that prohibit the most extensive use of the foot and leg muscles is the prime factor in the production of flatfoot. Shoe heels raise the heel above the level of the ball of the foot, permanently extending, to a greater or lesser degree, the foot upon the leg. Thus the soleus muscle which takes care of the first part of lifting the body is never wholly utilized and the lower leg cannot be complete-

FLATFOOT—LONGITUDINAL ARCH

cause of its greater height and because of its diminutive base as well, is a more potent factor in enfeebling the arch. A high heel is always one with a narrow under surface, for a high heel with the same circumference all the way down would be a monstrosity from the standpoint of beauty. Such a heel not only lessens to a great extent the action of the foot extensors, but it imposes a strain on the tibial and peroneal muscles to which they would never be subjected on the roughest roads in heelless shoes. The wobbling induced by high heels stretches and relaxes these muscles and has a tendency toward extension of the lateral ligaments and sidewise displacement of the bones. Decreasing the length of the heel increases the distance between the back and front piers of the arch and puts more stress on the bones, ligaments and muscles involved; while decreasing its width diminishes the lateral stability of the foot and leads to outward toeing in standing and walking.

Narrow shoes shorten the space between the two forward piers of the arch and transform its natural, triangular base into more of a parallelogram with a consequent reduction of

FOOT TROUBLES

ly developed. When the heel is constantly elevated none of the extensors of the foot nor the flexors of the toes, which sustain the arch, can entirely relax; and none of the flexors of the foot nor the extensors of the toes can fully contract; though this is of no importance in its direct effect upon the arch it is of considerable importance indirectly through its interference with the normal antagonism of the opposing sets of muscles. Of these two sets of muscles that should equally antagonize each other when the foot is at rest, one set is always partially contracted and the other always a little stretched, which results in weakening of both.

The arch is impaired by any heel, no matter how low, because it hinders full action of the foot extensors, the tendons of which pass beneath the arch and provide its main support; and the higher the heel, the greater the impairment. Though a foot-covering such as the sandal or moccasin must be regarded as the ideal, the comparatively low heel of the man's ordinary shoe would not be sufficiently detrimental in itself to break down the arch. But the heel of the woman's fashionable shoe, be-

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pedal equilibrium which disposes toward outward toeing.

The lengths of the great and little toes may be regarded as prolongations of the front pier bases of the longitudinal arch, and if the great toe turns slightly outward as it does in the unrestricted, natural foot, and the little toe is not deflected from its normal alignment, these toes add considerable stability to the arch. Pointed shoes, as well as those that are too short, force the outer toes toward each other, reduce the steadiness of the arch, and incline toward deviation of the feet from their parallel position.

High heels and narrow, pointed or short shoes all necessitate spreading the forepart of the feet apart to broaden the body's base of support and thus preserve its equilibrium. Now walking in this unnatural manner prohibits full extension of the foot, with reduction of action of the extensor muscles, the chief upholders of the arch. In performing the step, in this type of walking, the weight is rolled along the inner border of the foot and not largely along the outer border as it is in the parallel-footed walk; instead of standing se-

FLATFOOT—LONGITUDINAL ARCH

curely on its three piers the arch is tipped up on two of them, the rear and inner forward ones, and weight is thrust upon the inner, weaker section of the arch that should be borne by its outer, stronger part. Continuous outward deflection of the feet results in permanent contraction of some of the muscles and in constant lengthening of others; while constant eversion of the foot has a similar effect on other foot and leg muscles, one of which is one of the mainstays of the inner region of the arch.

As emphasized in Chapter II one muscle (the *tibialis posterior*), passing beneath the inferior calcaneo-navicular ligament which supports the talus at its head where there is no bone beneath to uphold it, constitutes the main strength of the longitudinal arch. When this muscle is weakened this ligament elongates and permits the head of the talus to fall forward, downward and inward, which establishes the condition known as flatfoot. Now high-heeled, narrow, pointed, short shoes tend toward splay-foot and enfeeblement of this muscle, and the eversion associated with splay-foot encourages inward displacement of the

FOOT TROUBLES

talus (sometimes called the astragalus).

Such shoes and such walking, moreover, injure the plantar muscles of the foot, which heighten the arch with their tension and buttress it with their bulk. Narrow, pointed shoes which force the great and little toes toward each other permanently stretch the abductors and permanently contract the adductors, never permitting free and full action of either; and walking with the toes outward in conjunction with inward bending of the great toe tends toward completion of the step with the ball of the foot and instead of with the tip of that toe only. In a shoe which bends the great toe out of its alignment and turns the foot outward, the small toes are scarcely used at all and the great toe is not properly employed at the end of the step so that the five muscles or sets of foot muscles concerned in flexing the toes begin to atrophy. And anything that restrains action of the toes detracts from the power of some of the leg muscles which are not only flexors of the toes but also extensors of the foot, and in both capacities guardians of the arch.

Many muscles of the foot, and two of the

FLATFOOT—LONGITUDINAL ARCH

leg are attached to the great toe. Hence any kind of shoes that prevents the free movement of the great toe from side to side or its full flexion and extension or any pressure that forces it out of line with the first metatarsal bone is a poor shoe. Such shoes necessitate a style of walking that fails to roll the weight squarely along its length. Properly speaking the step should end at the tip of the toe.

An arch supporter, unless worn temporarily in severe cases of dropped instep, is one of the predisposing causes of flatfoot. The muscles, especially the tibialis posterior and the flexor longus hallucis, if amply developed, are capable of upholding the arch under much more weight than that of the body, and no prop of the nature of an artificial arch support is necessary. As the body's weight bears down upon it, the normal arch flattens against the resistance of the muscles, lengthening the foot and giving spring to the step. By intercepting this lowering of the arch and this exercising of the muscles, a brace weakens the arch and reduces the foot's resiliency. A mechanical device of any kind is objectionable, but one made of flexible steel which permits some elasticity



A case of moderate degrees of flatfoot, the right slightly more affected than the left, but both extremely painful. Note lack of leg development, from failure to rise on toes in walking. Note also the inversion of the ankles.

FLATFOOT—LONGITUDINAL ARCH

of the arch, is less so than the ordinary, unyielding product. But the most serviceable and least objectionable supports are those made of sponge rubber, encased in durable but soft leather. These permit of considerable action of the foot muscles—in fact they make some such action necessary; therefore they are to an appreciable extent corrective, and have no tendency to weaken further the arch and foot muscles. Though rarely recognized as such, the average shoe with its stiff shank is not only a foot covering but also an arch supporter.

Standing, which does not furnish the alternate relaxation and contraction that strengthen, tone and enlarge the muscles but rather strains them by compelling an unrelieved tension, may be another cause of flatfoot. If this standing is prolonged, and is done in shoes that require outward toeing to secure the body's balance, the strain is more unnatural and harmful.

The change from quadruped to biped was obviously more detrimental in connection with standing than in relation to walking. There is much less difference in the comparative locomotory power of the horse and the man

FOOT TROUBLES

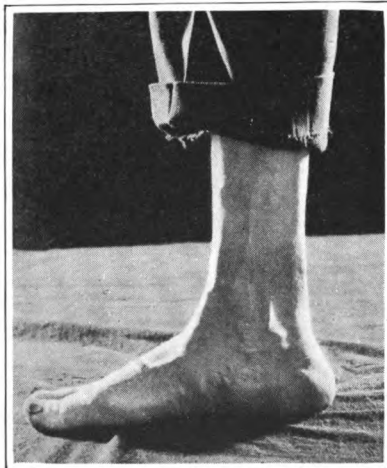
than there is in the standing capacity. A horse will stand all day voluntarily; a man, not over fifteen minutes. The quadruped, which is supported like a table, expends very little muscular effort in standing, but man uses up a tremendous amount of muscular force and nervous energy under the same condition. The human is naturally either a sitter or a mover, not a stander. Standing for long hours daily tends to weaken the arch directly through its effect on the muscles and indirectly through its drain on the general vitality.

Obesity, especially in those cases where the excess flesh has been acquired suddenly, frequently tends to break down the arch. In such instances, however, laxity of the muscles is in reality the principal cause of the trouble, because an arch sustained by fully developed muscles can easily carry many times one's normal weight without becoming flat. And the same holds true of porters, mailmen, moving men, baggage smashers, soldiers, etc., whose duties require the bearing of burdens. If one's muscles are normal and the weight of the burden is only gradually increased, he cannot lift or carry anything that is heavy enough to in-

FLATFOOT—LONGITUDINAL ARCH

jure his arches. The foot will not give way under any reasonable load imposed upon it, any more than will the hand, if it is not deformed and weakened by atrocious shoes and lack of sufficient exercise.

Long walks, especially if one is overweight or carrying packs, not prepared for by shorter walks gradually increasing in length, may overtax the muscles and induce flatfoot. And such walks in shoes with flexible shanks and low heels, when one has been accustomed to the ordinary rigid shank and high heels, will be more likely to flatten the arches because the weakened muscles are not equal to the arduous and prolonged task



The right foot that was shown in the previous illustration. The instep is low, arch moderately flat, heel prominent behind, and the entire foot fairly rigid and very painful.

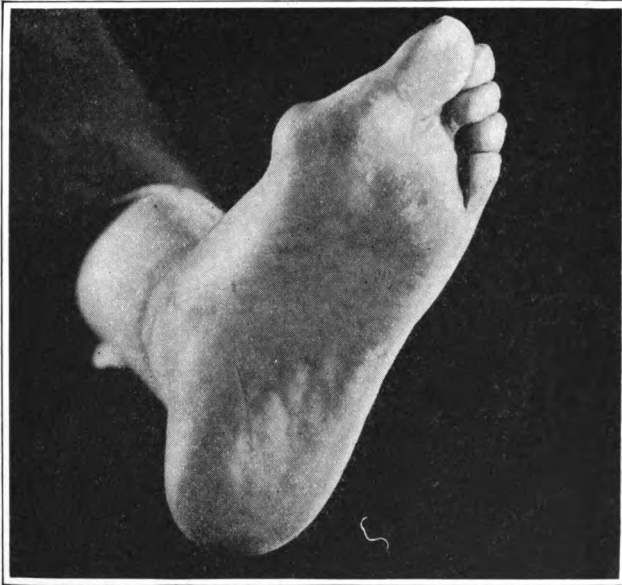
FOOT TROUBLES

forced upon them of holding up the arches.

But, while many cases of flatfoot are the result of strenuous exercise begun abruptly, in most cases it is the result of too little exercise rather than too much. Tight, uncomfortable shoes, which are tighter and more uncomfortable when the weight of the body expands the feet, discourage pedestrian activity. The purchase of a cheap automobile converts millions of walkers into riders, the phenomenal growth of the moving picture industry supplies millions with inexpensive, sedentary amusement, and for other millions the radio brings entertainment right into their own houses. Though one realizes something of the value of walking, an automobile ride or a radio program which gives him a sense of conquest of space, or a motion picture show which provides him with a feeling of dominion over space, time and human nature, appeals far more to his imagination than slow progression on his own legs for a short distance from his own home. The average person who has only a limited amount of leisure will not find time for walking in addition to automobiling, the radio, and the movies, and these modern

FLATFOOT—LONGITUDINAL ARCH

inventions are a menace to foot strength for all but the thoughtful.



The sole of the bunioned foot shown in the illustration immediately preceding. The second toe will be observed almost hidden above the great toe. The smoothness of the sole denotes lack of muscular action of the foot.

Health of the foot, which is supplied with blood and nerves as other parts of the body, must depend upon the condition of the circulatory and nervous systems, which in turn depend upon proper diet, adequate elimination,

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sufficient general exercise, etc. The persons most inclined to flatfoot are those who, in addition to wearing disfiguring shoes and neglecting foot exercise, break the laws governing health of the body as a whole. In the average individual wrong diet, overeating, insufficient exercise, too little water, not enough sleep, overwork, fear of cold air and cold water, the use of stimulants and drugs, and many excesses and abuses that sap the vitality, enervate the entire body, including the feet.

Symptoms of Flatfoot. One of the first symptoms of a tendency toward flatfoot which the patient may note after an amount of standing or exercise that has previously caused no discomfort is pain in the region of the arch and ankle which may extend to the calf, knee, thigh and hip. He experiences an unfamiliar coldness, numbness and congestion of the feet due to pressure of the falling bones on the blood vessels. He turns his feet far outward because that is the easiest way to walk when there is difficulty in rising on the toes. He cannot walk far and cannot run at all, and as the lowering of the arch becomes more pronounced, the range of the foot's motion slowly

FLATFOOT—LONGITUDINAL ARCH

decreases while the unused muscles stiffen, making every step painful. The foot flattens, lengthens and loses its function as spring and lever, producing the shuffling, dragging gait characteristic of the flat-footed.

Habits that are symptoms of flatfoot or are prone to produce it are wearing the heels off on the inner edge, rolling the foot inward and splay-footed walking. In severe cases the inner border of the foot touches the ground from heel to toe instead of clearing the ground beneath the arch as it does in the normal foot. Making impressions of the bare foot on smoked paper will clearly indicate to what degree the arch has fallen. In an advanced case the whole region between the ball of the foot and the heel, which should be arched, will leave its impression on the smoked paper.

Correction. The first essential in the treatment of flatfoot is to discard the shoes that have marred the feet and weakened its muscles and to secure shoes that will permit the foot and toes to assume their natural position. Such a shoe must be straight on its inside border and it must be straight far enough forward on its outside border to avoid any pressure on the

FOOT TROUBLES

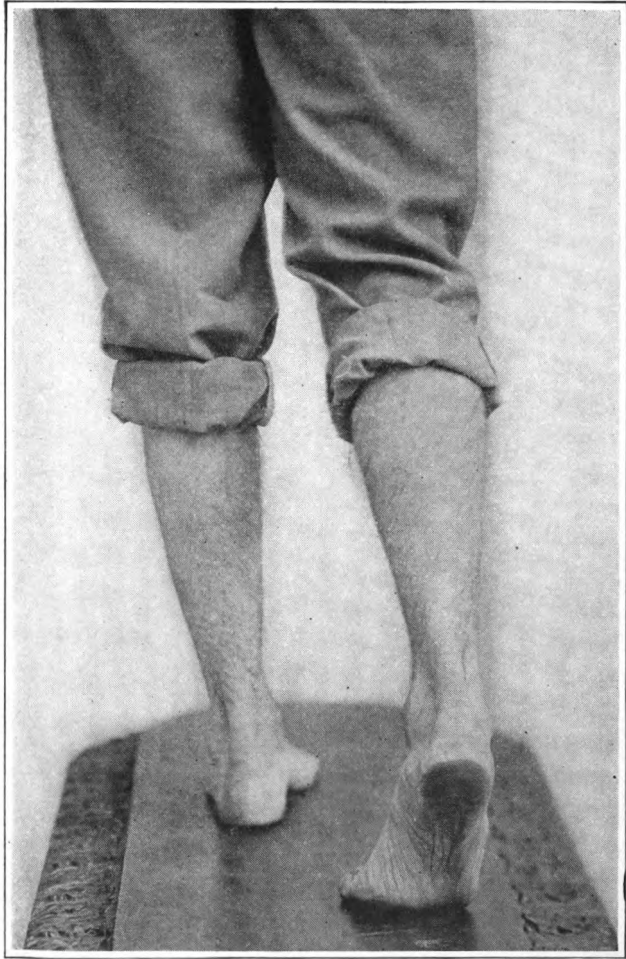
ends of the lesser toes. In order that the numerous muscles attached to the toes may be used most effectively, the toes should not be forced away from the straight line which they naturally form with their metatarsal bones and they should have room to touch the ground and bend without interference with each other, i. e., a shoe should have sufficient width at its forepart to prevent any crowding or cramping of the toes. It should be long enough to obviate any pressure on the ends of the toes when the foot is elongated by the full weight of the body upon it, and its cap should be high enough to prohibit any bearing down on the toes from above. The base of the shoe heel should be fully as large as that of the bare foot, and the lower the heel the better. The shank of the shoe should be flexible—should do no work for the arch at the expense of enfeebling the muscles, which are capable of keeping it elevated without assistance. It is advisable, however, to lower gradually the heels and only slowly to increase the distance walked in shoes with flexible shanks, as sudden and full use of the untrained extensor muscles for a prolonged period may further weaken them and defeat

FLATFOOT—LONGITUDINAL ARCH

one's purpose. Persons with normal arches, who have been wearing the ordinary shoe with a rigid shank and attempt long walks in shoes with flexible shanks and soles, will develop pains in the arches. They may cast aside their new shoes on this account, though gradually lengthening walks in such shoes are just the thing to strengthen the muscles supporting the arch.

In walking to correct flatfoot one should keep the toes straight ahead, because this way of progressing places no unnecessary strain on the weaker inner section of the arch and permits the fullest possible development of the muscles maintaining the arch. The weight is rolled mainly along the strong, outer region of the foot, crosses the ball and continues squarely along the great toe to its tip. In this way only can that important leg muscle, the flexor hallucis longus, and the foot muscles attached to the big toe be fully utilized; only when the feet are parallel can the foot be completely extended and that foremost sustainer of the arch, the tibialis posterior, be suitably exercised.

If one will give constant attention to the



Correct walking—toeing forward. At the end of the stride the entire transverse arch receives equal weight, and the lift of the heel exercises the longitudinal arch



Incorrect walking. It places abnormal strain upon foot muscles and ligaments, thus tending toward weakness of the arch and production of painful arch or flatfoot, or both.

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position of his feet, toeing directly forward—a habit worthy of immediate cultivation—will soon become automatic. Walking in the proper shoes in the right way is the most important of all exercises for strengthening the feet, not because it is the most effective but because it is the most universal in its application and the most pleasant to practice regularly. Walking is a comparatively mild exercise which may be continued for some time with particular benefit to heart, lungs and skin, as well as to the feet; it takes one into the open air; and it establishes new points of contact with the earth and its inhabitants. While special foot exercises are stationary, monotonous and will-taxing, walking is mobile, varied and imagination-provoking.

Better than walking in the most perfectly-fitting shoes is walking with no shoes at all. Bare-foot walking permits the freest, fullest use of all the muscles of the foot and leg and does away with all pressure, friction or irritation—which is present in some degree even in the most satisfactory shoes obtainable; it admits the healing air between the spreading toes; and it allows the sole to touch the regen-

FLATFOOT—LONGITUDINAL ARCH

erating ground. None except those who go bare-footed frequently can know what a foot-strengthening experience it is.

Though one who has worn sensible shoes and has walked correctly from babyhood will need no special foot exercises, such exercises are of great benefit to those with weak or fallen arches. The following exercises are designed to strengthen the principal muscles concerned in upholding the arch by using them to their greatest possible extent.

1. Stand with the feet parallel. Turn the toes inward and raise the heels as high as possible. Lower the heels slowly and return the feet to their original parallel position. Repeat, avoid more than mild fatigue.

2. Stand with the feet parallel. Raise heels as high as possible, lower, and then raise toes as high as possible so that the weight is balanced on the heels; lower toes. Repeat.

3. Stand with the feet parallel. Turn the toes inward and bend the ankle, raising the inner edges of the feet and shifting the weight to the outer edges. Lower the inner edges of the feet and return to parallel position, and repeat.



Correct standing position. The feet are parallel, toes straight ahead. Separation of feet stabilizes the body, and makes toeing-out unnecessary.

FLATFOOT—LONGITUDINAL ARCH

4. Stand with the feet parallel. Rise on the toes. Move heels away from each other as far as possible. Then bring them toward each other until the feet are parallel, and repeat.

5. Stand with the feet parallel. Raise toes as high as possible, turn them inward as far as possible and then outward until the feet are parallel, and continue.

6. Cross the legs while standing so that the weight is borne on the outside edges of the feet. Shift the weight from side to side, bearing the weight on the full sole of one foot and then on the other.

7. Secure a block of wood that is about four inches high. Stand on the edge of this block on the toes, the heels over the edge on the floor. Then rise as high as possible and slowly descend to original position. Do this several times.

8. Stand on the edge of the block of wood on the toes. Describe circles with the heels, both heels circling in the same direction and then in opposite directions.

9. While seated in a chair turn the feet far outward. Reach down and place your hands on the inner sides of the toes. Now bring the

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toes inward against the resistance of the hands.

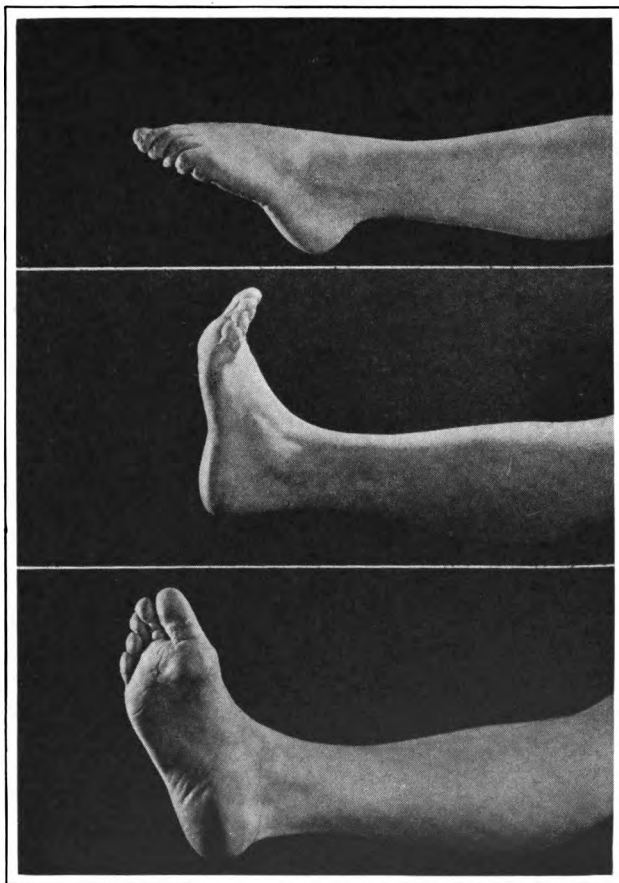
10. Seated in a chair with the toes elevated as much as possible, grasp the toes and ball of the foot securely with both hands. Extend the foot downwards and inwards against the resistance of the hands.

11. Lie on your back on a couch, with your feet turned far outward. Have another person grasp one of your feet on the inner, forepart. Now turn the foot inward against the resistance of the operator.

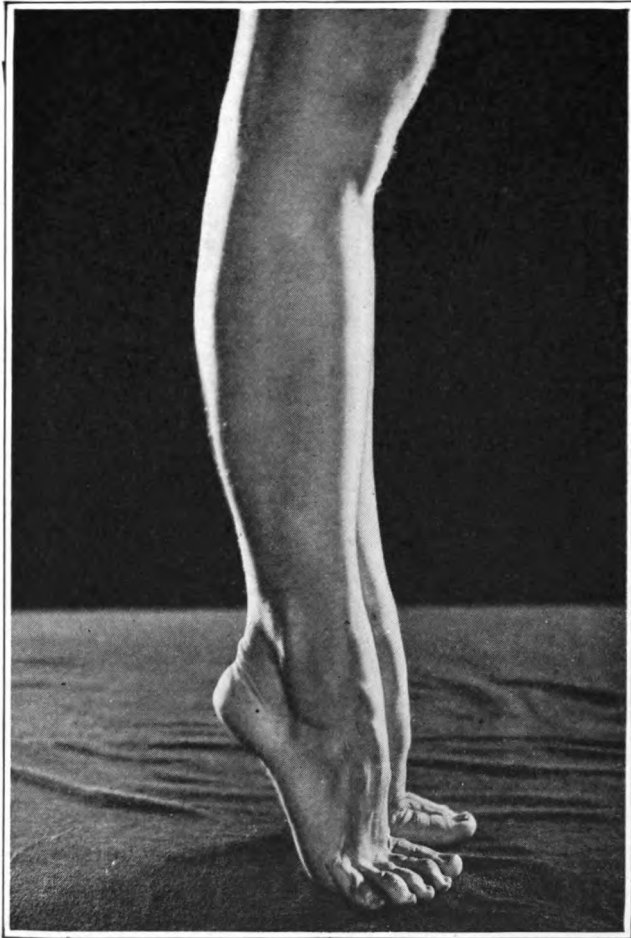
12. Without shoes or stockings walk about the room on your toes, with toes directly to the front, and also turned inward.

Exercises 1 to 8 may be made more strenuous by performing them with one foot at a time or by doing them while holding a weight, or still more strenuous by taking them on one foot while bearing the weight. Mountain-climbing or walking up two stair steps at a time are excellent exercises for the extensor muscles, increasing the ordinary range of extension of the ankle while bearing the weight of the body as does Exercise 7.

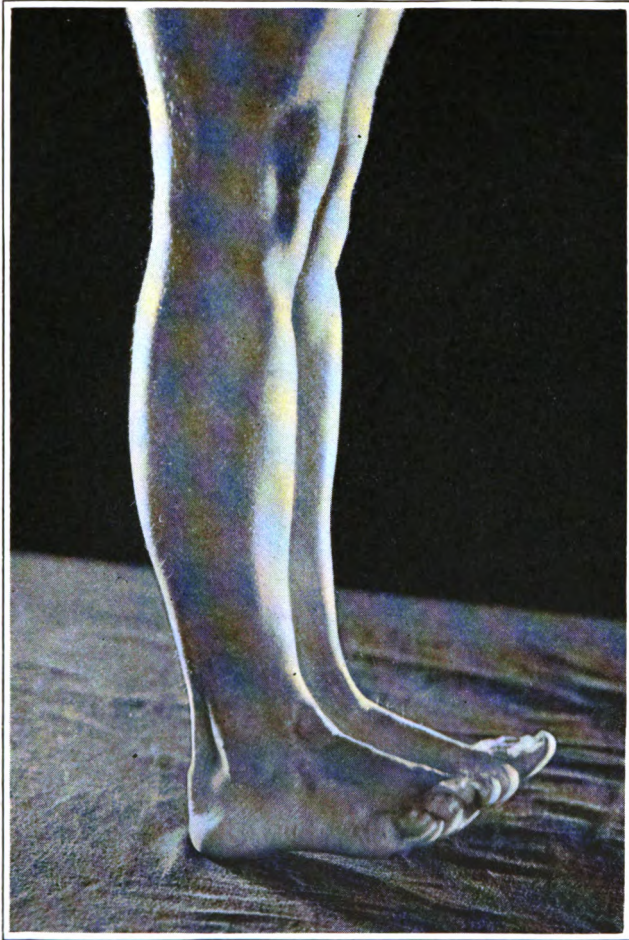
Since the abduction and eversion of the flat-footed standing and walking positions have



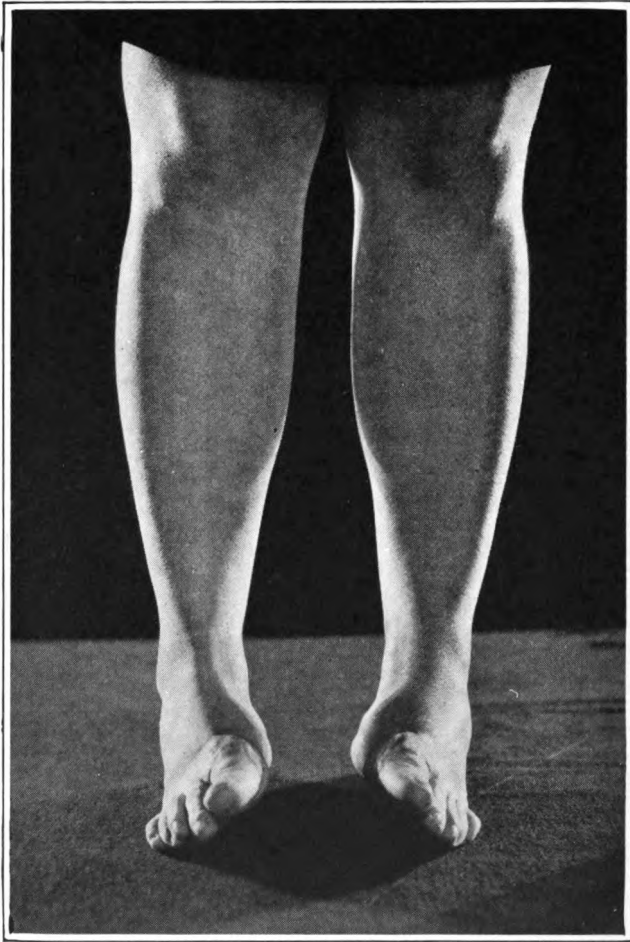
Lying down, or with the leg resting on a bed or couch, or merely with the leg held forward while seated, extend the toes as far as possible, then elevate as far as possible; also turn the sole inward and outward to limit of motion.



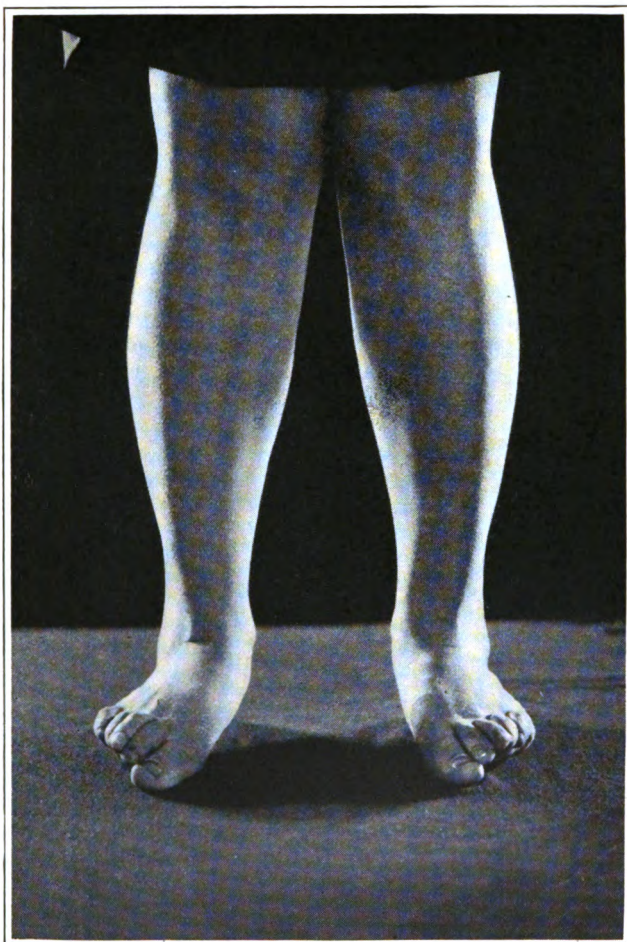
Raise the heels as high as possible, lower and repeat until the arch is only very slightly tired. Note that the toes are close together during the exercise.



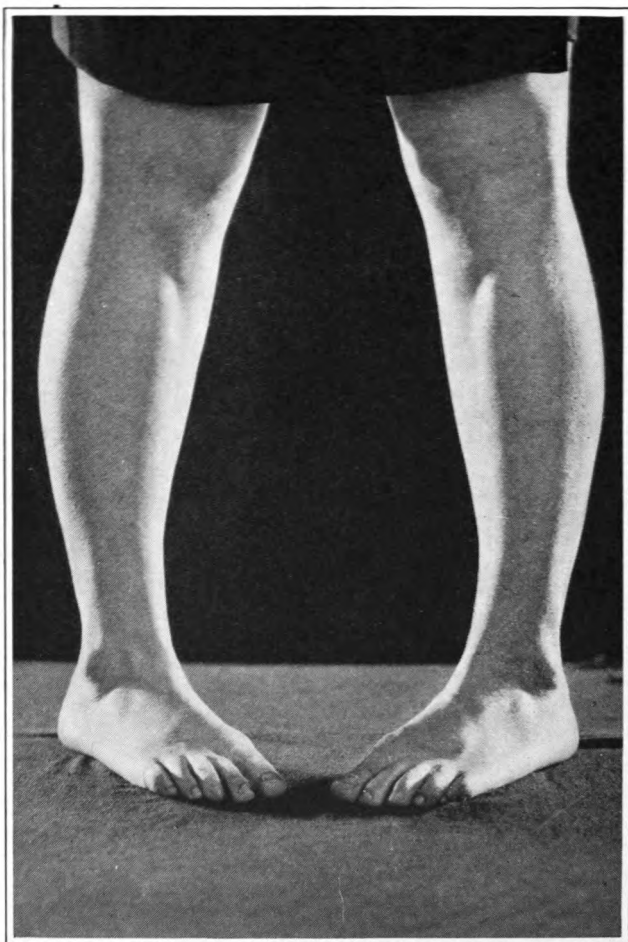
Raise the toes as far as possible; lower and repeat forty to fifty times. The hips may be swayed back to secure a slightly higher elevation of toes.



Starting with feet parallel, raise the inner borders as high as possible, and repeat fifty times. Also the illustrated position may be held and the ligaments slowly stretched.



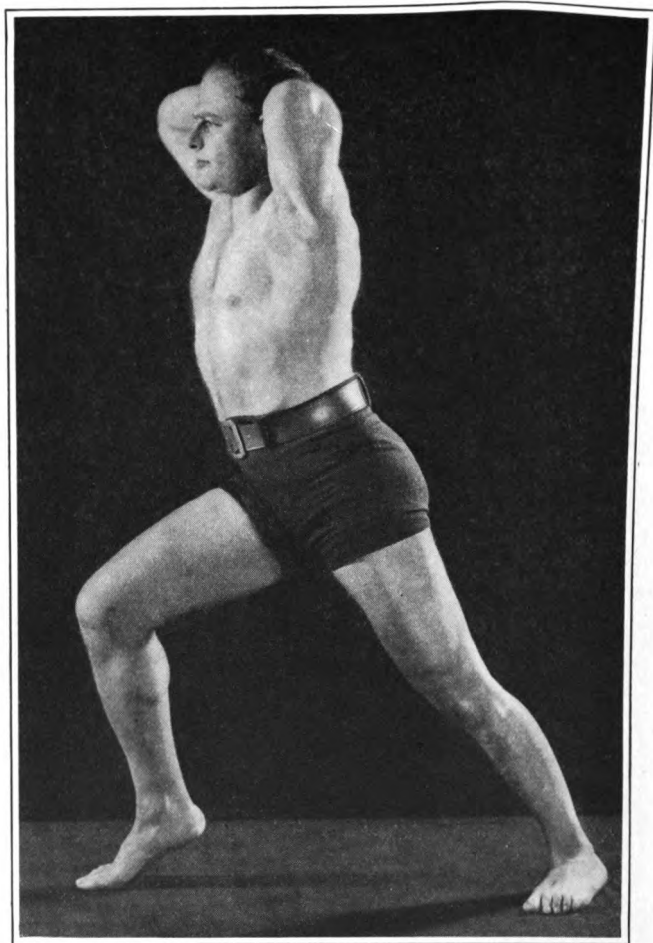
With feet parallel but several inches apart, raise the outer borders of the feet. Not much elevation will be possible, but the muscular effort is a valuable exercise.



Starting with feet parallel, raise the heels slightly, and quickly move them far outward; bring them together and repeat until slightly tired. (Note the tibialis anticus muscle development.)



Starting with feet parallel and close together, slightly raise the toes and move them far outward; bring them together and repeat. Put weight on balls of feet at each end of the movement.



Start in position shown, bend forward knee and raise heel of that foot. Repeat, then change foot positions and repeat. Lunge forward as far as possible for this exercise.

FLATFOOT—LONGITUDINAL ARCH

kept the tibial muscles lengthened and the peroneal muscles shortened, walking pigeon-toed about the room on the outer edges of the feet is a splendid counteractive drill. Repeat several times, resting when fatigued.

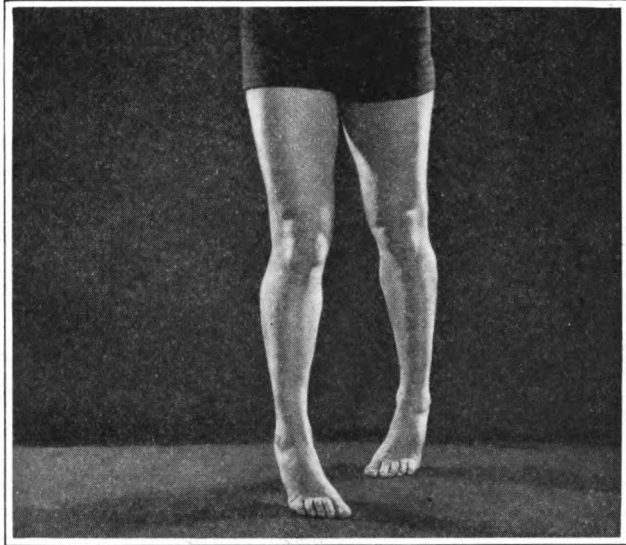


Walking about the room on the outer margin of the feet. Stockings, or gym or dancing shoes may be worn, but have foot freedom. Walk forward and backward.

Another valuable exercise is to walk about in such a manner as to utilize the muscles as

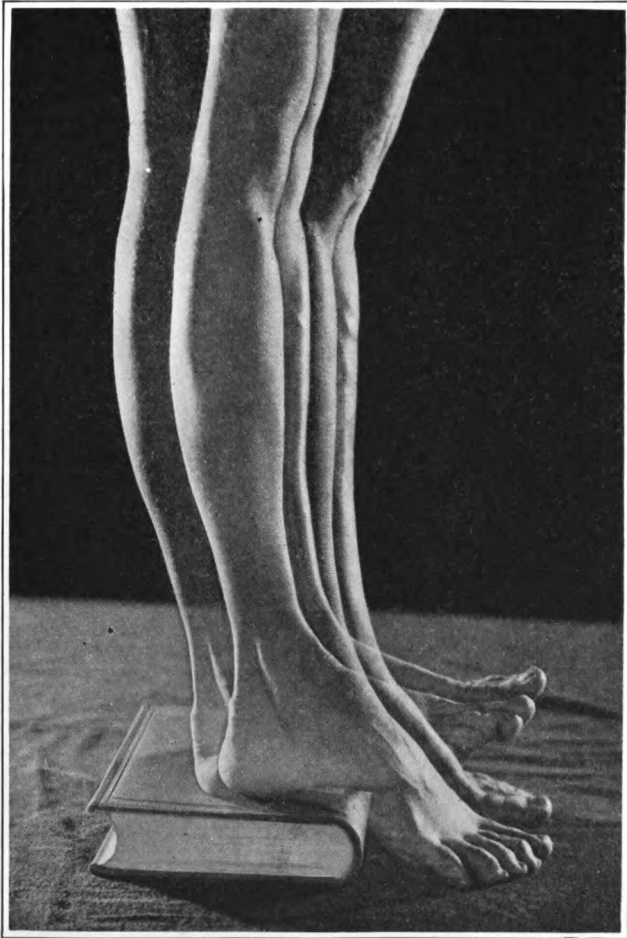
FOOT TROUBLES

fully as possible, i. e., rise on the toes as high as you can before each foot leaves the ground, and then raise the leg well, bending the knee

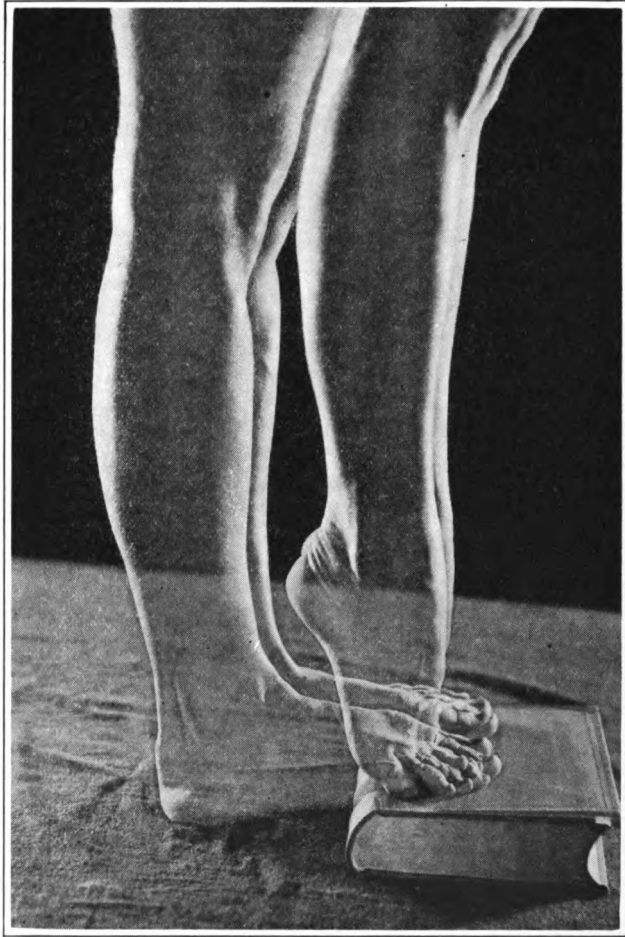


Walk forward and backward on toes, toes in, heels out, fifty steps. One may stop occasionally and raise and lower heels in stationary position; also cross one foot over another, keeping toes in same position.

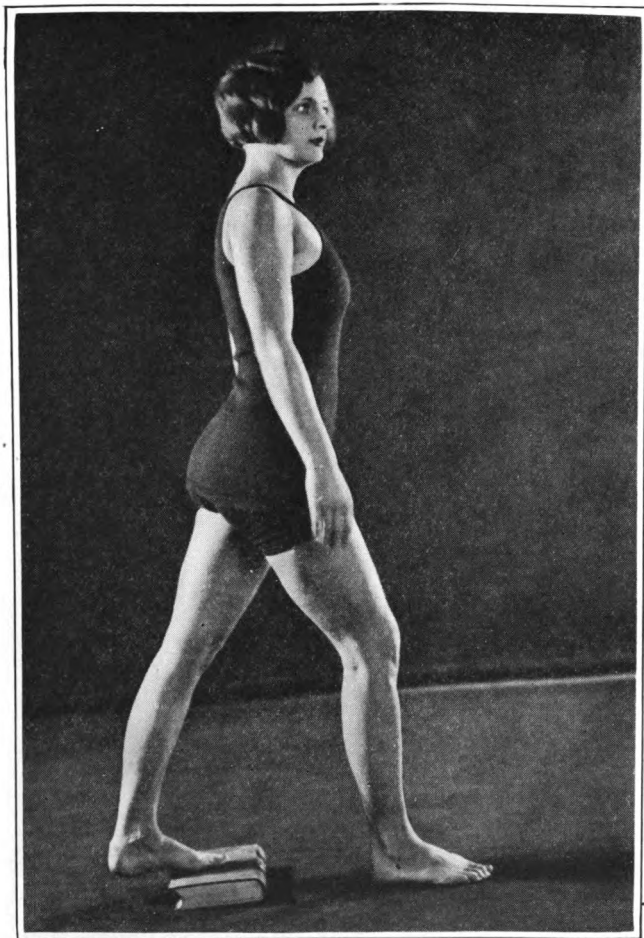
and at the same time flexing the foot to its utmost extent—the knee-bending being similar to the caricatured “clod-hopper” stride.



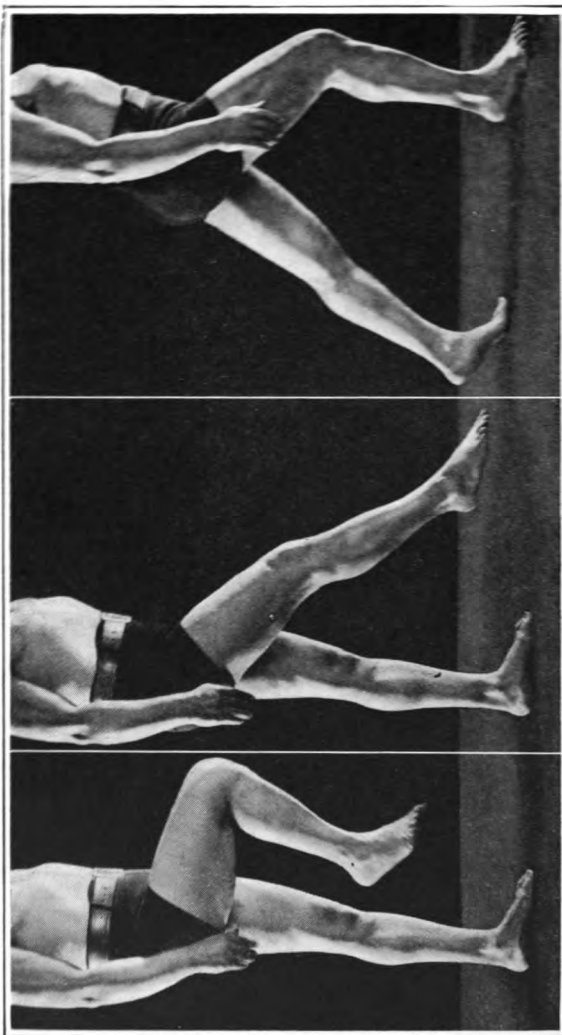
Showing clearly an excellent exercise, raising and lowering toes while standing with heels on a two-inch book or block. Have edge of book at middle of arch.



Standing with edge of two-inch book or block slightly forward of arch center, raise and lower heels. Take care not to strain. Use thinner block at first.



With right foot to rear and left arch on book or block, take a step forward, keeping left heel on floor as long as possible. Repeat and reverse.



To rest and strengthen the feet. With toes forward, raise the knee, then stretch toes downward and step forward, the toes touching floor before heel touches. Walk about room in this manner fifty or more steps.

FLATFOOT—LONGITUDINAL ARCH

Any of the exercises described can be taken whenever convenient during the day, but it is well to have a definite time or times for taking those which are specially indicated in your case in order to see that they are done. If no definite time is adhered to one may be inclined to neglect them. Special exercises should be taken at least twice per day but they can be practised whenever one thinks of them, if care is observed to avoid overdoing as described below. A few minutes' service at frequent intervals is generally better for the feet than a half-hour's exercise once or twice a day.

No exercise should be continued beyond the point of a slight fatigue or it will do harm rather than good. One should aim to increase the strength of the muscles by beginning with a small amount of light exercise and gradually augmenting its quantity and vigor. Pain or strain is evidence of over-exertion or of exercise not adapted to one's present condition. When one has discovered the error of his ways, too much enthusiasm in the adoption of restorative measures is the rule. The exercises just described, if taken up sanely, will be satisfactory in cases of weak arches or partially fallen

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arches, but they will be too strenuous at first for severe cases of flatfoot.

When the muscles have lost their strength, the ligaments stretched and the bones considerably displaced, it is obvious that something more than corrective footgear and exercises are required to restore the arch to its primitive or normal condition. In such cases a temporary arch supporter of some kind will be necessary.

Obtain a roll of zinc-oxide adhesive plaster one and one-half inches wide and five yards long, divest the foot of shoes and stockings, place it in the position known as pigeon-toed and apply the plaster as follows:

The first strap starts over the outer ankle bone, passes down the outside of the foot, under the foot at the front half of the heel, up over the inner ankle bone and up the inner side of the leg.

The second strap starts over this one, but one inch further front, so that it overlaps the first strap by a half-inch. It then passes down the outer edge of the foot under the arch, up over the instep, and is then wound spirally around the leg.

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A third narrow strap is placed around the leg circularly, just above the ankle, for the purpose of fixing more firmly the first two straps.

Every fourth night the straps should be removed, the leg bathed in salt water, well dried and well rubbed with alcohol. The straps should be dispensed with for a day and then fresh straps should be applied.

At each successive application the straps should be pulled up somewhat tighter than before, thereby inverting the foot more and hence lifting up the arch. When there is much hair upon the leg, it is well to shave it off. This will insure less discomfort when removing the straps, but alcohol or benzine will quickly loosen the adhesive.

The straps should be discarded completely as soon as possible, not only because they interfere to a certain extent with the circulation, but to prevent the feet and ankles from growing to depend upon them.

Or instead of the adhesive tape, an adjustable arch supporter, such as is now on the market, may be used. One lifts the depressed arch only a very little at first and gradually raises

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it more and more, as the foot accommodates itself to the change, by periodically increasing the elevation of the adjustable supporter. But such artificial heightening of the arch cannot be of any permanent value unless the muscles are slowly strengthened and the device eventually discarded. For this reason the very flexible muscle-building arch cushions of sponge-rubber may be recommended to those who require some sort of a brace until the muscles are able to raise and support the arches.

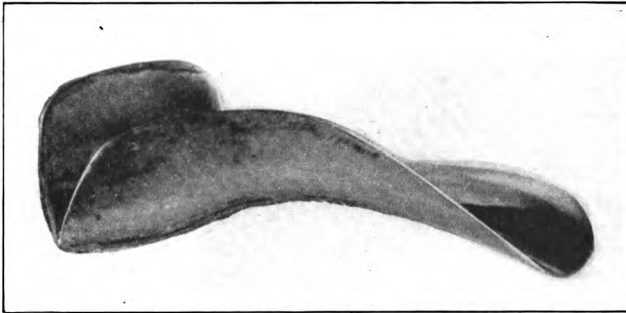
An osteopath or naprapath, through local manipulation, can be of considerable assistance in restoring the displaced bones to their former position.

Where there is a tendency toward elevation of the outer edge of the foot from inward rolling of the ankle, building up the inner edge of the heel with an extra strip of leather which is about one-fourth of an inch thick and gradually tapers off until it is as thin as possible at the center of the shoe, will help to lift the arch. If the heel is allowed to wear down on its inner border, the weight is thrown more

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and more on the inner margin of the foot.

When flatfoot is developed in persons whose work necessitates standing for many hours or carrying burdens for long periods each day, they should change to sedentary employment or, if this is impossible, they must take a vaca-



This solid metal support was "made to measure," and it is a perfect support, but by its very support it weakens the arch. It is very heavy, weighing almost one-half pound.

tion of several weeks. The relaxed tendons of the extensors and of the tibialis anterior require rest to restore their original length and tone before considering means of invigorating the muscles themselves. In many instances, however, it will be possible to take the foot exercises already described, while one is at

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standing work. Since it is standing comparatively motionless that causes many cases of flatfoot, rising on the toes and on the heels and walking on the outer margins of the feet and in the accentuated pigeon-toed position, even if only for a few seconds several times a day, will tend to correct the trouble or to prevent it if threatened.

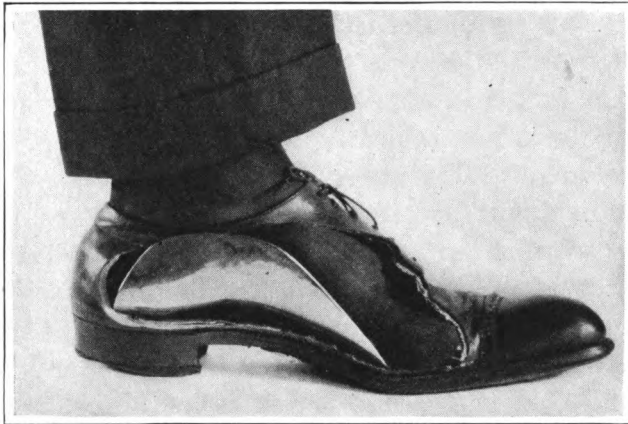
Since strenuous exercise of any kind would simply tend to level the arch again after raising it by mechanical methods, we recommend for such cases, at first, only the mildest form of exercise. While seated in a chair, the patient crosses his knees and exercises the free foot by raising the toes upward and inward, extending the foot downward and inward, rotating the foot, flexing the toes, and lifting them as high as possible.

After the muscles have been strengthened to some extent by these light exercises, the patient sits in a chair with his feet resting on the floor parallel to each other. In this position with only the weight of the legs on the feet, he takes the exercises prescribed for weak or partially flattened arches; later he does them in a standing position supporting some of his weight on

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a chair or table; and finally he takes them with the full weight of his body on his feet.

It is always preferable to go through these special exercises without shoes or other footwear to allow the fullest and freest play of the muscles and to give the feet a helpful air bath.



Illustrating the fit of the metal arch support in the shoe. This kind of a support prevents the muscles and joints from moving more than a fraction of their normal range of motion. This weakens the arch and makes the support permanently necessary.

Shoes made of leather, which is more impervious to light and air than any other covering of the body, prohibit normal action of the

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skin; shoes, because they are stiff and fit snugly even though they are not too tight, obstruct the circulation. So shoes at their very best must be detrimental to the feet. Though foot-gear cannot be discarded in any civilized community, cold foot baths daily and going bare-footed frequently will offset to a considerable extent its harmful effects.

Bathing the feet in cold water will improve the circulation and restore tone to the skin. The foot bath should range from a half minute to three minutes in length, depending upon the coldness of the water and the vitality of the individual. Soon after the bath the feet should be warm and rosy, and if they are not the bath has been too long or the water too cold. Should there be any difficulty in obtaining prompt reaction from the cold foot bath, alternate hot and cold baths, three minutes in the hot and one minute in the cold, making two changes, are preferable. An excellent tonic foot bath is in flowing cold water not over one inch in depth. The bottom of one foot rubs the other, the changes being frequent, until the feet are pink. Good friction should be given when drying them.

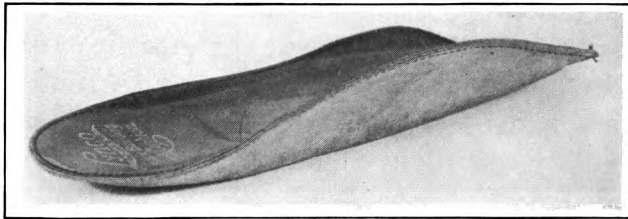
FLATFOOT—LONGITUDINAL ARCH

In summer the beaches furnish adults an excellent opportunity to go bare-footed without inciting the disapproval of society. Or if one will pass beyond the outskirts of the cities, he will find plenty of seclusion for the blessings of bare-footedness. And if he will walk without shoes through the dew at dawn he will secure the benefits of a cold foot bath in its most natural form. In winter one may enjoy the luxury of bare feet in the privacy of his own room provided it is adequately heated. The least that he can do is to substitute comfortable slippers for the constricting shoes which he has worn all day.

Constitutional treatment for the correction of flatfoot is of much importance where indigestion, constipation, headaches, nervousness, obesity, depleted vitality, etc., clearly indicate wrong living habits, because the muscles upholding the arch cannot be in a normal, healthy condition without pure blood properly circulated. Pure blood depends most of all upon the right food in the right amount. The most common dietetic errors are eating too much animal protein in the form of meat, fish, fowl and eggs; too much of the worst kind of

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starches such as white bread, macaroni, spaghetti, cake, refined cereals and boiled or mashed potatoes; too much of the most harmful type of sweets as pie, cake, candy and rich desserts; too much grease in fried foods, gravies, meat fats, cream and oils; too little uncooked, unsweetened fruit and not nearly enough raw and properly cooked (baked, steamed or boiled without discarding the water) fresh vegetables; using condiments that encourage overeating and eating without an appetite; the free drinking of tea and coffee which injures the digestion and poisons the blood, and not enough water drinking; and eating too often and too much of everything.



Compare this soft leather-covered sponge rubber arch support with the metal one. It is so flexible that the ends can be brought together, yet elastic and strong enough to serve as a brace to the arch. It allows the foot structures to exercise and strengthen, which firm supports actually prevent.

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The first requirement for pure blood is food that will supply the elements needed by the body and will encourage prompt, complete elimination of wastes from the body, such as the fresh fruits and vegetables, part of them uncooked, milk, whole grain products, nuts, and a small amount of meat and eggs. Meat or eggs once per day is the maximum; the best starches are the whole grain breads or cereals and baked potatoes; the best sweets are figs, dates, raisins, very ripe bananas, honey, and pure maple sugar; the best fats are in milk, cheese, butter and nuts; and the best drinks are water, milk and unsweetened fruit juices. One should avoid vinegar and condiments entirely and should partake of pork, gravies, cream, fried foods, pie, cake, candy, tea, coffee, and soda fountain concoctions very sparingly, if at all. Confining the bulk of the diet to plain, unrefined foods, eating only when very hungry, and fasting for a meal or two when one realizes that he has overeaten will, in the vast majority of cases, keep the blood pure.

Most people eat much more than they should of everything. Since overeating overworks

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the stomach and uses up energy unnecessarily for digestion, the way to keep the stomach in the best condition and to have the maximum of vitality for higher purposes is to eat just as little as possible and as seldom as possible to maintain weight and strength.

The organs of elimination—lungs, skin, kidneys and bowels—void their poisons through the medium of water, and about two quarts are needed daily to prevent retention of wastes and consequent pollution of the blood stream. Since neither these organs, nor the digestive apparatus, nor the heart can function normally in the absence of exercise, daily walks and calisthenics constitute the minimum requirement, but outdoor sports of all kinds are also recommended because they add variety and encourage more activity. Another factor which is indispensable for normal action of two of the excretory organs, the lungs and the skin, is a plentiful supply of fresh air. Fear of cold air and cold water, in most instances, is a big obstacle to pure blood. One who wears heavy, woolen underwear, takes hot baths only and avoids exposure to cold air effeminates the skin and impedes normal sur-

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face circulation. His colds and catarrh—eliminative efforts on the part of his body—clearly indicate that his blood is filled with toxins. But the one who takes cold baths daily the year round and wears his summer underwear all winter, other things being equal, is not likely to be afflicted with catarrh or frequent colds. The majority try to be too warm and too comfortable, and they could cleanse their blood and invigorate their whole system by gradually accustoming themselves to nude air baths, cold water and less clothing.

Many undermine their strength with tobacco, alcohol, late hours, overwork, sexual abuses and excesses, destructive emotions such as anger, hate, envy, jealousy, and a general pessimistic outlook. The cure in such cases is an ideal and the realization that the maximum of physical, mental and spiritual health is needed to attain it.

Health, like every other form of success, rests largely upon self-restraint and industry—self-restraint in connection with injurious appetites and emotions, and industry with reference to exercise, bathing and the reaching of a worthy goal in life.

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Obesity imposes unnecessary labor on the muscles supporting the arch and it makes one less inclined to take up walking and special exercises for eradicating or preventing flat-foot. Though I do not regard overweight as the main cause of a relaxed arch, in the beginning of treatment when the muscles are feeble it is a serious obstacle to overcoming flatfoot. Surplus fat prevents that gradual acquisition of muscular strength which is essential in restoring the foot structure to normal.

The prime factor in reducing weight is reduction and modification of the diet. Obese individuals should confine their food intake for the time being to the fruits and vegetables, a large part of them uncooked, and an amount of skimmed milk and toasted whole wheat bread that will permit a gradual decrease in weight. They should partake of potatoes and the very sweet fruits such as figs, dates, raisins and bananas in moderation, if at all. The vegetables will satisfy the appetite without keeping up the weight and the milk will supply the required animal protein. After the excess fat has been lost, a small quantity of meat and eggs may be added to the diet. Reg-

CHAPTER IV

Flatfoot—Transverse Arch

IN the normal foot the heads of the metatarsal bones, which are joined to the phalanges, are not all on the same plane but form a slight upward arc so that only the first and fifth joints touch the ground. When the heads of the second, third and fourth metatarsals drop below their normal position, there is a flattening of the transverse arch. This arch is normally maintained by ligaments binding the bones together transversely and by muscles, especially the transversus pedis, which crosses beneath the bones at right angles to the foot. Proper functioning of this muscle is the chief factor in upholding the transverse arch. This is insured by a shoe that is wide enough to permit the alternate expansion and contraction of the forefoot under the weight of the body and by walking with the toes directed straight forward. When the shoe is so narrow

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terferes with their free action and complete development.

A shoe that is narrower than the foot, which most shoes are, keeps the transversus pedis abnormally contracted to some extent even when the weight is not borne by the foot, and it prevents the foot from normally expanding in standing or when the weight is on the ball of one foot while walking.

In a shoe which does not raise the heel above the ball of the foot, most of the weight, when standing, falls on the rear support of the longitudinal arch. The front supports of this arch, which constitute the two supports of the transverse arch, bear some of the body's weight but are more largely concerned in maintaining the balance. Now when high heels are worn the natural weight distribution is disturbed—much weight is thrust upon the transverse arch that should be borne by the longitudinal arch which is more strongly upheld by muscles and better able to bear it. Were the shoes to which these high heels are attached broad enough, the transverse arch, when standing and during the first part of the step, would be flattened to an extent impossible in heelless shoes or in the

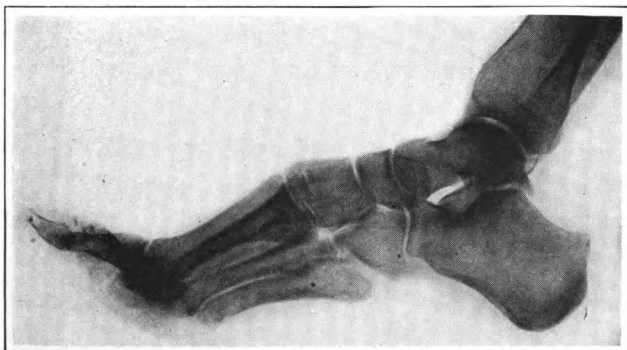
FLATFOOT—LONGITUDINAL ARCH

ular exercise, slowly increased in vigor and in amount unless there is high blood pressure or other contra-indications, is valuable from the start in connection with the altered diet.

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that the foot cannot expand under the body's weight when taking a step, or if the toes are pointed outward so that the weight falls only on the inner pillar of the arch and the transversus pedis is not fully utilized, this muscle becomes weak through disuse, the ligaments begin to stretch and finally the arch collapses.

Causes. The elevation of the transverse arch is protected partly by its ligamentous binding but chiefly by the normal functioning of the adductor muscle of the great toe and the transversus pedis muscles. Then the main causes of a fallen metatarsal arch must consist of anything that weakens these muscles or in-



Side view of a flat transverse arch, with the toes arched upward from bony displacement and abnormal muscular and tendinous tension.

FLATFOOT—TRANSVERSE ARCH

bare feet. Since this would give the trans-versus pedis unnatural work, it would be bad enough. But if the shoes are narrow, as is almost invariably the case when the heels are high, the arch cannot extend normally. Thus there is a tendency to expand the arch unnecessarily, which is thwarted by the narrowness of the shoe instead of the resistance of the muscle.

The high-heeled shoe is pointed, as a rule, and the weight of the body pushes the foot far forward so that the toes are jammed against the end of the shoe. And when the shoe is narrower the ball of the foot is forced farther front than it should be, and this further interferes with satisfactory operation of the arch.

A pointed shoe—one that is not straight on its inner border—bends the great toe out of line, and permanently contracts and weakens one of the muscles which is inserted into the inner side of the base of the first bone of the great toe and gives considerable support to the transverse arch.

Those who wear high-heeled, narrow, pointed shoes, as emphasized in Chapter III,

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tend to become splay-footed and to roll the weight, when walking, along the inner border of the foot, instead of mainly along the outer border and across the ball of the foot. In this type of walking the weight is imposed only

upon the inner support and not upon the highest point of the arch, that is, the arch does not function at all and this part of the step has no spring. If one walks pigeon-toed, the weight is thrust upon the outside support of the arch instead of upon its highest point.

In brief, the *transversus pedis* can never contract as much



Showing a spread transverse arch (at greatest width), with deformities of most of the toes.

FLATFOOT—TRANSVERSE ARCH

as it should while standing if high heels are worn, it can never extend as much as it should while walking if the shoes are narrow and pointed, and it is hardly used at all if one becomes splay-footed, as is likely to happen when such footgear is employed. Decreasing the normal range of action of this muscle, the chief upholder of the metatarsal arch, impairs that arch or breaks it down.

If there is a fallen longitudinal arch, which prohibits normal downward movement of the foot, the foot must be slanted outward in walking and the metatarsal arch is not utilized. Thus lowering of the rear arch predisposes to leveling of the front one.

An hallux valgus or bunion, the result of a narrow shoe built on a crooked last, is prone to produce a fallen metatarsal arch. Forcing the great toe inward projects the larger joint of that toe in the opposite direction, separating the bones, stretching the ligaments and muscles, and increasing the width of the foot at the ball. And increasing the breadth of the foot in this region must involve a collapsing of the transverse arch. If there is an hallux valgus of the little toe also, this ab-

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normal expansion of the foot is increased.

A shoe that has a hollow in the centre of the sole with the edges raised may be a cause of anterior flatness of the foot, since it forces the natural concavity of the ball of the foot into more or less convexity. And standing for long periods in high-heeled shoes, especially pumps, which must be narrow and tight to stay on, is a prominent cause of the same trouble.

The causes of a flattened transverse arch or of a flattened longitudinal arch are largely identical,—constitutional infirmity which affects the quality of the sustaining muscles, and wrong shoes or lack of suitable exercise which affect their quantity.

Symptoms. Pain in the forepart of the foot after a moderate amount of standing or walking and callosity in the central portion of the ball of the foot, which is subjected to abnormal pressure and friction, are the chief symptoms of a weakened or fallen metatarsal arch.

Correction. To be normal the metatarsal arch must not be unduly taxed in standing and it must be permitted to expand freely as it does in the unrestricted, natural walk. Only in this way can the transversus pedis, the main

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muscular support of the arch, be fully used and completely developed.

The first essential in the treatment of a fallen metatarsal arch is to discard the shoes that have prevented free action of the supporting and sustaining muscles and to secure shoes that will permit strengthening of these muscles. Such a shoe must be straight on its inner border and wide enough to allow the utmost expansion of the arch when the full weight of the body is on the ball of one foot; it should have a perfectly flat sole and, if any heel at all, a low one with a large base. As explained in Chapter III, however, the heels should be gradually lowered if habitually they have been worn high.

One should walk with the feet parallel, for only in this way can the weight be rolled directly above the highest point of the arch and the transversus pedis be fully extended. Walking in the right shoes in the right way is an excellent exercise for strengthening the anterior arch because the whole weight of the body on the front part of the foot properly expands it and the entire freedom from the body's weight when the foot is off the ground permits it to contract normally. This natural,

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regular functioning of the arch, which was doubtless the chief factor in evolving it after the quadruped became a biped, should be the foremost agent in restoring it to normal. Frequent short walks gradually increasing in length, not spasmodic long ones, are the kind that will insure safe and steady improvement.

Rope-skipping, walking on the toes, stationary running, stair-climbing, mountain-climbing, running and jumping are all excellent exercises for the metatarsal arch provided the feet are kept parallel. Fast running is a vigorous exercise, for the ball of the foot hits the ground with great force which strongly expands the arch. Jumping not only extends the arch as the body leaves the ground but very forcibly does so as the body returns to earth. The running broad jump, the high jump and especially the pole vault are powerful expanders of the transverse arch and should never be attempted by anyone with impaired arches.

SPECIAL EXERCISES

1. While sitting, flex the toes downward as far as possible (but avoiding cramping),

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drawing them together in a bunch; relax or extend the toes gently upward, and repeat several times.

2. Stand with feet parallel; raise heel of one foot and then that of the other so that most of the weight is alternately on the ball of one foot and then the other.

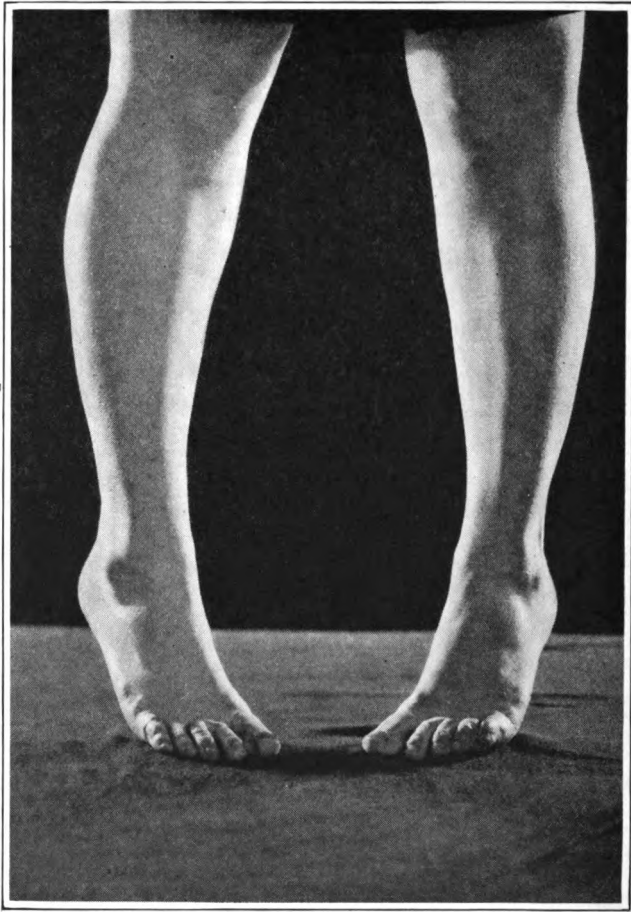
3. Standing with the feet parallel, raise heels so that the weight is resting on the balls of the feet and return to position. Do not strain to raise the heels as high as possible in this exercise.

4. Stand with feet parallel; lift the toes as high as possible so that the weight is borne by the heels; rock forward so that the weight is borne on the balls of the feet at the end of the swing, and continue rocking forward and backward.

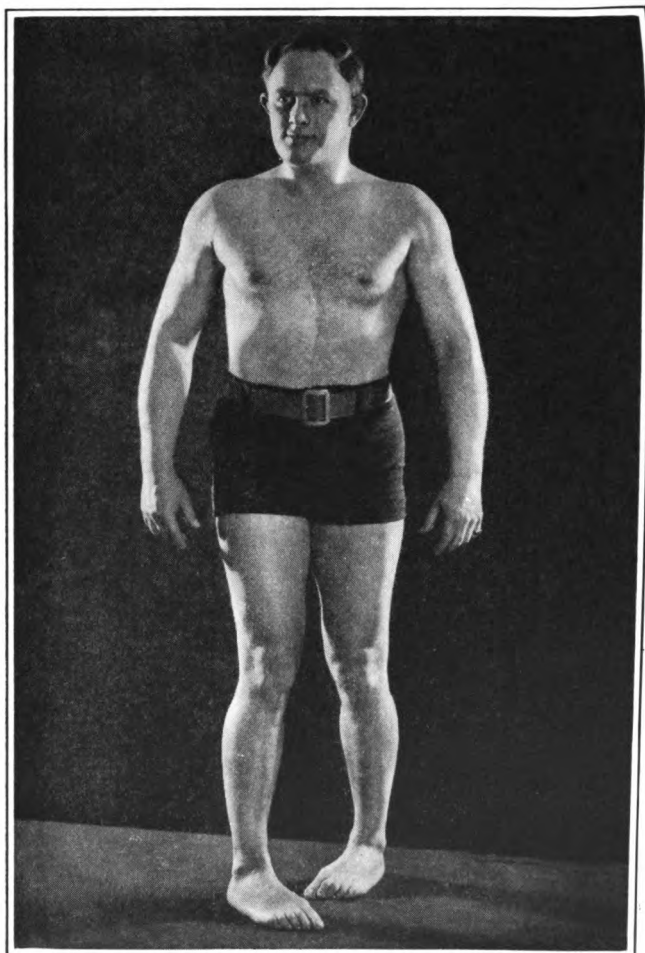
5. Rise slowly on the ball of one foot and then the other, removing one foot from the floor at a time.

6. Stand with feet parallel; raise the heels a little; then roll the weight to the outer edges of the forepart of the feet and return to position.

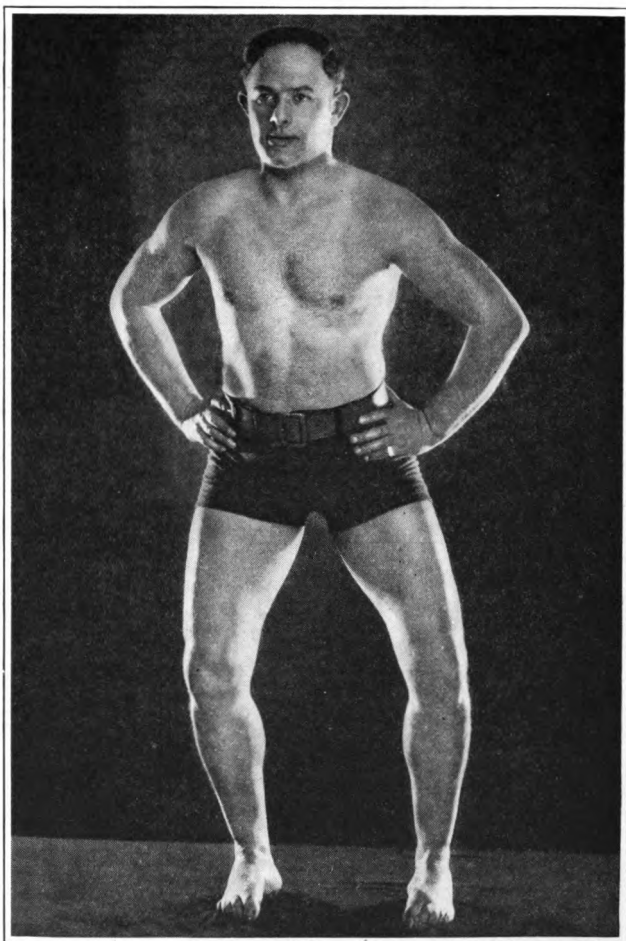
7. Stand with the feet parallel and the heels



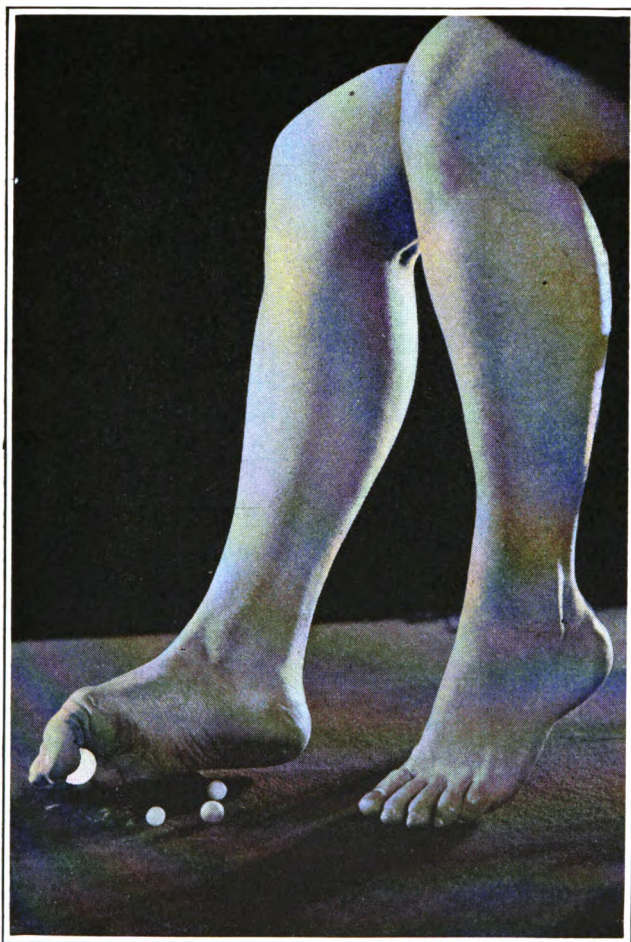
Stand with toes together, heels far apart, then rise on toes as far as possible. In lowering heels, keep them far apart, and keep them apart throughout movement. It is a good plan to try further to separate heels when raised. Repeat forty to fifty times.



Walking with short strides, with toes in and heels out. At each step attempt to grasp the carpet with the toes. Keep the heels well outward. Cross feet, keeping toes in, and attempt to grasp.



With feet some distance apart, curl the toes downward as if attempting to grasp the floor. Relax and repeat. The knees may be bent, and heels partly raised. One may use this exercise in walking about in a room.



Use the toes to pick up marbles. Turn foot on side, as shown; also keep it sole down during the movement. Pick up several times. Alternate left and right foot and also practise with both feet together.

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off the floor; rise on the toes as high as possible and return to first position. This is very similar to Number 2, only more strenuous.

8. Jump off the floor with both feet at once. This exercise should be avoided if there is much weakness of the arch.

Exercises 3, 4, 6, 7, and 8 can be made more effective by doing them on one foot at a time and all of them can be made more strenuous by using weights. It is better to take exercise for the transverse arch bare-footed than in the best of shoes.

SEVERE CASES

In a serious case of flatness of the anterior arch, where the muscles are flabby, the ligaments stretched and the bones badly displaced, proper shoes and corrective exercise alone are not sufficient. A naprapath or an osteopath, who will press the bones back into place with his thumbs, can be of much assistance. Though the services of a naprapath or similar manipulator are secured, an arch supporter is required, which may be one of the muscle-building arch cushions, or an adjustable arch supporter which will raise the arch slightly at first

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and a little more at frequent intervals until the bones are restored to their original position. One should consider these supports, however, merely as temporary crutches and should take exercises to strengthen the muscles maintaining the arch so that such artificial props may be gradually discarded as soon as possible. A chief advantage of the sponge-rubber supports is that they permit and necessitate the action of the muscles and ligaments of the foot arches.

If one directs the toes outward and rolls the ankle inward, as is usual when the transverse arch is flat, fitting the soles and heels with extra strips of leather will mechanically help to improve the standing and walking habits. These strips are one-fourth of an inch thick on the inner border, gradually decreasing in thickness until they are as thin as possible at the center of the shoe. But one should have this extra leather removed as soon as the sustaining muscles have been trained to do their work efficiently.

Too heavy exercise or too much exercise at the start will simply undo what has been accomplished by the manipulative treatment and

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the arch supporters. The special exercises already described, excepting Number 4 and Number 8, will be satisfactory provided they are taken seated instead of standing. Secure a swivel chair or a piano stool and sit with the feet parallel and partially beneath the chair. By leaning forward when doing the exercises, considerable pressure can be imposed on the transverse arches. As a substitute for Number 7, one can lift the legs and pound the balls of the feet against the floor with the degree of force which he deems best suited to the condition of his arch. By grasping the arms of the swivel chair or the top of the piano stool and sustaining part of his weight on his hands, one can graduate these exercises from the mildest to just a little less strenuous than the same movements performed in the standing position.

The cold foot baths, bare-foot walking and constitutional treatment suggested in the chapter on the longitudinal arch are of equal significance in the correction of a fallen metatarsal arch.

CHAPTER V

Other Foot Ailments

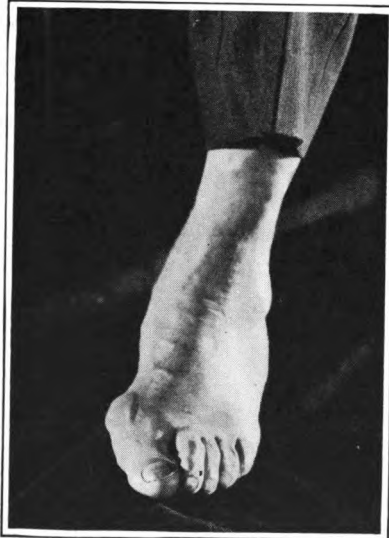
FLATFOOT of one or the other variety, or of one or another degree, is by no means the only disabling defect that may disturb one's foot comfort and efficiency, and through this one's general comfort and efficiency. There are few people who do not have some trouble with their feet, either from alteration of the anatomical structures, callosities, sensitive skin or nerves, poor circulation, excessive or foul perspiration, inflammations of joint structures or their protective cushions or in some other manner. In this chapter will be found the common preventable and correctible foot disorders.

HALLUX VALGUS AND BUNIONS

In the normal foot the two phalanges of the great toe and the metatarsal bone (with which the first phalanx articulates) form a straight

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line. If either of these phalangeal bones is bent toward the center of the foot, the deformity is described as hallux valgus. It is due to short shoes that can accommodate the length of the foot only by forcing the great toe inward, or to soles that instead of projecting straight forward curve outward at their inner margin. If the outward curvature starts



Bunion, on partially flat foot. Note how the great toe turns outward at the first joint. The second toe rides high, but does not appear to in the illustration.

at the ball of the foot, which is generally the case, the hallux valgus involves the metatarsophalangeal joint—there exists a luxation of this joint in nearly all cases; and if the deviation continues to the tip of the shoe, it also affects the joint between the phalanges. A high

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heel jams the toes against the end of the shoe whether it is too short or long enough, so that the great toe is pressed inward and backward; and when the shoe with the high heel is also pointed, which it usually is, the forepart of the foot is pushed into the narrowest region of the shoe where its deflection is greatest.

Any material inner divergence of the great toe impairs the efficiency of the foot. The length of the foot decreases, which disturbs the body balance and shortens the step; the anterior width of the foot lessens and its lateral stability diminishes, with a consequent tendency to outward toeing and inward rolling of the ankle, which strain the longitudinal arch and under-use the transverse arch; the important muscles attached to the great toe are less effective when pulling around a corner; and the side of the great toe, not the under surface of its tip, completes the step.

If an hallux valgus is pronounced and has existed for a long time, a bunion is likely to be associated with it, for the causes that produce the one incline, in the course of time, to produce the other.

When the second phalanx of the great toe

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and the metatarsal bone with which it articulates meet at an angle instead of squarely end to end as in the normal foot, these bones tend to fuse at their inner point of contact where the pressure is too great and to enlarge at the



Bunion deformity, showing the alteration at both the tarso-metatarsal and metatarso-phalangeal joints, also rheumatism at the latter joint, toward the second toe.

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outer region of the joint which is unnaturally spread apart. And every step of the splay-footed walk, to which hallux valgus conduces, forces the great toe farther out of line and opens farther the outer side of this joint because the weight leaves the foot at the side of the first phalanx of the great toe instead of from its under surface. In its journey to the great toe, moreover, the weight passes along the side of the joint, not directly beneath it as in the parallel-footed walk, and irritating pressure is exerted on an area of the joint not fitted to bear it. The increased growth of bone, in conjunction with inflammation of the bursal sac (a sac of tough tissue containing fluid, serving as a cushion against friction), ultimately establishes a red, knobby protuberance known as a *bunion*. And a bunion is not only always accompanied by an hallux valgus, which seriously reduces the strength of the whole foot's structure, but it is a painful, disabling disfigurement in itself. Flatfoot, in some degree, is present in practically every case of either of these conditions, and it is a frequent cause of them.

Correction of an hallux valgus or a bunion,

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insofar as correction is possible, consists of removing the lateral pressure from the joints and the side of the great toe and of gently forcing that toe back into line. A broad shoe with a straight inner border will dispose of the pressure and provide space for the great toe to straighten. Walking squarely on the soles with the feet parallel to each other will encourage the great toe to resume its former position, and if the foot is unshod the weight of the body will be more effective in aligning the toe. The remarkable condition of the feet of a Turkish bath attendant who has served in that capacity for many years is convincing evidence of the curative value of bare-foot walking. Unless the bunion is very swollen and painful the exercises recommended for flatness of both the longitudinal and transverse arches will be of assistance. Hot foot-baths will be of benefit if there is great tenderness, but otherwise frequent cold baths will help.

Sometimes considerable assistance can be given these simple measures by the use of adhesive tape, properly applied. A strip may be placed along the inner side of the great

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toe, and over this and around the toe another strip; then the first strip is brought back along the inner margin of the foot to the heel or at least to the center of the foot—the toe being held inward as much as the discomfort will permit until the tape is firmly adhered to the foot. This exerts a steady but gentle pull on the toe in the direction it must take for correction of the deformity. Care must be observed that the encircling strip is not tight enough to obstruct the local circulation, and it may be better to avoid extending the strip farther than two-thirds around the toe. Obviously, these appliances necessitate the wearing of a broad-toed shoe. A light strip of celluloid may be used along the inner surface of the toe and foot and secured in place by adhesive tape. This will be helpful in early or mild cases but not in long standing or severe cases.

Another very comforting device and one that will have a corrective influence is the “spool” of flexible or sponge-rubber designed to fit between the great and second toes. These “spools” are made in different sizes, so that one may select a smaller one at first and as

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the deformity is corrected in some degree those of larger size may be used.

Ordinary cases of hallux valgus and bunion will respond satisfactorily to these simple remedial measures, but extreme cases of long standing will show little or no improvement. Permanent alteration of the joint prevents change in the direction of the great toe. The only chance of straightening the toe consists of an operation for removing the abnormal growth of bone that has filled up the lateral aperture of the joint, but an operation is always dangerous and may produce a condition worse than the one it seeks to rectify. I do not recommend the knife in any case, but rather natural methods which, though they cannot cure the severest cases of bunion, can usually make them fairly comfortable. Using a soft shoe such as kid, or modifying its shape with a bunion stretcher so that it fits the bunion, in conjunction with the other measures suggested, will reduce the pain and disability to the minimum. Usually the wearing of the sponge-rubber arch supports will be a great relief and of much value as a curative factor in any case that is correctible.

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HAMMER TOES

Shoes so short that the lesser toes cannot lie flat, or high heels which produce the same effect by driving the toes against the front end of the shoe, are the causes of hammer toes. Narrow-toed shoes are usually a factor in the cause, also. In the beginning the toes remain flexed only while the shoes are worn, but in the course of time the tendons shorten so that the toes do not straighten when the deforming pressure is removed. The curled position that they maintain and the flattened end resulting from the pressure against the sole of the shoe make them resemble miniature hammers, hence the name.

The last phalanx of a hammer toe (usually the second toe) is directed downward instead of forward, irritating the end of the toe through constant pressure on the nail, which frequently becomes ingrown. Though the principal bending of a normal toe is done in a direction just opposite to that of the fingers, a hammer toe cannot even straighten, much less bend upward. Thus a hammer toe is practically useless in itself; it is a shortened toe

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which decreases the length of the foot; and it is a sensitive toe which hinders activity of the foot and leg. Further addition to pain results from the tender corn or callus developed upon the top of the first phalangeal joint, which is usually bent upward.

Correction, insofar as it is possible, depends upon the use of shoes that are long enough to avoid any pressure on the ends of the toes under ordinary conditions of foot expansion and wide enough that the offending toe may be spared crowding. Those who stand much or bear burdens will require longer shoes than those who do not, and their shoes should be fitted while standing on one foot and holding the maximum amount of weight that will be carried. A heel should be selected that is low enough to prevent the foot from slipping forward in the shoe. Kid shoes without caps are to be preferred; and it will be of advantage to have stockings large enough to have an individual space for each toe—stitched off by machine. This greatly helps prevent overlapping and overcrowding.

Rising on the toes as high as possible, without shoes, the feet turned inward a trifle; walk-

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ing on the toes; and bare-foot walking, which allows the toes to grasp the ground, will tend to restore their former symmetry. Manipulative treatment, provided it is not too vigorous, will be of assistance and may be the only treatment necessary in early cases. Simply attempt to straighten the curved toes with the fingers without applying enough force to cause much pain. Light splints, such as strips of celluloid, may be applied to either the upper or lower surface of the toe and along the metatarsal, though it will usually be better on the under surface, because of the sensitive callus on top. The occasional case of congenital hammer toe (seen in infants) can almost invariably be corrected by massage and manipulation, but the light splints are of value here, also.

CLUB TOES

Toes that have abnormally slender shafts and bulbous ends are called club toes because of their resemblance to small clubs. They are due to a shoe that combines insufficient width throughout with a pointed but not too short last. If a shoe is a little narrower than it

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should be, the sides of the toes are brought into contact with each other, but if the shoe is still narrower, the compression is so great that flesh is crowded from the shafts into the ends of the toes where the pointedness of the shoe affords room for expansion. Such expansion may operate both in a forward and in a sidewise direction so that the toes become elongated as well as bulbous. The second and third toes are the ones most likely to be affected since they are the longest of the inner group and have the extra space yielded by the point of the shoe directly in front of them.

A club toe is a feeble toe that has had no room for muscular development—a toe that has been subjected to painful constriction which curtails all foot action. It is generally found in company with hallux valgus, bunions, corns and fallen arches.

The use of broad, square-toed shoes will remove the deforming pressure from the sides of the toes and will permit proper distribution of flesh throughout their length; while free and sufficient individual action of the toes in sensible shoes or bare feet will enlarge their attenuated shafts. The affected toes should be

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gently massaged from tip to start, in order to shift tissue mechanically to some extent and to improve the circulation and nutrition.

OVERLAPPING TOES

A pointed shoe is often so narrow that the toes must overlap to find room in it. Crossing the toes is the only way to make the forepart of the foot pointed so that it will conform in shape to such a misshapen shoe. The first toe is especially inclined to overlap the second; the third to overlap the fourth; and the fourth to overlap the fifth. The nail of the under toe turns rough and black from contact with the plantar surface of the over-riding toe.

An overlapping great toe is a case of hallux valgus usually accompanied by a bunion, and such a toe in combination with an overlapping third and fourth toe seriously decreases the anterior width of the foot, which leads to splay-foot and enfeeblement of both arches. Overlapping of the toes not only interferes directly with their action but also conduces to eversion of the foot which reduces toe movement to the minimum. Thus an overlapping toe is a weak toe on a weak foot.

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A shoe built on a broad and straight last, in connection with parallel-footed walking, which properly spreads the toes at the end of each step, will tend to restore overlapping toes to their former side-to-side positions. Bare-foot walking, or any exercise which elevates the body on the toes, is a valuable remedial agent. Manipulation, practiced diligently and regularly two or more times a day will greatly improve the condition. If there is tenderness to prevent this, then an adhesive strip may be worn above and one beneath the toe, attaching it to the neighboring toes.

INGROWING NAILS

An ingrowing nail is due to pressure which drives the flesh up against and over the nail. The nail itself is usually not abnormal. The most common location for an ingrown nail is the outer corner of the great toe and is directly due to the upper pressure of the overlapped second toe. When the great toe is deflected by a pointed shoe, is bent inward and backward by a short one, is jammed against the shoe with considerable force by a high heel, and completes the step with the side instead of the

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tip, there is abundant cause for an ingrowing nail. At first there is merely a laceration of the nail fold, but continuance of the pressure keeps the wound open and makes it deeper. The irritation is frequently so intense and so prolonged as to lead to inflammation and suppuration which involve the matrix. In his effort to secure relief the sufferer usually cuts the nail on an angle, leaving a sharp point to cut into the flesh and as the nail grows out, to plow through the flesh and perpetuate the trouble. This ailment makes walking painful and may reach a stage that will keep one off his feet entirely.

The cure requires toeing straight forward in a sufficiently long and low-heeled broad shoe, conforming at its inner border with the natural alignment of the great toe. The nail must never be trimmed short enough to reach the matrix. A very slight curve, well cleared of the matrix, may be made in trimming, or the nail may be cut straight across. A little strip of gauze may be inserted under the edge of the nail, or a strip of silver foil may be used, and is to be preferred; a little roll of cotton should be placed between the affected toe and its neighbor.

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CRACKING BETWEEN THE TOES

Stockings and shoes at best keep the feet too warm and incline to over-activity of the sweat glands, but if the stockings and shoes are tight enough to hold the toes close together, a bad condition is made worse. When the toes are in constant contact with each other, the skin between them becomes hot, moist and tender and begins to peel, crack, or indicate the presence of eczema. Such toes cause an intense itching which cannot be relieved without the inconvenience of taking off the shoes, and in severe cases become very painful.

The principal remedial agent is a shoe that will allow the toes to assume their natural position which requires at least a little space between them. And the stockings or socks should not be confining enough either before or after washing to bind the toes against each other. Divesting the feet of all covering for as protracted a period as possible and as often as possible, so that the air and light have free access to the interstices between the toes and that freedom from footgear can lower the temperature of the feet, is an excellent counter-

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active measure. Bathing the feet in cold water will further reduce their temperature, toning up and hardening the abused skin areas, and salt added to the water makes it more effective. One must be careful in drying the feet after bathing to dry them thoroughly between the toes—a precaution rarely taken. A little powdered boracic acid or borated talcum may be sprinkled between the toes until the condition has been to some extent remedied.

Constitutional treatment may also be needed, especially if there are symptoms of eczema.

CORNS (CLAVUS)

Corns may be either soft or hard, but all are due to abnormal friction and pressure. The body vainly attempts to protect the delicate tissues by forming this horny substance, but in the case of hard corn the corn is as hard as the shoe area which produces it and is therefore just as painful to the sensitive nerves beneath it.

The commonest seat for corns is the outer side of the little toe which is rubbed by shoes that are too narrow or too pointed, though other frequent locations are the tops of the

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joints of any of the toes. High heels which jam the toes far forward where the shoe width is least are a cause of such corns. Hammer toes and overlapping toes which are constantly pressed upon by the cap of the shoe because of their increased height generally bear a double row of corns on their backs, and if the cap is too low, corns may develop on the tops of toes in normal position. Calf and other stiff leathers are much more apt to cause corns than delicate, yielding kid leather.

Corns are a painful affliction which sour the disposition and limit foot action; they serve only one good purpose—that of a barometer of weather conditions. But since the cure is simple and certain, there is no necessity for anyone to suffer from them. Though there are many applications on the market that will remove a corn, the only permanent cure is to avoid the shoes that are responsible for their formation. A soft shoe that is wider than the foot and has a cap that is soft or sufficiently high, or, better, without a cap at all, and that does not have high heels or curve inward too soon on its outer border, is a sure cure for corns. Keep the pressure removed long

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enough, and the corn will disappear. By wearing what is sold as "Thin Rounds" (a circular piece of felt with a hole in its center) constantly for some time, one can cure a corn without discarding the shoes which established it, but the corn will return after discontinuing the "Thin Rounds" unless a better-shaped shoe is procured. An oval piece of felt, with a center hole, is sometimes more convenient. There is no objection to paring the corn to the level of the surrounding tissue, but this should be done after "soaking" the foot for twenty to thirty minutes in hot water.

Soft Corns. Soft corns which appear between the toes are caused by friction of the toes against each other; the material making the horny tops of hard corns is, in soft corns, soft and shriveled by continual stepping in perspiration, though if proper shoes and the protective felt corn plasters are worn for a long enough time they will disappear. Rolls of cotton or gauze may be placed in the folds between the toes. The soft corns may be removed by the application of corn salve. They are prevented from reappearing by dispensing with the narrow, hard shoes, pointed toes and

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high heels that keep the toes in constant contact with each other. The treatment already suggested for "Overlapping Toes" or "Cracking between the Toes" is equally applicable to soft corns.

CALLOSITIES

Calluses, like corns, are due to abnormal friction and pressure; they are usually found on the ball of the foot, on the enlarged joint of the great toe, or on the lower half of the side of the great toe indicating that the weight leaves the foot at this point instead of at the tip of the toe. These blemishes are painful in themselves and sharply limit all kinds of foot action.

Raising the fallen transverse arch will cure the callosity on the ball of the foot, while measures for straightening the great toe and correcting the bunion, as well as walking squarely on the soles with the feet parallel, will dispose of the calluses on the enlarged joint and the side of the great toe.

To remove callosities temporarily soak the feet in hot, very soapy water for about ten minutes. Then dry the feet, apply vaseline

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to the calloused spot and rub with a piece of rough pumice stone. Continue this treatment every night until the callus has been gradually rubbed off. Vaseline may be applied during the day to prevent hardening and the wearing of soft insoles, of cork or felt, will make the feet more comfortable. A bunion plaster (similar to a corn plaster but larger) may be used on some of these for relief when walking.

CHILBLAINS (PERNIO)

A swelling and inflammation of the joints of the feet resulting from exposure to cold is known as chilblains. A low temperature tends to contract the blood vessels especially where they are small, near the surface, and far from the heart. Tight shoes which obstruct the circulation, heavy stockings which overheat the feet and render them sensitive to a slight degree of coldness, blood which is clogged by too much of sweets, fats and starches, thick from lack of water, and slow from failure to exercise, and any commission or omission that depletes the vitality, may be causes of chilblains. The ordinary form of chilblains is characterized only by redness or blueness,

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slight soreness and intense itching, and the skin is glossy; proximity to artificial heat intensifies the itching, but neglected chilblains may degenerate into sores, fissures and ulcers which are painful and disabling. There may be considerable swelling and puffing, with additional pain due to the tension. Only one toe or several or all of them may be affected and in some cases even the entire foot may be involved. In extreme cases gangrene may set in. Each return of cold brings a return of symptoms unless the condition is successfully treated.

Successful treatment must be based upon removal of the causes. At first the parts should be returned to normal temperature by snow or iced water immersion. Later, simple food, two quarts of water per day, carefully fitted shoes built on a last recognizing the requirements of the foot, and renouncing of all devitalizing habits are essential. Daily baths, as cold as good reaction will permit, will improve the general circulation, and cold foot baths will better the local circulation. Those who wear summer underwear, cotton socks and low shoes during the winter are less

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likely to be afflicted with chilblains than those who resort to heavy underwear, woolen socks and high shoes, but all footwear must be large enough to permit the foot to exercise and to allow each toe individual action. Wrapping the foot for the night in a cold, wet linen or cotton cloth, covered by a dry woolen cloth to keep out the air, is an effective immediate treatment. Bathing in boric (boracic) acid solution is to be commended, especially if the skin is broken and there are any evidences of infection.

TENOSYNOVITIS

Inflammation of the sheath of a tendon, which may be attended with considerable pain, is described as tenosynovitis. The tendon of the extensor longus hallucis and the tendons of the extensor longus digitorum, which traverse the top of the foot near its surface, are the ones most subject to this complaint. Tenosynovitis is frequently due to a shoe that fits too snugly above the instep, that has a wrinkled or stiffened tongue or is laced too tightly, or to a pump that cuts into the flesh, though other causes are more abrupt injury or prolonged

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overuse of the part beyond the point of fatigue. Aside from pains and aching there may be a grinding or friction felt when the affected tendon is moved. In some cases, however, a serious exudation fills in this region and masks the gritting or grinding. The treatment needed is to remove the causes and give rest to the inflamed tendon sheaths. A splint may be necessary or advisable. Alternate hot and cold local applications followed by gentle massage and rest will be found very helpful.

PAINFUL HEEL

Those who do a great deal of walking or standing may develop a painful heel and especially when one has the weak-foot habit of striking the heel heavily in walking. When the arch is elevated, in the contracted foot, the heel and forward pillars of the longitudinal arch bear all the weight, instead of some of it being borne by the outer border of the foot; this is apt to cause a painful heel. A darned sock, a small hump raised by a bent-over nail, or an unevenness in the leather insert of the heel—a slight inequality that would occasion no discomfort in a moderately-used foot may

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create considerable pain in an over-worked foot.

Relief will follow removal of the cause or glueing a felt or sponge-rubber insert inside the heel of the shoe, and rubber heels should be worn. In the occasional cases due to suppressed gonorrhoea general treatment for the eradication of the causative toxins must be followed.

BLISTERS

Blisters are due to continuous rubbing on one small area of the skin. Though the shoes fit fairly well, prolonged use of the foot without having hardened it by progressive exercise, will produce blisters. Any uneven or unyielding point in a shoe or stocking may cause sufficient friction to cause a blister. The quickest way to restore the injured skin to normal is to prick the blister at its very base with a sterilized needle and express the accumulated fluid. Thus the water is released through one or more small holes and the outer skin is kept practically intact; but if the blister is allowed to break under the influence of the same friction that caused it, the outer skin is

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badly torn and the sensitive surface below it exposed to the air. An abrasion brought about in this way is very painful. Should it be necessary to continue the activity that occasioned the blister, expelling the fluid as suggested and applying adhesive tape over the affected area will materially decrease or entirely terminate all distress. A layer of gauze should be put over the blister before applying the tape, to prevent pulling of the skin at this point when the tape is removed, or a small strip of tape may be attached gum-surface to gum-surface to the region of the tape that will be directly over the blister. If the adhesive tape is put on as soon as any chafing is noted, blistering can be avoided.

When a blister follows a moderate amount of walking, it is a forerunner of a corn or callosity, and the misshapen or ill-fitted shoes that are responsible for its formation should be discarded.

STINKING FEET

When indoors during the winter and practically all of the time in summer shoes keep the feet too warm. There is too free perspira-

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tion with but little air to evaporate it which is conducive to a malodorous condition of the feet. Shoes, nevertheless, are only the occasion, not the cause, of stinking feet. Over-eating, which gives the excretory organs too much to do; an excessive amount of animal protein, especially meat; a clogging diet, too little water, and under-exercise which decrease elimination through lungs, skin, kidneys and bowels; and heavy underwear, hot baths and lack of proper skin stimulation which allow the pores in parts of the body other than the feet to become inactive—these are the real causes of stinking feet. If too much poison is ingested and the work of expulsion is not distributed among the depuratory organs as it should be, the system takes advantage of the favorable circumstance of overheating to discharge as much waste as possible through the feet.

Rational treatment calls for reformation in eating, drinking, exercising, clothing and bathing habits, not in some medicated liquid that will prevent perspiring of the feet by paralyzing their sweat glands. Not only is constitutional treatment such as outlined in Chapter

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III indispensable in these cases, but changing the socks daily, washing the feet with pure soap and warm water followed by cold three or four times per week, bathing the feet in cold water night and morning, wearing thin hosiery and low shoes, preferably of porous kid leather, and going bare-footed frequently are also urgently required.



Showing gouty alterations in the small bones, with a gouty deposit on middle bone of great toe.

RHEUMATIC PAINS

Pains in the feet that are not referable to flat-foot or minor pedal ailments may be due to rheumatism. Such cases will not respond to local treatment but require improvement of digestion and purification of the blood. A

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fast of three to eight days, drinking water freely and taking a daily enema, broken with fruit juice and followed by a diet of fruits, vegetables, whole grain products and nuts, has produced excellent results in many of these cases. Great care must be observed, however, to resume solid foods very gradually after a fast of more than one or two days. Sweating baths, or hot baths followed by cold to the feet, legs or entire lower extremity, will naturally give considerable relief.

GENERAL SWELLING

General swelling or puffiness of the feet may be attributed to either local causes, such as flatfoot, tenosynovitis and tight shoes, or to constitutional causes such as diseases of the heart, lungs, liver or kidneys. A case of swelling of the feet which is a symptom of a serious disorder of one of the major organs of the body should be under the supervision of a physician or a sanitarium understanding and employing natural methods of treatment.

CHIROPODY

Abuse of the modern foot is so merciless

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and the mutilation is so serious and universal that a new specialist, one who treats pedal ailments, has appeared. And as long as the majority continues to wear a crippling shoe, either because of ignorance of its effects or because of an insane determination to be in style in spite of the cost, chiropody will be a lucrative field, and a necessary one. There are "quacks" in this specialty as in others, but the thoroughly equipped chiropodist is a valuable addition to one's staff of health restorers until one has learned to rely more upon himself and natural ways of living.

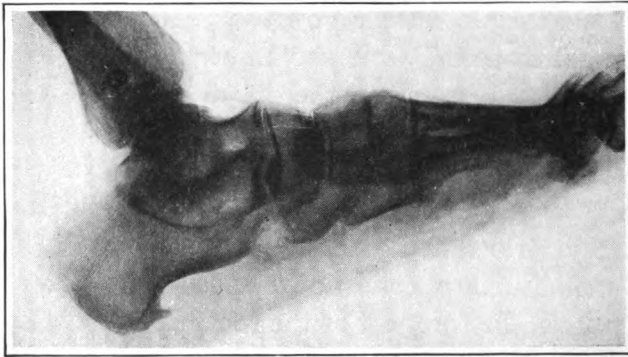
CHAPTER VI

Talipes (Clubfoot)

TALIPES is a deformity of the foot presenting four variations: equinus, calcaneus, valgus, and varus. In *talipes equinus* the heel is raised and the front of the foot lowered so that the weight of the body is borne by the front of the foot alone. The foot is constantly extended upon the leg; and the toes are extended upon the foot. If the extensor muscles of the toes lose their power, the foot becomes almost a straight-line prolongation of the leg; and in such cases only the tips of the toes touch the ground, making crutches necessary. The position in walking (upon the heads of the metatarsals) suggested the name, which, liberally translated means horse-like talipes. *Calcaneus* is a condition opposite to that of equinus, the forepart of the foot being elevated and the heel prominent; hence the name, which refers to the calcaneum or heel bone. The foot

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is continuously flexed upon the leg, and the os calcis (heel bone) is the single point of support. *Talipes valgus* is a deformity in which the foot is twisted outward at its center and everted, the weight in walking falling on the inner border of the foot; while *talipes varus*, the opposite of valgus, is characterized by the turning in of the foot, combined with an inward twist of the front of the foot that emphasizes the curve of the inner border which is raised, the weight in walking falling on the outer border of the center of the foot. Most cases of clubfoot are a combination of two of these simple forms, as *equinovarus* (downward



Rheumatic spur on the calcaneus (heel bone), with involvement of articulation immediately in front of ankle joint.

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and inward), *equinovalgus* (down and outward), *calcaneovarus* (upward and inward) and *calcaneovalgus* (upward and outward).

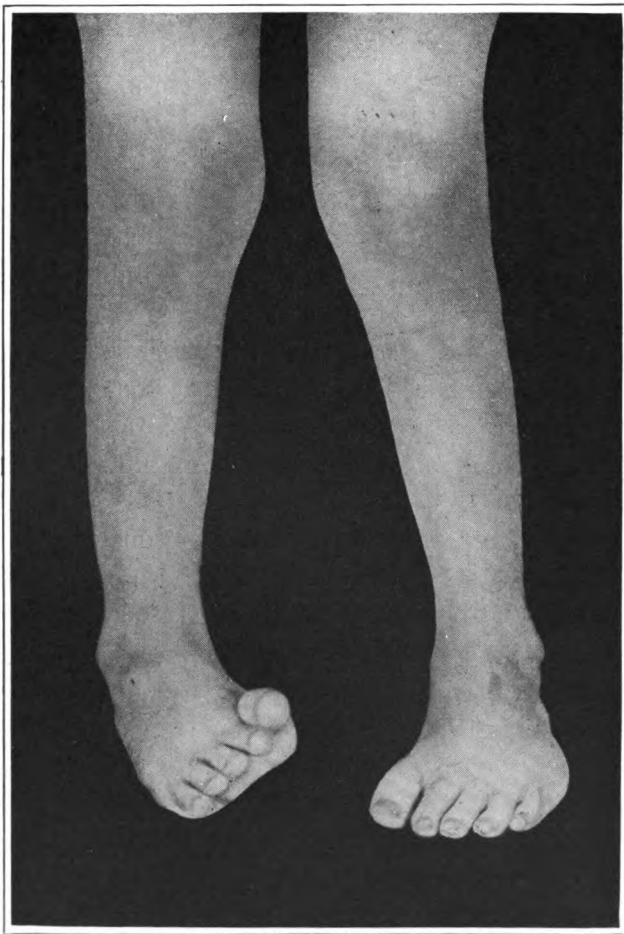


X-ray photograph of congenital clubfoot, with disease in small bones of foot, especially the scaphoid which is at the top, near the ankle joint.

In the normal foot, traction of the tibial muscles which enter the foot at the inner side

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of the ankle, exactly counterbalances that of the peroneal muscles which gain admission at the outer ankles; and the pull of the flexors which pass in front of the ankle nicely offsets that of the extensors which stop at the heel or glide behind the ankle on their way to the front of the foot. Inequality in the drawing power of these opposing sets of muscles is the source of talipes; but the problem immediately arises as to whether the contractile force of one of them is too great or of the other too little. Physicians have usually believed that spasticity (contraction) of the soleus and gastrocnemius muscles produce talipes equinus; of the flexors, talipes calcaneus; of the peroneals, talipes valgus; and of the tibials, talipes varus. And this belief led to an operation, known as tenotomy, on the tendons of the supposedly contracted muscles for the purpose of decreasing their pull on the muscles assumed to be normal. But the fact is that most cases of clubfoot are not caused by abnormal tension of the muscles toward which the foot is distorted, but by paralysis of the muscles away from which it is drawn. The muscles condemned to operation contract with simply their regular amount of force,

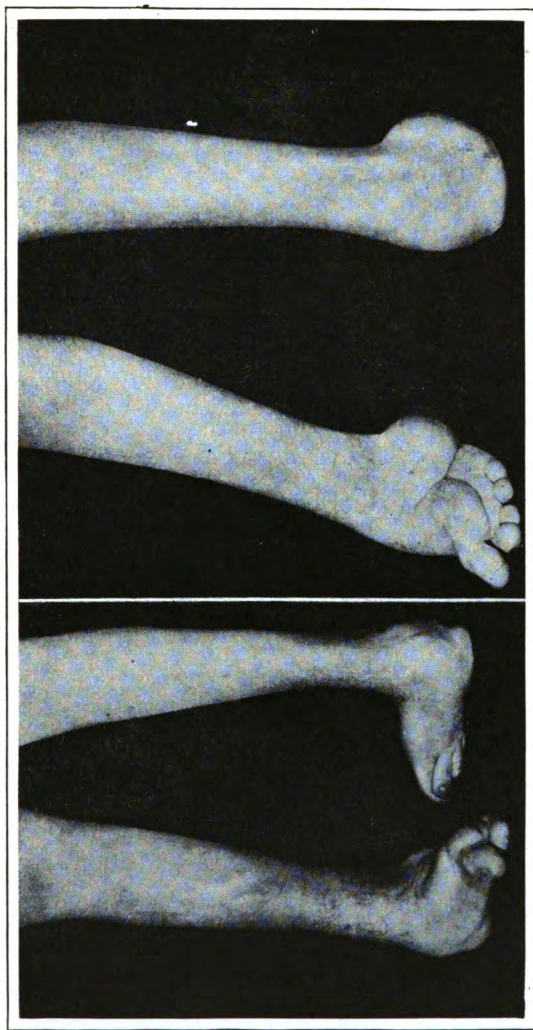


Different degrees of clubfoot, in the same case, resulting from infantile paralysis. The right foot shows a talipes varus, with a slight degree of talipes calcaneus.

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which is deforming because the relaxation of the opposing muscles alters the balance of tension which keeps the foot straight under healthy conditions. The ease with which the talipes of a new-born baby or the clubfoot of a fresh case of infantile paralysis may be controlled by gentle manipulation is convincing evidence that the perversion is due to slackness of the muscles of one side rather than rigidity of the muscles of the opposite side. So laxity of the flexor muscles causes equinus; of the soleus and gastrocnemius, calcaneus; of the tibials, valgus; and of the peroneals, varus.

The twist of talipes does not occur at the ankle except in calcaneus, where the heel has dropped in consequence of relaxation of the soleus and gastrocnemius. At only one place in the foot (see Chapter II) is there a juncture of bones running directly across it, i. e., the end-to-end articulations of the talus with the navicular and of the calcaneum with the cuboid. It is at this point that the arrangement of the bones affords the least lateral tenacity, and it is here, not at the ankle, that the foot bends downward in equinus, outward in valgus, and inward in varus. Any irregu-



Two views of double clubfoot or talipes, both feet showing talipes varus, with the right foot showing a combination of talipes varus and equinus, or equinovarus. Note the stick-like legs from inability to use the leg muscles.

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larity in the action of the soleus and gastrocnemius will obviously affect the ankle-joint, while disparity of the other nine muscles of the leg which go beyond the mid-tarsal joint for insertion will distort the foot at that joint.

Whether congenital or acquired, talipes, except in a few rare cases, is due to a paralysis of the group of muscles on the side away from which the bones are deflected. The causes of such a paralysis manifesting itself at birth have not been accurately determined, but some condition *in utero* prevents the foot from developing normally. The sources of the muscular insufficiency conducive to acquired talipes are easily identified. Usually this results from some spinal cord paralysis, especially infantile paralysis. It may be said that the underlying causes of acquired talipes are absurd diet, over-feeding, under-elimination through lungs, skin, kidneys and bowels, and the other blood-defiling habits enumerated in the chapter on flatfoot, which lead to acute contagious diseases, rheumatism, infantile paralysis, etc.

The effects of talipes are a tendency toward rigidity of the normal muscles, arrested growth or wasting of the foot and leg, and deformity

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of the bones. Because their enfeebled antagonists do not furnish ample resistance, the unaffected muscles, pulling with only their proper intensity, are constantly shortened; and the irritation and inflammation in consequence of the abnormal position of the foot, as well as the weight of the body upon it under such a condition, set up reflex contraction in them. Thus an eventual inflexibility of these muscles is a result of talipes and not a cause. The distortion of the foot and the unnatural pressure imposed upon surfaces unfitted for it bend and constrict the blood vessels so that the flow of the arterial blood is materially diminished. Reduction in the supply of nutrient blood in conjunction with paralysis of one set of muscles and the progressive atrophy of the opposing healthy ones, through lack of motion and resistance, checks growth or permits actual wastage. A clubfoot is or will become a small foot on a withered limb. The venous circulation is affected by the same forces as the arterial and the deformed foot is cold and blue. Walking on a clubfoot will gradually further displace the tarsal bones and establish new, unnatural and incomplete articulations. When

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talipes has been neglected long enough to allow a radical change in the structure of the bones, a cure by any method is an impossibility.



Here we see the effects of infantile paralysis. Front and rear views of the fairly normal right leg and foot, and the undeveloped left leg and left flat foot. Note that above the knee and the instep and toes of the left extremity are abnormal.

Treatment of congenital talipes should begin at birth, and of acquired talipes as soon as any deformity is noted. Even a short delay in the adoption of corrective measures, particularly if walking is performed on the distorted feet, decreases the chances of ultimate recovery. Practically every case of congenital

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talipes can be completely corrected and every structure made perfectly normal if treatment is begun immediately upon discovery of the defect, or even later but before the child has ever borne its weight upon the affected foot. But treatment begun later can do much toward correcting the deformity.

In a case of congenital equinus, a thin board a little longer than the baby's foot is covered with adhesive plaster and attached to the sole so that the front end projects a little beyond the toes. The foot is forced gently and gradually into normal position and held there by a broad, long piece of adhesive tape proceeding from the anterior extremity of the board along the top of the foot and up the front of the leg. The same method is used in a case of congenital calcaneus except that the piece of board extends a little beyond the heel and the long piece of tape passes up the back of the leg. Adhesive tape alone is usually sufficient to hold the foot in normal position in congenital varus or valgus. Beginning at the top of the foot, adhesive tape two or three inches wide is wound around the sole in the direction in which the foot is to be straight-

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ened, the foot is forced into its proper position, and the tape carried up the side of the leg. Notching the edges of the tape at constricting points will prevent obstruction of the circulation. When necessary the adhesive plaster may be removed with benzine or alcohol without injuring the baby's sensitive skin.

A child with talipes should not wear shoes until old enough to begin walking. In talipes calcaneus an ordinary shoe may be used with a spur projecting backward from the heel. Two bars jointed at the ankle run upward from the sides of the shoe to a band of leather which encircles the leg. A piece of rubber is stretched between an eyelet in the spur and the back of the leather band to take the place of the partially paralyzed soleus and gastrocnemius muscles. In talipes equinus the artificial muscles will originate at the front of the leather band and end at the points in the top of the front of the foot where the tibialis anterior and the peroneus tertius muscles are attached, which would be at the base of the first and fifth metatarsals respectively. An artificial tibialis anterior muscle in a case of valgus and an artificial peroneus tertius in a case of



For talipes equinus. Holding the ankle firm with the right hand, press the forward end of the foot upward toward the body. Relax and repeat fifteen to twenty-five times.

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talipes varus will be required. In a complication of troubles in talipes, as in equinovarus, for example, both tibialis anterior and peroneus tertius muscles will be supplied externally, but the latter must furnish more traction than the former.

In a case of valgus or varus, the shoe is cut in half where it coincides with the mid-tarsal joint of the foot, and the two parts reunited by short chains, elastic or ball and socket joints. Since the distortion in these cases arises at the mid-tarsal joint, the shoe should offer no impediment to any degree of twisting in this region. The object is to draw the foot back into place by the slow, natural action of the artificial muscles, not to force it back and hold it stationary with the unyielding resistance of an unmodified shoe.

Walking in shoes which substitute the action of the deadened muscles with elastic traction, will tend to restore both sets of muscles to a healthy condition, the paralyzed ones by putting them through the motions of a normal muscle and the unaffected ones by opposing them with the proper resistance.

A congenital or an acquired case of talipes,

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if treated immediately, will respond satisfactorily to the methods outlined, though in the acquired form much depends upon whether recovery from the original causative disease has taken place. When the original paralysis, however, is neglected and followed by a tensed condition of the antagonistic muscles, the chances for a cure are materially decreased. Perhaps the muscles have been contracted so long that they cannot be extended even though great force is brought to bear upon them. The usual procedure in such cases is the performance of an operation known as tenotomy, but such an operation cannot be of the slightest benefit unless succeeded in due time by walking in shoes that furnish substitute muscles. And I am of the opinion that naprapathic or osteopathic treatment will gradually accomplish in a better and safer way all that this operation will achieve suddenly—and more. If prolonged manipulative treatments cannot break up the rigidity of the muscles, I doubt if an operation can be of any benefit. Though the foot may seem to be absolutely fixed in its crippled position at first, hot foot-baths followed by regular and persistent attempts over

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a long period to restore flexibility to the contracted muscles will often prove successful, especially if fasting, water-drinking, enemas, proper diet, etc., are employed at the same time. When no attempt has been made to correct a talipes which has existed from babyhood or childhood to maturity, and one has walked upon the twisted feet until they have become misshapen and calloused appendages, with the bones displaced and altered and new articular surfaces formed, there is no use in trying to effect a cure.

The value of manipulation in all cases of talipes cannot be over-emphasized. There is nothing equal to the hand for bringing the crooked member back into place—for regulating the amount of force and for directing it in just such a manner as to fulfill one's purpose without injuring the foot. And there is nothing better than gentle massage for increasing the flow of blood to the part, thus improving its nourishment and stimulating its growth. Lightly tapping the paralyzed muscles with the finger tips or edges will help to awaken their contractile power. The services of a specially trained manipulator, such as a napra-

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path or osteopath, are particularly recommended for talipes.

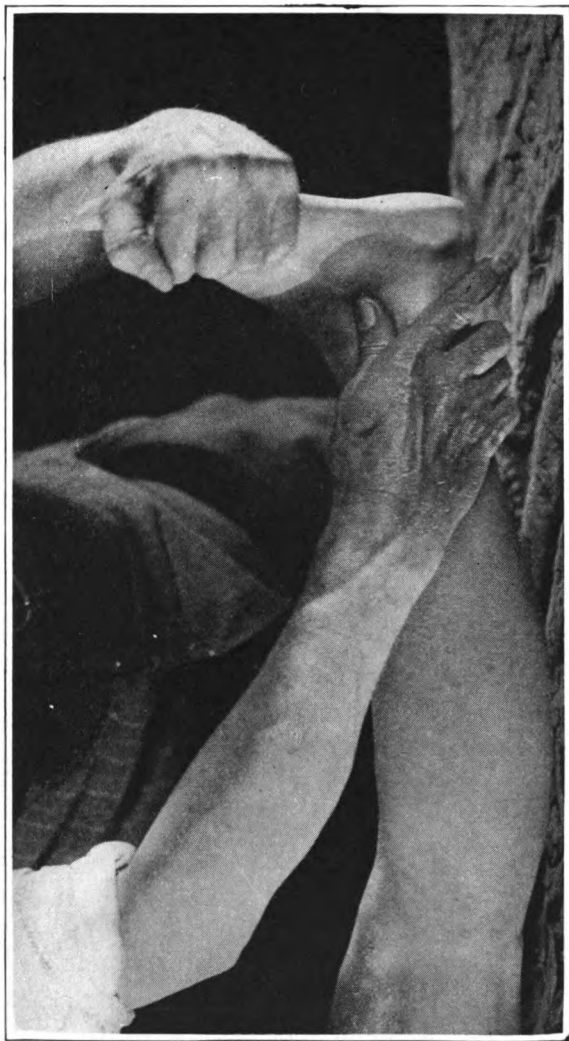
Operation on sound muscles, assumed to be over-contracted, when the real trouble is paralysis of the opposing ones, may restore the foot to equilibrium by releasing it from all muscular action, but such a foot will be useless. And putting it after the operation in a plaster of Paris cast or in a steel-soled contrivance with cogs and screws for rigidly holding the foot in the right position at the sacrifice of all local exercise will not only prevent the paralyzed muscles from awakening but will destroy the vitality of the healthy muscles. The chief attribute of a muscle is power to move, and the only hope of reviving a semi-paralyzed muscle is through action. Massage, electricity, hydrotherapy and elastic substitutes—which will encourage motion in the muscles—are the essentials for curing talipes.

KNOCK-KNEE

Knock-knee and bow-legs are not defects of the feet, and are not directly related to talipes; but as they are sometimes of such extreme degree that they cause a turning out



For equinovarus. Grasping the foot and ankle, with little-toe side down; place a padded, firm, wide support under the foot, midway between toes and heel, and press firmly down. Relax and repeat.



For talipes equinovarus. Press upward (toward hips) with left hand, then twist the foot in and out to limit of motion, holding firm with right hand, as shown. Relax and repeat.

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or a turning in, respectively, of the foot, they may be considered here. And in any case they are such prominent deformities of the lower extremities that they deserve consideration in a book of this kind.

In this deformity the legs bend inward so that the knees knock against each other in standing or walking. The muscles are not strong enough to hold the legs straight and the knee joint gives way under the weight of the body, though usually, perhaps, the condition depends upon the particular formation of the bones and of the hip and knee joints. Devitalized foods, faulty elimination, etc., the same constitutional causes which operate in the production of flat feet—are responsible for the muscular weakness that allows knock-knee to develop. Beginning to walk too soon, especially when the sustaining power of the muscles is below normal, or carrying heavy loads during childhood under the same condition, frequently results in knock-knee.

Cases that are taken early will readily respond to a combination of constitutional and local treatment, but cases that are neglected until near or after maturity are difficult to

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handle because of the contraction of the biceps of the leg. A naprapath or osteopath or any other skilled general manipulator will be of great assistance in helping to overcome the rigidity of this muscle. Other local treatment consists in regular use of a device for gradually drawing the knees back into their proper position. This way consists of a steel rod which is jointed at the hip and the knee, extends down the outside of the leg from a leather belt about the waist to the shoe; a pad, furnished with strong elastics at each side and fitted to the inside of the knee, is buckled to this rod. In this way the knee is constantly drawn outward by the contractile force of the elastic. This contrivance is worn at night and also during the day when convenient. One should do as little walking and standing as possible until the knees have been brought back more nearly into their normal position. The legs should be exercised daily in the reclining position until the knees have been straightened, and then walking and other special exercises should be gradually adopted.

Every effort should be made to purify the blood and keep it pure, for pure blood is the

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first essential in the acquirement of healthy muscles.

Flatfoot and knock-knee usually go together. Flat feet have a tendency to produce knock-knee and knock-knee is prone to produce flat feet. Building up the inner border of the heels and soles and adhering to the other methods suggested for the correction of flat-foot will be of assistance in the treatment of knock-knee.

Special Exercises. 1. In standing position cross the legs and do the deep knee bend.

2. From standing position partially bend the knees. With the hand on the outside of the knee joint force the knee outward against the resistance of the hand. This may be done with one knee at a time or with both at once.

3. With shoes off, lie on the floor on the right side. Rest the outer side of the right foot on the seat of an upholstered chair and then raise the body with the right arm. Take the same exercise on the left side with the left foot.

BOW-LEGS

In this abnormality the legs bow outward. Not only is the knee out of its alignment, but

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the bones of the lower leg and sometimes the bone of the thigh are curved. Bow-leg may be inherited, but is usually due to a softness of the bones, and bow-legged children very frequently have been the victims of some serious constitutional disease, especially some degree of rickets.

The first requirement is an improvement of the diet, which at an early age of the child has been so poor that the bones have become weakened. Plenty of fresh fruits, vegetables and milk should be included in the daily menu, and the bowels must be kept active, using the enema occasionally if necessary.

A mechanical device for slowly straightening the leg is needed. From a leather collar encircling the thigh a rod descends at each side of the leg to the shoe. Straps supplied with elastic pass around the leg and the inner bar at one or two places, i. e., where the leg is most curved. Thus a constant tractile force, which may be regulated as desired, pulls the leg back into place. This device is worn at night and also in the daytime when convenient. One should do as little standing and walking as possible while the legs are being straightened.

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The legs may be exercised daily in the reclining position to use the muscles and keep the circulation good. After the bowed legs have been straightened, walking and special exercises are taken up gradually.

Bow-leg and pigeon-toe usually go together, and either is inclined to produce the other. Though toeing in tends to break down the transverse arch of the foot through partial disuse thereof, it puts no strain on the longitudinal arch as toeing out, which is associated with knock-knee, does.

Special Exercises. 1. From standing position partially bend the knees. With the left hand on the inside of the right knee joint, force the knee inward against the resistance of the hand. Same with other knee.

2. With shoes off lie on the floor on the right side with the inside of the left foot on the seat of the chair, the right ankle resting over the left ankle or knee. Now raise the body with the right hand. Take the same exercise on the left side with the inside of the right foot on the chair.

CHAPTER VII

Shoes and Hosiery

SHOES were first worn by a generation which had groped its way far enough upward to realize that protection of the feet against the roughness of the earth and the changes of temperature, weather and season would conduce to their comfort and welfare. It was a later and more enlightened generation that perceived the possibilities of the shoe not only as a shield against bruising, chilling and wetting, but also as an artistic covering to compel the admiration of others. And finally there appeared a generation so intent upon making the shoe beautiful that they forgot all about the original purpose of making it useful—and of the purpose and needs of the feet themselves.

Why Improper Shoes Are Worn. Stylish shoes were originated by the offspring of the rich who were determined to distinguish them-

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selves from the populace, not by worthy deeds, but by any means within their power. The most exclusive shoe would be one so uncomfortable and unserviceable that the laboring classes would experience difficulty in wearing it. A foot-casing that was ill-shaped, tight and almost impossible to keep on would be the ideal thing for this purpose. The majority of the poorer classes, accepting such shoes as a real mark of superiority and not wishing to be judged as common, have attempted to wear them in spite of the necessity for unrestricted use of their feet. And eventually "fashionable," as applied to footgear, came to represent in a vague, general sort of way the average, unquestioning individual's conception of what is fit and handsome.

In full accordance with the attitude which gave rise to the stylish shoe, the thoughtless person regards a short foot, a narrow foot, and a high instep as the chief attributes of pedal beauty. A pointed shoe which causes deflection and overlapping of the toes, and a narrow shoe which obliterates the normal space between the toes and reduces the width of their shafts by pressing the flesh into their ends, does

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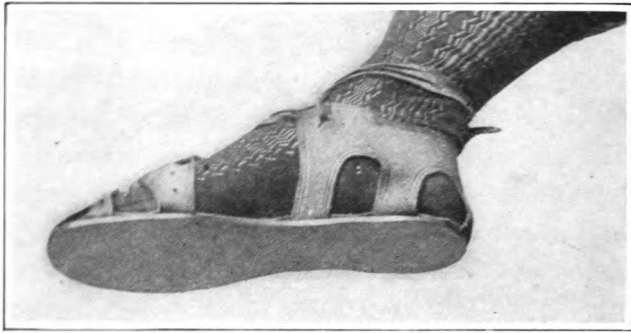
diminish the breadth of the forepart of the foot both in appearance and in fact; a stiff shank does raise the arch; and a high heel which keeps the foot permanently extended does decrease the straight-line distance from heel to toes and makes the foot look shorter.

But the shoe which at first makes the foot smaller and prettier will eventually defeat its purpose. The pointed shoe increases the breadth of the foot by the width of a bunion; the stiff shank assists in producing an arch so weak that the body weight breaks down that shank; and the high heels aid in establishing a flat foot, which is a lengthened one. So the foot that did not measure up to popular standards of beauty and grace finally degenerates into an appendage that the most short-sighted must recognize as not only deformed and ugly but also painful and unserviceable. For the most part our present-day footgear is but little less stupid and idiotic than was the custom of Chinese high caste who bound the feet of their girl babies so that they were more deformed than the talipes foot and less serviceable as supporting appendages.

Ignorance of the barest fundamentals of

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anatomy, of how the arches are formed and maintained, of why the toes should retain their normal positions with a little space between them, of why the feet should remain parallel with the weight properly distributed on the



We would have stronger arches, more sound and warmer feet if we all wore sandals a good part of the time. There is no constriction at heel, toe, or instep; and every muscle and joint has full action. A good type of sandal is shown.

soles, of what is needed to keep a muscle strong, of why the heel should not be elevated above the ball of the foot, and of the exact relation of the average shoe to these essentials of pedal normalcy—ignorance of these matters explains why so many wear disfiguring shoes. It might seem, upon first consideration, that no one but an imbecile would day after day endure the painful molding of a shoe that pro-

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duces bunions, calluses, corns, ingrown nails, etc., whether he knew anything about the foot's structure or not; but the fact that an intelligent person tolerates atrocious footgear appears less remarkable when we remember that even the thinker, except in his own narrow realm, is slow to trace cause from effect. The truth is that the average individual, whether studious or not, has given no consideration at all to his feet and is not inclined to do so unless they become so painful as to demand his attention. There are a few, no doubt, who will continue to subject their feet to the influence of the latest in shoes at any cost, but the vast majority will insist upon better shoes when the immediate connection between the ordinary, illogical shoe and the prevalence of foot deformity is demonstrated to them. It is a question of arousing a repugnance for the shoe that is certain to cause disfigurement, pain and incapacity and of creating a love for the one that is just as certain to keep the foot healthy and strong, comfortable and serviceable.

Improper shoes are worn by some classes to show their superiority over other classes, and they are adopted by the poor to demonstrate

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their equality with the rich. Spike-shaped, high-heeled, short-vamped shoes are bad enough for the rich girl who steps into her limousine when she desires to go a few paces and who stands only to say "Good Night" to her departing guests, but they are outrageous for the working girl who must mince her way on her toes for considerable distances and stand for long hours daily in a shop or factory; they are bad enough for the debutante whose most strenuous exercise is a little dancing, but they are abominable for the growing Tom-boy of a girl who still longs to run, skip and jump.

Defects of the Average Shoe. The average shoe is spike-shaped—its inner border curving outward and deflecting the great toe, its outer border curving inward too far back and deflecting the little toe as well as pressing against the ends of the third and fourth toes. A shoe of this shape not only bends the outermost toes inward but it crowds the three central toes so that their sides touch, their shafts decrease in width, or they overlap each other. Such a pointed last interferes with the action of the transverse arch and of the toes, directly

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through lateral constriction and indirectly through its tendency to produce splay-foot. It is largely responsible for hallux valgus, bunions, hammer, overlapping and club-toes, hard and soft corns, calluses and cracking between the toes.

A pointed shoe is too narrow across the cap and it is usually also too narrow across the ball of the foot. If so, the evil influences of the spike-shape are intensified.

The ordinary shoe, especially that bought by women, bears a heel that is too high and has too small a base. By thrusting the foot forward such a heel has the effect of increasing the narrowness and pointedness of the shoe, thus exaggerating its mischievousness. The high heel exhausts the muscles upholding the longitudinal arch by keeping them partially contracted, and it enfeebles the metatarsal arch by compelling it to bear an undue proportion of the body's weight, while the narrowness of the sustaining base impairs both arches through its disposition toward eversion and abduction of the foot.

The cap of the average shoe is reinforced so that it will not be subject to denting or sag-

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ging. While such reinforcement does improve the appearance of the shoe, it is overdone. A cap that is as unyielding as a piece of wood, particularly if it is too low and tapers downward too quickly, renders the narrowness, pointedness and shortness of a shoe still more destructive. The hardness of the cap is a prominent factor in the development of a thickened or ingrown nail.

The individual who seeks a pointed, high-heeled shoe in order that her foot will appear smaller than it is will be prone to select a shoe that is much too short for her. A short shoe is an active agent in the production of hallux valgus, bunions, hammer-toe, overlapping toes, and ingrown nails, as well as a predisposing cause of sinking longitudinal and transverse arches. Though shortness is not an intrinsic shoe defect, it usually accompanies real shoe faults.

The stiff shank, that is a part of the customary shoe of both men and women, is designed to furnish support to the posterior arch artificially which the extensor muscles should supply naturally, and such abnormal assistance can only weaken the foot's structure.

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Though the stiff shank is not so bad as the regular arch supporter, which is still more unyielding, the difference is one of degree and not of kind.

Pumps. The worst type of shoe is the pump which will not stay on unless it is too tight. Above the instep where the leather of a shoe can fit quite closely without impeding foot action and where snugness is most effective in keeping the shoe on and in place, the pump is cut away. Buttoning, after the shoe has been put on, permits reduction of the shoe's opening to the exact dimension of the ankle, while lacing has the same advantage and also that of minor adjustment whenever necessary. The pump, which lacks these means of altering the size of the opening for the foot's admission, must be too short and too narrow in order to stay on. Because it is cut away above the instep where a moderate degree of tightness is not harmful, it must be confining across the toes where looseness is most essential. The heel, which requires no play, is often allowed to slip up and down at every step, forming blisters and calluses. The toes are constantly tensed in an effort to keep the pump from

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falling off, and so is the mind. A French vamp is a pump with such a high heel that it will not stay on without a strap across the instep. Thus the pump, which combines all the disadvantages of the average shoe with peculiar defects of its own, particularly favors the development of every form of foot trouble.

A short vamp (the portion of a shoe that is immediately attached to the sole and fits about the lower part of the foot) in a high or a low shoe thrusts too far forward the seam which unites the vamp and the "upper," so that the seam crosses above the ball of the foot where the leather should be soft and flexible and offer no resistance to the transverse wrinkling naturally made by the foot in motion. In a pump, short vamps cut into the flesh just where the foot should have the most freedom for bending. Like other contrivances for making the foot appear smaller than it is, the short vamp interferes with normal action of the foot and is a source of discomfort and deficiency—general as well as local.

Taking it all in all, if one had set out to construct a foot-covering that would do everything possible to ruin the feet, he could hardly

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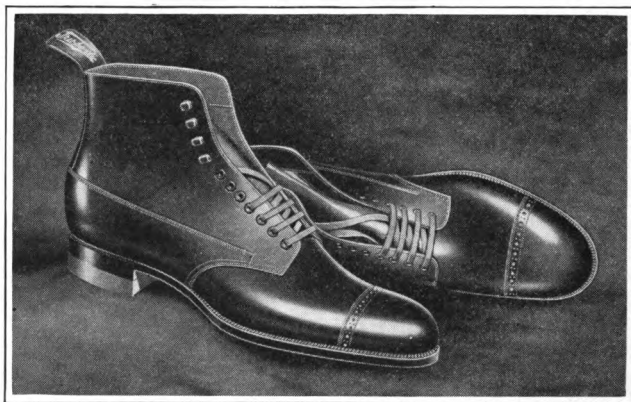
have hit upon anything more effective than the average shoe.

What a Proper Shoe Should Be. The shape of the proper shoe will conform to that of the normal foot expanded under the full weight of the body. The inner margin will be straight; the outer margin will be straight far enough forward to prevent any lateral pressure on the little toe and it will not curve inward abruptly enough to touch the ends of the central toes when extended to their full length. The shoe will be wider and longer than the foot under maximum expansion. The cap will be high enough throughout to avoid any pressure on the ends, sides or tops of the toes, the vamp will reach far enough back to help hold the shoe on and to allow unrestricted bending of the foot, and the sole will be stout yet flexible. These are absolute essentials in a shoe that will not deform the foot in any way.

Only a shoe without any heel whatever will permit the fullest use of the muscles which lift the heel and sustain the arch. In theory, no heel should be used; in practice, a large heel not over five-eighths of an inch high, such as

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the average shoe for men carries, will not materially detract from the efficiency of the foot. And the same may be said of the ordinary stiff shank. The flexible shank may be adopted, however, without attracting that attention, that is objectionable to many and which a heelless shoe will invite.



A really sensible shoe that meets the customary demand of neat, trim appearance. The toe is reasonably wide; but the best feature is the straight line of the inner border—no out-curving to deform the great toe and entire foot.

A correct shoe must take into account the quality of the leather and the character of the workmanship. A cheap shoe is a coarse, stiff product that banishes comfort, limits foot action and inclines toward every kind of

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pedal weakness and deformity. It is rather more apt, too, than the higher-priced article to exhibit all the defects of the average last. The price of a good shoe must include the cost of suitable materials and satisfactory construction, and since even the best of footgear will harm the feet to some extent, one should not allow an unreasonable economy to govern his purchases. A cheap suit, hat or glove will injure nothing except one's pride, but a cheap shoe may ruin one's feet, one's health, and one's spirit.

A low, lace shoe is usually preferable to any other. On account of the supportive leather over the instep it can be large enough to afford the foot ample action, which the pump cannot; because of the adjustability of its lacing it can be made to fit under varying circumstances which the button shoe cannot; and by reason of its lowness it gives the ankle freedom and the foot ventilation, which the high shoe does not. Walks through the woods or deep snow or over very rough ground may require the protection or reinforcement of the ankles which high shoes grant, but Oxfords (low shoes) are usually equally satisfactory

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in these cases and more so for city streets.

Footwear that has been treated in such a way as to close the pores of the leather, as patent leather or water-proof shoes, increases the unnatural heating of the feet and decreases evaporation, making the skin tender and sensitive. Rubbers and arctics should be worn only when absolutely necessary, since they add an extra covering to the already overburdened feet—a covering designed to keep out water and just as effective in keeping out the air. Canvas shoes with rubber soles, which are known as tennis shoes or sneakers, while far less harmful than the average leather shoe in many respects, are pernicious in their interference with normal action of the skin, which they overheat and keep bathed in stale perspiration which cannot evaporate. Wearing one pair of shoes is bad enough, but using leather-lined shoes is equivalent to wearing two pairs at once.

Of all the leathers employed in constructing shoes, kid is the most satisfactory of all, for it is especially flexible, yielding and porous. Unless it departs radically from the proper shape and size, a kid shoe will be comfortable

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and harmless. Whether the foot is contracted by cold or rest, expanded with the weight of the body on it, lengthened from prolonged exercise, or swollen in consequence of hot weather, the pressure from kid will be less variant than from other leathers. Because it is porous and thin and offers the least resistance to ventilation, kid is cool in summer; because it is soft, flexible and sets up but little impediment to foot action and circulation, it is warm in winter. The elasticity, smoothness and delicacy of kid make it particularly suitable for one who has sensitive or painful feet or is anxious to avoid pedal defects.

Kid shoes should be worn by adults with bunions, overlapping toes and hammer-toe, cracking between the toes, corns, calluses and sweating feet, because their porosity and suppleness qualify them for alleviation or cure of all foot ailments. And parents who value the dowry of their children's perfect feet will insist upon the protection of kid from babyhood to maturity. Because kid is so soft that it will not chafe or mold the feet, of course it will be marred somewhat more readily than tougher leathers, but susceptibility to outside influ-

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ences is the best measure of a shoe's fitness for encasing tender feet without injuring them.

There are many manufacturers today who are endeavoring to make shoes that comply with the needs of the ideal foot. Some of these products are satisfactory but others are not, partly because there is no one style of shoe that will fit every type of foot. Some of them have departed from the ordinary last more radically than is necessary. The inner edge, for example, may be made to curve inward, affording space that the everted great toe of the average individual will never be able to utilize; while if this margin were simply kept straight, the shoe would fit better, look better and sell better. Though these manufacturers deserve more praise and patronage than has been accorded them, the orthopedic shoe is not by any means a universal solution of the foot-fitting problem.

To avoid foot trouble it is not necessary to wear a special shoe or one of such unusual shape that it is conspicuous. A shoe may be obtained in nearly any store, except in the smallest towns, which lay no claim to re-

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formation—that is a compromise between the ideal and the average that will afford comfort, prevent deformity and look well. If it is cut fairly straight on the inner border, is almost as broad as the expanded foot across the ball and toes, and bears a heel that does not exceed five-eighths or three-quarters of an inch in height, the chances are that it will prove satisfactory, especially if the leather is soft and pliable, preferably of kid. Of course, this is not the shoe that the window display will feature or that the salesman will show at first, but if the customer will insist upon a shoe that exhibits some semblance to the foot and refuses to consider the average product, the clerk will usually find something sensible in stock.

Because feminine footwear is worse than masculine, as a whole, women will have more difficulty in procuring a fairly sane shoe, but they can do it if they are intelligently persistent, and within the past two or three years more sensible (or, rather, less absurd) shoes are to be found in growing numbers. Though the exercise of a little judgment in choosing from the material at hand is all that is needed in most cases to solve the shoe question, if

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one lives in a locality where it is impossible to secure a shoe that is even approximately harmless, satisfactory footgear may be purchased from one of the large mail order houses.

The woman who knows nothing of anatomy and suspects nothing of the viciousness of the average shoe will say, if anyone urges her to adopt pedal covering really adapted to her needs: "Surely, you don't expect *me* to wear those funny-looking things!" That's it! The right shoe is queer-looking to the person who has always worn the wrong shoe. But she must be taught that the footgear which produces bunions and flatfoot, and not that which prevents such painful deformities, is ugly—that the effect of a shoe on the shape and usefulness of the foot must determine its claim to beauty. For those who have a real desire to correct or to prevent foot troubles, nothing will prove better in the line of footgear than sandals or moccasins. Except in cities these, especially the former, can be worn anywhere except to social functions and church; and as many women spend most of their time in the confines of their homes, these should be worn here, though one might do even better

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by going barefoot at home. When camping or hiking, the moccasin may be used with pleasure and profit, or the sandal may be worn where sand and gravel will not interfere by getting in the sandals beneath the feet.

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Though a narrow, pointed stocking or sock may hold the toes too close together and bring about an unhealthy condition of the skin between them, it could hardly be blamed for the production of any serious pedal deformity, but when shoes have developed hallux valgus, bunions, hammer-toe and overlapping toes, hosiery of insufficient length or breadth may constitute a considerable check upon corrective treatment even though the disfiguring footwear has been discarded. It would be particularly inclined to hold the toes in their false positions when the weight of the body was not counteracting this tendency. Then, especially at the outset of any restorative regime, it is essential that the hosiery be long enough and broad enough to preclude any constriction of the toes. Since there are stockings and socks on the market conforming to

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the structure of the feet so carefully as to differentiate the right from the left, it is an easy matter to procure perfectly-fitting hosiery. Most stockings and socks shrink upon washing, and this fact should be taken into consideration in deciding what size to purchase, for the size must be proper *after* washing more than before.

Shoes alone tend to keep the feet too warm by shutting out much of the cooling air and preventing adequate evaporation of the perspiration. But because hosiery increases this difficulty, this should be as light and porous as possible. Silk, lisle and cotton are generally preferable to wool. One who is out-of-doors for long periods in winter, especially if comparatively inactive during such periods, may feel that woolen hosiery is essential to warmth, but he should change to a lighter sock when he comes indoors. Besides, if his shoes are large enough for foot freedom in activity, the feet will be much warmer than any amount of covering by socks or stockings can make them. Sedentary workers who spend only a few hours outside each day will usually find it better to avoid woolen hose unless they live

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in a very cold climate. Woolen socks, however, because of their greater thickness and greater protection against the friction of the shoe, are often serviceable to those who attempt long walks without preparatory hardening.

Someone may ask: "Why wear hosiery at all if it harms the feet?" There are three good reasons: it protects the foot against the hardness of the leather, the leather against the corroding perspiration of the foot, and the bareness of the leg against the invectives of society. Though a few individuals have discarded hosiery—some for health, some for style, some for necessity, and others merely to be "different"—most of us have no desire or need to imitate them.

CHAPTER VIII

Foot Troubles of Children

USUALLY before puberty has been reached the perfect feet which are the heritage of practically every baby have grown into grotesque shapes that Nature never intended them to assume. Hammer-toe and overlapping toes, corns and even bunions—deformities deplorable in the middle-aged—often disfigure the feet of girls still in short dresses and of boys in knee pants.

Dr. L. A. Hawkes, who examined the feet of 1581 children, found that 65.4 per cent. of the boys and 64.9 per cent. of the girls had some form of foot trouble. He reported that the second stage of true flatfoot had been reached by 28.8 per cent. of the boys and 31.7 per cent. of the girls.

Dr. Dukes, who examined 1000 boys entering Rugby School, stated that 32.5 per cent. had flat feet; 44.5 per cent., lateral curvature

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of the spine; 4.5 per cent., bow legs; 52.6 per cent., knock knees; and 43.7 per cent., chilblains.

The official statistics compiled by these physicians should be of immense interest to all parents, for they indicate clearly that the feet of civilization are seriously menaced long before maturity has been reached. Such figures should lead to the formulation of two questions: What is the cause of this wholesale mutilation? and How can I avoid it in the case of my own child?

Causes. The chief cause of this almost universal crippling is the use of shoes that have viciously molded the feet when they should have merely protected them. During the formative period of their growth, the feet of children are particularly plastic and subject to the evil influence of a shoe that does not reasonably approach in form the natural outline of the foot and does not foster a habit of walking that suitably develops the muscles entrusted with upholding the arch and moving the toes.

Pedal defects are very likely to afflict children whose parents are too poor or too

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ignorant to feed them properly. When food that will nourish the body adequately, keep the blood pure and maintain active elimination is not supplied, the bones, ligaments and muscles cannot acquire their normal durability and strength. In such cases the feet are more susceptible to the destructive influence of an unscientific shoe and the child tends to knock-knees, which in turn inclines to flatfoot.

Bad habits of standing and walking, not chargeable to illogical shoes or to poor food, but to lack of knowledge or carelessness on the part of parents, may be primarily responsible for collapse of the arch. Prevention of children's foot troubles consists in the avoidance of every possible causative factor.

For thousands of years before the dawn of civilization prehistoric man walked about this earth bare-footed. Through a long process of evolutionary growth, unrelated to shoes, the foot reached its present state of perfection, and it can unquestionably do its work best without the constriction and opposition of shoes. The skin of the feet, as well as that of the entire body, evolved without the intervention of any covering whatever, and no doubt

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it can function completely only when freely exposed to air, light and sunshine. Because the feet are more constantly in contact with the earth than any other part of the body and are most subject to the influence of dirt, rain, and snow, they require more protection than the head, hands, etc. But the attempt to escape cold, dampness, scratches and bruises by means of a thick, leather casing has been costly. Without the confinement of shoes, the feet would perspire no more freely, would have no more odor, and would be no more sensitive than the hands.

Footgear is harmful enough merely as a faultlessly-fitting protection; but when it degenerates into a style-displaying medium which alters the shape and function of the feet, it is an abomination. Washing the shoes is inconvenient and possibly detrimental to their appearance, and leather is too hard a substance for direct encounter with the skin; hence hosiery appears first as an instrument of sanitation and comfort and then as a concession to convention. And the poor skin is farther removed from the healthful sun, light and air.

Prevention. Every normal boy is a little

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prehistoric man who is blind to any of the advantages of shoes and loves to go bare-footed. He is not afraid of cold water or dirty mud; on the contrary, he will walk straight into them at every opportunity whether he is shod or unshod. Because the air and the water and the light will do his feet a world of good, and because childhood is the only period of life during which one may dispense with shoes and stockings without displeasing society, his parents should allow him to go bare-footed just as much as possible. They should not withhold from him one of the greatest luxuries of boyhood for fear of infections, which are a negligible danger if the child's diet and elimination are such as to keep his blood pure.

All that has been said of little boys applies with equal force to little girls.

When the feet must be covered, the prevention of children's foot troubles rests largely in supplying them with shoes that will never infringe upon the right of all the toes to lie straight and parallel without colliding with each other and to enjoy the absolute freedom of natural movement under all circumstances—with shoes large enough to allow for the

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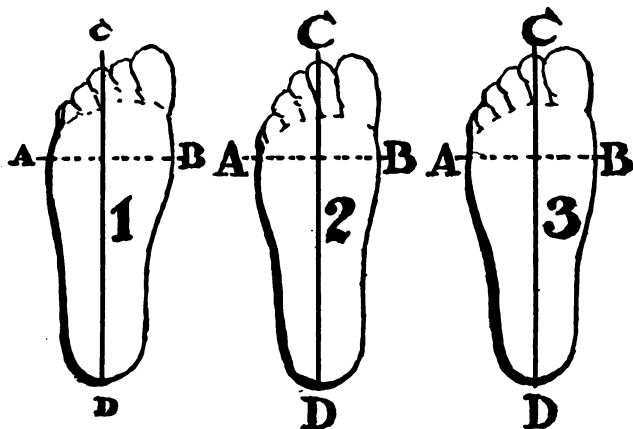
maximum of possible growth of the feet until the shoes wear out. And because the skin of children is especially tender, their shoes should be thin, flexible and porous.

The normal child is on his feet practically all of the time that he is free to do what he pleases, and since an abusive shoe is productive of the most harm when the foot is in action, proper footgear is of even more importance to children than to adults. Moreover, young people participate much more generally than older persons in games and sports requiring running and jumping, which are more injurious to the feet than walking, if performed in disabling shoes. Then the plastic condition of the child's foot, his free indulgence in pedal exercise, and his penchant for the most vigorous forms of activity should induce his parents to provide him with shoes that will encourage the fullest and freest movement of the feet and will offer no impediment to their normal expansion and natural growth.

To know what kind of a shoe a child should wear and to see that he wears it is not all that is required. As long as the majority of children use crippling shoes, the child in a judi-

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cious shoe will be the butt of cruel gibes, which will be hard to endure unless his parents extract the sting from them by careful explanation and sympathetic counsel.



Our feet are cast in three distinct molds—the type known as straight, shown in the center of the picture; the type known as inflare, shown at the left; and the type of foot known as outflare, shown at the right. Every human foot falls into one of these classes. One should always select a type of shoe that corresponds to his type of foot and thus avoid misuse of the feet.

The boy or girl who is fitted with scientific shoes will find it difficult to stand or to walk with the feet directed outward—the standing and the walking of such a child will probably take care of themselves; but if necessary there should be constant direction to keep the feet

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parallel until this position becomes habitual and automatic.

Children should be instructed not to jump from high places. Though the natural arch is strong and can withstand a terrific impact, children, who have poor judgment in such matters, may subject the foot to a strain that it should not be expected to undergo. They are likely to alight on hard, uneven ground where even a low jump may prove disastrous.

The dominant custom of allowing a child to eat all kinds of the richest foods at any time of the day or night is primarily responsible for the ill-health and partly responsible for the impotent feet of the average adult, and the current practice of eating much candy between meals and of crowding out plain foods with desserts at meal time is one that no sane parent will tolerate. For the sake of their stomachs and brains as well as their feet the diet of children should consist of simple, wholesome food—fruits, vegetables, milk, whole grain products, nuts, and a small amount of meat and eggs. Three meals a day, with nothing between meals except an apple or orange, are enough. Since a child does not

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understand the relation of natural food to pure blood and of pure blood to sound feet, his eating should be controlled by someone who does understand these.

Many a young fellow, athletic, strong and virile—every inch a man with the exception of his feet—vainly regrets the youthful ignorance that has left him with an incurable bunion. Many a young woman, beautiful in form and face—lovely in all respects but one—has reason to curse the fashionable footgear that has marred the total effect of the perfect whole. The boy who has worn straight-last shoes from bare-foot days will attain manhood with a foot that will match the rest of his body, and the girl who has been required throughout childhood to wear a shoe scientifically adapted to the shape and size of her foot will grow into womanhood with a foot that is just as God made it—a foot that she can show with pride, not one so maimed and ugly that she must hide it from the sight of others for shame.

It is the plain duty of all parents to learn the essentials of foot anatomy and function. Then they will set a worthy example for their

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offspring to follow, will be capable of imparting the necessary knowledge, and will meet no resistance when they request their children to wear non-deforming and strength-building shoes.

CHAPTER IX

The Effects of Improper Shoes

WHEN the majority of persons fail to blame their shoes even for corns, bunions or hammer-toes, it is not surprising if they never suspect that much of their ill-health, diminished physical and mental power, loss of beauty by lines of suffering, premature old age, pessimism and general failure in life might be traced to this source.

The effect of bad shoes is not confined to a lessening of the flexibility of the joints of the foot, to under-development of the muscles of the foot and leg, to the painful and disfiguring pedal ailments which we have discussed at length, and to weakness and reduced efficiency of the entire lower extremity.

Raise the heels of a woman five feet, six inches tall just two inches, having her hold her body straight from the ankles upward, and her head will be thrust forward almost a

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foot. If high-heeled shoes are worn it is obvious that radical changes in posture are required to push the center of gravity backward, to keep her from falling forward. There is a backward bending of the body at the knees, a forward bending at the hips, a backward bending at the shoulders and a forward bending at the neck. Thus high heels establish a permanent zigzagging from the ankles to the neck with a strain on muscles and joints that is borne by bones in the normal unshod, erect position. Such unnatural strain may lead to abnormalities of the knee- and hip-joints and to sciatica, lumbago or neuritis. The position which high heels force one to assume throws the shoulders back and the abdomen and pelvic organs forward, tending to antero-posterior curvature of the spine, prolapsus of abdominal organs, and displacement of the womb with possible sterility and menstrual irregularity and pain.

If one of the arches is weaker than the other or one of the ankles rolls inward more than the other, (the left foot is usually longer and is therefore more susceptible to the destructive influence of a crooked last and an elevated

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heel), the knee- and hip-joint on that side will be lower and the spine will curve toward the other side to maintain the center of gravity in its most advantageous position. The pelvis will be tilted and the shoulder above the better-foot will be lower than the other. Thus a flatness of one arch, or a depression of one more pronounced than that of the other, tends to develop deformity of the hip joint and lateral curvature of the spine.

High heels, by decreasing the range of the gastrocnemius and soleus muscles, which descend to the heel bone as the Achilles tendon, shorten that tendon to such an extent that low heels cannot be suddenly adopted. In such cases the heels must be gradually lowered to give the contracted and weakened tendon an opportunity to slowly stretch back to its normal length.

Walking, as well as the greater part of the pleasant and helpful outdoor games and sports, requires foot action. But ill-shaped and poorly-fitted shoes, which render all pedal movement uncomfortable or even painful, conduce to inertia. Lack of a reasonable amount of exercise impairs digestion, circulation and

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elimination, and impairment of these functions leads to headaches, colds, catarrh, nervousness, rheumatism, diabetes, obesity, emaciation, and to diseases of the heart, stomach, liver, lungs, skin, kidneys and bowels. Too little physical activity may be the principal factor in the development of practically every disease, and the effect of a shoe may range from a corn which makes walking distressful to a painful bunion or an advanced case of flat-foot which brings pedal motion nearly to an end.

If the chief cause of spinal curvature, menstrual disorder, nervousness, etc., is not recognized—and it seldom is when that cause happens to be a shoe—there is no possibility of curing them.

The constriction of tight shoes or the pressure on blood vessels due to fallen arches, acquired through the use of wrong shoes, makes it difficult for the heart to pump blood through the feet. Exposure to rain, snow and cold is a more serious matter under such circumstances, and a "cold," which is largely the result of congestion of blood in the interior of the body, is more likely to develop.

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Everyone knows how a painful shoe can change a happy, elated optimist into a miserable, dejected grouch; but few have the least conception of how many friends have been lost and enemies gained, of how many social careers have been shattered and business ventures wrecked because of shoes. Unless you treat your feet kindly, they will not let you feel kindly toward the rest of the world.

Whenever any alteration of normal posture is necessitated by illogical shoes, work is thrown on muscles that should be performed by bone, and when the muscles are using up more than their share of the body's total output of nervous energy, then the heart, lungs, brain — some other part of the body — must receive less than its share or this waste of vitality must result in nervous debility and general fatigue.

Corns, calluses, hammer- and club-toes, and overlapping toes—defects which a shoe can hide as well as produce—will be a cause of shame or chagrin occasionally, but the knob of a bunion or the plainness of a flat-foot, which no shoe can conceal, will be a perpetual source of humiliation.

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The pain, fatigue and worry chargeable to tight, mutilating footgear will lower the corners of the mouth, wrinkle the brow and harden the eyes—will clothe the face with an expression of severity, bitterness and hostility. One



The same foot and shoe. Excellent proof of the constricting effect of "stylish" shoes. The exposed foot shows clearly how much it is cramped when in the narrow shoe. The outward curve of the inner shoe border already has permanently curved the great toe outward. The toe should point directly toward the observer.

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who wears fashion-prescribed shoes should not hope to retain her beauty or to recover it if lost. The inactivity, the ill-health, and the mental suffering ascribable to shoes tend to hasten the approach of old age, and one who molds her feet with stylish leather should not expect to prolong her youth. Since the anguish of abused feet demands an enormous amount of unwholesome and unnecessary attention which is diverted from head work, and impairs the physical health upon which normal brain power depends, one who is addicted to the use of laming shoes should not anticipate growth of the intellect.

Success is the reward of the strong, the youthful and the mentally alert. Competition in the struggle for the prizes of life is so keen that no one can afford to harbor any distress or to squander any energy needlessly, but the wearer of the ordinary shoe does just that. It has been estimated that over seventy per cent of civilized peoples are consciously or unconsciously suffering from foot troubles of some kind—an estimate which was probably too low; and the almost universal prevalence of pedal infirmities is undoubtedly one of the

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reasons why the number of those who achieve conspicuous success is so small.

Unscientific shoes are not only responsible for an enormous loss to the individual, but also for a stupendous loss to the nation. The productiveness of those who must stand for long hours daily in shops, stores and factories is especially diminished by such shoes. Survival of a nation often depends upon the ability of its men to fight, and the large number of rejections on account of flat feet and bunions during the World War called the attention of medical authorities to the effect of bad shoes on military eligibility. The strength of a nation depends upon its wealth and its health as a collective unit, and faulty footgear is a menace to both.

CHAPTER X

Keeping the Adult Foot Normal

IF A CHILD reaches maturity with straight, beautiful feet, and has been taught to take pride in such feet, the chances are in favor of retaining pedal normalcy throughout life. There is a critical period, however, in the development of every young man and young woman, from the age of sixteen to twenty, during which all that has been gained in earlier years is in danger of being lost. The young man of seventeen or eighteen is extremely sensitive to the disapproval of his comrades and will be strongly inclined to adopt the model of shoe affected by them, and the young woman of the same age will naturally crave the approbation of the average young male who admires the current, fashionable shoe favored by women. Thus parents frequently require greater understanding and sympathy to guide their offspring through the "teens"

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with unblemished feet than through childhood.

Just one pair of faulty shoes may produce a bunion which many years of perfect foot-gear cannot efface. It is a difficult matter always to purchase a shoe that proves after a few days of trial to be satisfactory in every way, but many, through false economy or an unwillingness to admit to relatives that they have made a mistake, wear out a shoe that they know is injurious. A shoe that deflects or cramps the toes or creates prolonged discomfort of any kind should be cast aside even if it has cost many hard-earned dollars.

Though the foot is a complicated structure composed of many parts delicately adjusted to each other, it is tough and strong in its normal condition. An athlete weighing one hundred and fifty pounds who clears twelve feet in a pole vault subjects his arches to a force of over 1000 pounds, and the strong man who performs a back lift of 5000 pounds supports that amount of weight with his arches; but these are not the men who recruit the ranks of the flatfooted. The fact is that the arches in their natural state are provided with a strength that far exceeds any demand

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that ordinary use of the foot will make upon them.

A soldier who wears the right shoe and has the weight of equipment gradually added to that of his own body simply strengthens his arches. And the fat man who slowly takes on excess flesh until he weighs enough for two, acquires fallen arches largely because of the impure blood, the flabbiness, and the inactivity associated with obesity, not solely because of his avoirdupois.

It is surprising to discover how much abuse the foot can endure without breaking down. Sometimes atrocious shoes are worn for years, exercise is neglected, and every law of health is disregarded; yet the feet retain a fair degree of usefulness. If one will insist upon pedal covering that even in a moderate degree respects the form and dimensions of the foot, will be reasonably active, and will give some attention to his diet, his chances for preserving sound feet are good. But if one will bestow unusual care upon his feet, they cannot help but serve him vigorously and faithfully until the end of life.

The first requirement for keeping the feet

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normal is never to tolerate a shoe that does not conform with the outline and bulk of the foot; the second, is always to walk or stand with the feet parallel and the ankles plumb. When the toes point straight forward, the most ground can be covered with the fewest steps, and the object of walking is to transfer the body from one point to another with the least expenditure of energy. With the feet turned outward, ground would be lost even though the foot were completely unrolled, which it is not; for this gives the walk a rotary, useless motion which is ludicrous. Thus the splay-footed walk also tends to shorten each step by the length of the toes.

When the toes are turned neither in nor out, the foot can bend its maximum at ankle, ball and toes, all the muscles of the foot and leg are fully used, and the arches which they uphold are firmly elevated. When the muscles, arches and toes function completely, the step is effective, resilient and graceful.

The human foot was consummated by untold millions of years of evolution without the interference of inimical footgear. The unshod savage progresses with his feet parallel; so

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does the bare-footed boy who recapitulates in his development every stage through which the race has passed. Not only the bones and muscles of the foot and leg but those of the entire body are best adapted to the type of stride that evolved them. So man should wear a shoe that will encourage him to move like the savage and the bare-footed boy. The individual who employs a shoe that prohibits such walking is counteracting the perfecting influence of millions of years of evolutionary growth and is showing his contempt for the divinity that shapes the destiny of mankind.

CHAPTER XI

The Shoe of the Future

BECAUSE it cannot send a root into the ground for nourishment as a plant does, the animal found it necessary to move about to sustain life. Stability in standing and speed in motion are best secured through the agency of four legs, and for millions of years the quadruped was the dominant species. The whole structure of civilization rests upon handwork, and it was the survival and developmental possibilities of the hand that caused the appearance of the biped. So the two feet that were now required to do the work of four underwent many essential changes. An elongated, fan-shaped foot with spreading toes and flexible arches replaced the small, uncomplicated pedal extremity of the quadruped. For thousands of years man wore no covering on his feet, but when he migrated to colder climates and was subjected

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to weather of a more bitter nature he turned to shoes for the sake of comfort.

It was not until after class distinctions had come in vogue and some wealth had accumulated that the wives and daughters could lead lives of leisure and distinguish themselves from working, walking women by the display of fashionable, unserviceable shoes that the foot ailments of humanity began. The laborer has large, natural, useful feet, so the obvious way to show people that you are not a laborer is to have small, unnatural, useless feet. Even the men of the wealthier classes were affected by this feminine ideal of exclusiveness. And both sexes of the working and lower classes, in spite of the necessity for using their feet, have always tried to imitate other classes in the selection of their shoes. Though the "common people" have discarded their belief that it is a disgrace to work, they still cling through habit to the type of shoe which was born of that conviction.

And while most of them don't know now why they are wearing the so-called fashionable shoes nor what effect such shoes have on health, strength and prosperity, these shoes

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are ruining their feet, their spines, their dispositions and their careers. If society's pedal covering departed only slightly from the natural lines and needs of the feet, there would be no occasion for alarm; but when it comes to forcing a fan-formed foot into a spike-shaped shoe, two or three sizes too short and only half as wide as it should be, and putting stilts under the heels that will throw one on the face unless the body is twisted into a corkscrew position to maintain one's balance, it is time for sensible individuals to quit the company of Lady Style.

The people must be taught that it is no disgrace to wear footgear that will permit them to use their feet with the greatest freedom and comfort, just as they have been taught that it is no dishonor to work. They must learn that a shoe can protect without torturing—that it can shield yet still be commodious and decorative. When they realize the true lineage of Dame Fashion, they will laugh at anyone who suggests that they should wear a shoe merely because it is the latest style.

(THE END)