agricultural implements continue to manufacture cripples quite as rapidly as war ever did.

To give an account of every improvement and peculiarity claimed by the various manufacturers of artificial limbs in this country would be to fill many pages with reprints from their catalogues; the space at the writer's disposal will allow only a brief mention of some of the chief features with which he is acquainted; there may be others just as good, and better. The Anglesey leg is practically the model from which all subsequent attempts are derived. It was introduced into America by Selpho, who, later on, improved it by making the knee-joint of two broad steel plates, the upper one convex, the lower concave and covered with leather; it had india-rubber buffers to prevent concussion at the ankle joint. The Palmer leg had an excentric hinge at the knee to prevent sudden flexion, and wooden joints with spiral springs to straighten them after flexion. Dr. Bly further modified the "Anglesey leg" by making the ankle-joint without bolts or ordinary hinge; in their place he used a ball of glass or ivory which was inserted in a bed of rubber and by this means lateral as well as antero-posterior motion was obtained.

The ankle-joint is the *crux* with most manufacturers; here we find most variety, and here too are the strong and weak points of the various limbs. The "Marks" leg has no ankle-joint at all, and a foot of rubber with a wooden core. The "Frees" limbs, on the other hand, by means of an ingenious double joint at the ankle (duplex ankle joint), give both lateral and antero-posterior motion at that joint. Between these two extremes of universal motion and no joint at all there are many with antero-posterior motion only; and each variety has excellencies claimed for it. The "Doerflinger" leg has a steel-bearing rocker-plate ankle-joint without cords, and also a foot of felt. In Fuller's "walkeasy" leg there are ball-bearing knee-joints for amputation below the knee, and sponge rubber foot with articulated ankle-joint; Fuller furnishes three varieties of ankle-joint, as well as a sponge rubber foot with rigid ankle. The adjustable double slip socket of the "Winkley Artificial Limb Company" is designed to secure an artificial leg that does not chafe, rub, or pull on the end of the stump, or irritate or make sore the place of bearing. The "Chicago Artificial Limb Company" makes a leg with a ball-bearing ankle-joint, and a felt foot, which is lighter than wood or rubber, also an aluminum limb. Which of all these varieties of legs and ankle-joints is the best, we cannot undertake to decide.

The first real *artificial foot* was made about one hundred and fifty years ago by Ravatau. "This apparatus was intended for a dragoon whose right foot had been amputated above the ankle. The whole mechanism consisted of a boot which reached above the knee, where it could be fastened with leather straps; the boot was laced its entire length. In its interior a metal strip extended on each side from top to bottom, and at the end was attached to a hollow metal cylinder, which was intended to replace the missing ankle-joint. The boot had a metal sole. Inside of the cylinder was a coiled spring, with convolutions like a snail shell, forming a contour of the foot. Thus an elasticity was imparted in walking. The empty spaces in the inside of the boot were filled with horsehair. The dragoon by means of this contrivance was able to serve many years in the army." (*Scientific American*, Supplement, No. 1374.)

*The Foot* has presented grave difficulties to the prosthetists, who are almost unanimous in condemning the various foot amputations as being unsatisfactory from the point of view of their art. After Chopart's, Lisfranc's, and Hey's operations, as the extensor tendons have been divided, the heel is apt to be drawn up by the tendo Achillis. Of all the foot amputations Syme's presents the best possibilities to the makers of artificial limbs.

In the case of children, it is a most mistaken policy to wait till they have finished growing before supplying them with an artificial leg. Such a course of delay, as is often adopted, makes the child grow up round-shouldered and one-sided; and, to say nothing of the appearance, a properly fitting apparatus is more healthful. Self-lengthening limbs or extension apparatus can be procured from most makers; the "Chicago Artificial Limb Company" furnishes a self-lengthening limb, perfectly adjustable, and capable of being lengthened by the purchaser.

*Upper Extremities.*—Previous to the last century we find little mention of artificial arms and hands. We read of an iron arm made for a captain in the sixteenth century, and an iron hand weighing about three pounds with fingers that could be flexed by the other hand, and extended by pressing a knob on the side of the hand. But most of these early hands and arms were designed to enable the wearer to hold a sword or shield, or to handle the reins. A monk and a locksmith figure in the early manufacture of artificial hands, but their productions have only a historic interest. The first really useful hand was devised by Pierre Ballif, a dentist of Berlin, nearly a hundred years ago; most of the modern hands being simple modifications. As the need for artificial hands and arms is more urgent than is that for lower extremities, so the manufacture of the same seems more difficult; some prosthetists do not supply them at all, and some others supply them but do not make them. Artificial hands of delicate workmanship will enable a patient to write, use a knife and fork, raise and lift a glass, or shake hands; but where strength is required, as for laborers and mechanics, it is better to have a solid stock into which can be inserted the various implements required. Almost any tool or agricultural implement can be used efficiently; in some cases they are inserted into the hand, and in others they take the place of the hand. The attachments are generally by means of a screw or the "bayonet lock."

An artificial limb should be applied as soon as possible; that is, as soon as the wound is healed, and there is a good healthy stump. When amputation has been performed for disease a longer delay will be necessary than when traumatism has been the cause of the mutilation. As soon as healing is complete and there is no longer any tenderness, the stump should be prepared by daily bathing and massage, followed by bandaging. This will give a firm stump without superfluous adipose tissue. Joints should receive passive motion, not only to prevent ankylosis, but also lest the muscles by contracting should limit motion. In case of delay the stump is apt to become flabby and enlarged, and while in that condition is totally unfit for the application of an artificial limb. Ordinarily a limb can be applied in from one to three months.

With regard to the stump most suitable for the application of artificial limbs it may be said that, while the general rule in amputation has been to save all that is possible, this should be interpreted somewhat laxly with regard to the lower extremity. In the upper extremity any, even the smallest remaining, part of a hand is far more useful than any artificial appliance; but in the lower extremity the loss of an extra inch or two is of no moment compared with a serviceable stump. An artificial arm applied to the shoulder, and artificial fingers, have merely a cosmetic effect, and cannot be of much service. An artificial arm of considerable utility can be applied to a stump when the amputation has been made anywhere between the upper third of the humerus and the wrist. In the lower extremity, amputations at the hip do not allow of the application of a limb that can be of much use. In thigh amputations, a serviceable stump can be obtained anywhere between a point within five inches of the hip to one situated within about three inches from the knee. Amputations within three inches of the knee, either above or below the joint, should (from the prosthetist's point of view) be avoided.

Whenever possible the patient should be measured for and fitted with the artificial limb by the manufacturer. It is true that many makers are willing to have the physician or even the patient or some lay friend take the measurement, and they will send full directions for the purpose; but every effort should be made to have the







manufacturer himself assume this responsible task. An artificial limb is not a luxury, to be indulged in for a short time, but is meant to be a daily companion for many years, and if it is not comfortable and does not fit properly, it will never be of much use. To the writer it seems as rational to order an artificial limb from one's own measurements, as it would be to order a set of artificial teeth in the same manner; doubtless it *could* be done, but fortunately there are other and better ways.

In choosing an artificial limb, bear in mind the requirements of the patient; the weight and construction of the limb are more important than the price. As a rule, the simpler the apparatus the greater its utility. A complex piece of mechanism which cannot be got at without taking to pieces the whole limb, and which is liable to be constantly in need of attention, adds considerably to the cost, and in the case of a laborer keeps him from his work. Generally, it will be found best to obtain the catalogues of various makers in the vicinity, and, on selecting one, to be guided largely by his opinion. A reputable maker cannot afford to supply a poor limb, and as a rule he knows a great deal more about the matter than the average physician.

There is no reasonable limit to the possibilities of an artificial leg. Not only do patients stand, walk, and run on it, as well as attend to their daily avocations, but many also dance, skate, and ride a bicycle with apparently as much ease as before they were crippled. Without indorsing the glowing descriptions put forth by some makers, which almost make one think that their productions are vast improvements on the natural limbs, one cannot but recognize the truth of the following: "It is of no small advantage nowadays both to surgeon and to patients to realize that the loss of a limb is not necessarily a disfiguring or mutilating affair, but that very frequently an artificial limb well fitted will be of vastly more service and less trouble and annoyance than a member already crippled by disease, or left in a condition where life even is thereby threatened. In other words, the art of the instrument maker has done very much to assist the surgeon, and to make patients willing to undergo serious operations who otherwise would be very loath to lose so useful a part of their bodies as one or more limbs. It has done much also to atone for the horrible injuries and mutilations inflicted by railway and other accidents" (Truax, in "Johnson's Encyclopædia," 1894, v., 270).

The *weight* of an artificial limb is a matter of some importance. Legs vary from two or three pounds to seven or eight pounds. It is a mistake to buy one that is too light. One must bear in mind the weight, occupation, age, sex, and stature of the patient. Other things being equal, a heavy leg lasts longer than a light one. Some patients prefer a fairly heavy limb, others a lighter one. As a rule, it is well to have a leg sufficiently heavy to bear *more* than any strain that is likely to be put upon it. Beyond this we would have the leg as light as possible. It must be noted that it is the weight of the *foot* which makes an apparently heavy limb.

The *cost* of an artificial limb varies according to the maker and the length of the limb. The present market price of a first-class leg, thigh amputation, is from $80 to $125; below the knee, about $35 to $75; foot, $30 to $50; arm and hand, above the elbow, $50 to $100; below the elbow, $40 to $75. These figures vary little if at all from those given in the former edition of the Reference Handbook; in reality they are cheaper, as the limbs of to-day are superior to those of a decade and a half ago.

*Durability* of artificial limbs. This, too, is variable. Some will last fifteen years or even longer, others, by the same maker, only three or four years; the difference depending mainly on the amount of care and attention bestowed upon the limb; much, too, depends on the habits and occupation of the wearer. From five to seven years may be taken as the average "life" of an artificial leg; an arm lasts ordinarily about twice as long. Alterations in the stump often necessitate, if not a new limb, some modification in the socket. Many limbs are cast aside, not because they are worn out but because the wearer wishes for a new one. The United States Government, with marked generosity, supplies its pensioners with new limbs every three years.

In giving a list of some of the manufacturers of artificial limbs we would borrow the cautious words of the writer on this subject in the former edition of the Reference Handbook: "The following list is given with some hesitation as it is of course only a partial one, and the writer does not wish to imply that there may not be better manufacturers in the country than these. But general practitioners have usually so slight a knowledge of this branch of industry that the following names of well-known and reputable manufacturers are given for their convenience": C. A. Frees, 853 Broadway, New York, and 106 Fifth Avenue, Chicago; A. A. Marks, 701 Broadway, New York; Daly & Co., Bible House, New York City; Sharp & Smith, 92 Wabash Avenue, Chicago; George R. Fuller Co., Rochester, N. Y.; The Doerflinger Artificial Limb Co., Milwaukee, Wis.; J. E. Hanger, 207 4½ Street, N. W., Washington, D. C.; The Chicago Artificial Limb Co., San Francisco, Cal.; William T. Simpson (successor to James A. Foster), Detroit, Mich.; The Duluth Artificial Limb Co., Duluth, Minn.; The Winkley Artificial Limb Co., Minneapolis, Minn.

*R. J. E. Scott.*

**LIMPING, DIAGNOSTIC SIGNIFICANCE OF.**—Among the first signs of hip disease is limping, which, in the early stage, may disappear entirely to return after an interval of days or weeks; it is present sometimes in the morning when the patient leaves his bed, and "wears off" after a brief period of activity; it breaks up the natural rhythm of walking in which equal time is given to the two feet. When he limps the patient leaves the well foot longer on the floor than the affected foot. He makes the well one give a more accented stroke as it hastens to relieve the affected limb from the weight of the body. The well limb hurries forward to take the blow of the descending body, and thus destroys the natural rhythm in which the two feet move alike and in equal time. The simplicity of the normal rhythm makes a slight deviation from it very noticeable, so that limping always receives early recognition and attention. But in the absence of all other signs and symptoms it may not be easy to say which foot is the affected one, a question which may be answered by noticing which foot strikes the floor the hardest and quickest blow in walking. The foot which does this is the well one. The patient unconsciously hastens the action of this foot in order to relieve the affected one from the blow of the weight of the body which accompanies walking. The rhythm of human locomotion has not received the attention to which it is entitled. Normal rhythm may be expressed as follows: One — two — one — two — one — two, and false rhythm thus: One—two——one—two——one—two.

Limping may be described as asymmetrical walking. In ordinary cases it depends less on a difference in the length of the limbs and on their deformed relation to the trunk than it does on a failure of the two limbs to make steps of equal length and in equal time. And much of the lameness which we see is preventable by learning to keep correct time in the motion of the feet. A perfectly well person can walk lame by simply giving more time to one foot than to the other, which may be demonstrated at once if the reader of this will lay down the book and walk across his room, violating in his steps the natural rhythm in which time is equally marked and letting one foot linger on the floor longer than the other at each step. And conversely, one who is really lame can lessen the appearance of being so by learning to observe the natural (one—two—one—two—one—two) rhythm of human locomotion. This precept has proved of especial value in hip disease.

*Adoniram B. Judson.*

**LINDEN FLOWERS.**—*Lime Flowers. Tilia Flowers.* The flowers of several species of *Tilia* (fam. *Tiliaceæ*). This article, though still extensively employed among the common people of Europe, and to some extent in this country, is of so little medicinal importance that it may be dismissed with brief mention. It contains a very small amount of volatile oil, with gum, sugar, and a little tannin. It is very mildly antispasmodic and emollient, and, given in the form of a copious warm draught, becomes diaphoretic. *Henry H. Rusby.*

**LINEVILLE MINERAL SPRINGS.**—Wayne County, Iowa.

Post-Office.—Lineville Springs. Hotel.

These springs are located two and one-half miles southwest of Lineville, a thriving town of 1,000 inhabitants, on the southwestern branch of the Chicago, Rock Island and Pacific Railroad. The Mineral Springs Hotel is a large, convenient, and commodious structure, picturesquely situated amid the hills bordering the Grand River. The scenery is diversified and interesting, and the atmospheric conditions are of a salubrious and invigorating character. Everything has been done to render the house and surrounding grounds pleasant, comfortable, and homelike. The sanitary arrangements are excellent, and, with pure air and the presence of the mineral springs, with hot and cold water, the place offers many inducements to the seeker after health or recreation. The water is brought from a point 150 feet below the surface by means of pipes to the interior of the hotel. It is clear and sparkling, and very pleasant to the palate. The following analysis was made by Mr. A. E. Woodward, late assistant geologist of the State of Missouri:*

One United States Gallon Contains:

| Solids. | Grains. |
|---|---|
| Silica | 0.11 |
| Alumina | .28 |
| Calcium sulphate | 1.90 |
| Magnesium sulphate | 3.18 |
| Sodium sulphate | 180.30 |
| Potassium sulphate | 1.74 |
| Sodium chloride | 15.07 |
| Total | 202.58 |

This is a valuable purgative water. It is useful in dropsical affections due to renal disorders. It has also produced excellent results in cases of chronic constipation, functional disturbances of the liver, certain cutaneous diseases, and other affections. *James K. Crook.*

**LINSEED.**—Linum. Flaxseed. "The seed of *Linum usitatissimum* L. (fam. *Linaceæ*)" (U. S. P.). The universally known and cultivated flax is a slender, blue-flowered annual, its bark contributing the extremely tough fibres from which linen is made. It is a native of the Old World, but has been in cultivation so long that its wild state is wholly unknown. There is no plant of which the proofs of its ancient use are so substantial; linen coverings are folded around Egyptian mummies more than twenty-five centuries old. It has also been found in the relics of the prehistoric Lake Dwellers of Switzerland. It is frequently mentioned in the Bible, and has been known from the earliest times of ancient Greece and Rome. The employment of the seeds is also of very ancient origin.

The plants being collected for their fibre, and dried, the seeds are combed off from them, and constitute the article under consideration. Since the plants are pulled up, considerable dirt is apt to get into the seed. This is increased by the seeds of many weeds, and these impurities are often very imperfectly winnowed out. In trade, the relative amount of this foreign matter is roughly estimated by shaking up the seeds in an inverted conical bag, which carries the impurities to the bottom, or tip of the cone. The character of this matter, furthermore, conveys to the expert an idea of the geographical source of the product.

The following is the official description of flaxseed: "About 4 or 5 mm. long, oblong-ovate, flattened, obliquely pointed at one end, brown, glossy, covered with a transparent, mucilaginous epithelium, which swells considerably in water; the embryo whitish or pale greenish, with two large, oily, plano-convex cotyledons, and a thin perisperm; inodorous; taste mucilaginous, oily and bitter. *Ground linseed* (linseed meal, or flaxseed meal), for medicinal purposes, should be recently prepared and free from unpleasant or rancid odor. When extracted with carbon disulphide, it should yield not less than twenty-five per cent. of fixed oil. The filtered infusion of ground linseed, prepared with boiling water and allowed to cool, has an insipid, mucilaginous taste, and should not be colored blue by iodine T.S. (absence of starch)." The British Pharmacopœia requires a yield of thirty per cent. of oil, and, as a matter of fact, nearly thirty-five per cent. should be yielded. There are about fifteen per cent. of gum, twenty-five per cent. of albuminous matter, a little resin, and a trace of amygdalin, which gives the bitter taste. The ash should not exceed five per cent. The chief adulterants are starch, and the use of a meal made from the ground cake left after the expression of the oil.

Uses.—Linseed is chiefly, if not entirely, used in medicine as the material of which poultices are made, for which, by its elasticity, its low conducting power for heat, and its retaining qualities for water, it is exceedingly well adapted. The addition of camphor, as a preservative and antiseptic, is common, and gives a stimulant tendency to the poultice. *Henry H. Rusby.*

**LINSEED, OIL OF.**—Oleum Lini. *Flaxseed Oil.* "A fixed oil expressed from linseed without the use of heat. A yellowish, or yellow, oily liquid, having a slight, peculiar odor, and a bland taste. When exposed to the air it gradually thickens, and acquires a strong odor and taste; and if spread, in a thin layer, on a glass plate, and allowed to stand in a warm place, it is gradually converted into a hard, transparent, resin-like mass (absence of *non-drying oils*).

"Specific gravity: 0.930 to 0.940 at 15° C. (59° F.).

"It does not congeal above −20° C. (−4° F.).

"Soluble in about 10 parts of absolute alcohol, and, in all proportions, in ether, chloroform, benzin, carbon disulphide, or oil of turpentine.

"It should not more than slightly redden blue litmus paper previously moistened with alcohol (limit of *free acid*).

"If 2 c.c. of the oil be shaken with 1 c.c. of fuming nitric acid and 1 c.c. of water, it should neither completely nor partially solidify, even after standing for one or two days (absence of *non-drying oils*).

"If 10 c.c. of the oil, contained in a small flask, be mixed with a solution of 3 gm. of potassium hydrate in 5 c.c. of water, then 5 c.c. of alcohol added, and the mixture heated for about five minutes on a water-bath, with occasional agitation, a dark-colored but clear and complete solution should be obtained.

"If this liquid be diluted with water to the measure of 50 c.c., then cooled, and shaken with 50 c.c. of ether, the clear, ethereal layer, after having separated, should not show a bluish fluorescence, and when carefully decanted and allowed to evaporate spontaneously should leave not more than a slight, and not oily, residue (absence of *paraffin oils*)" (U. S. P.).

This differs from most other fixed oils in its large percentage of albuminous matter, though this imparts no special medicinal properties. Rancidity and septic contamination should be guarded against. Its chief use in medicine is in the formation of the official *Linimentum Calcis*, Lime Liniment or Carron Oil, consisting of equal parts of this and lime water, a favorite application to burns, as is the oil itself. The oil is used upon an immense scale in the arts. *Henry H. Rusby.*

**LINT.**—A loose, soft, and fine mat or fabric of linen fibre, used as an application to wounds, to check hemorrhage by the mechanical action of the fibre, to serve as packing or padding and as an absorbent vehicle for the

* Geological Report of the Mineral Waters of Iowa, 1892, p. 127.





application of medicinal substances. The best is the "patent" or woven lint. It is a soft, loosely woven cloth, with a heavy flocculent nap on one side, beautifully bleached and clean, and so tender that it can be easily torn in either direction or pulled into woolly bits. Picked, scraped, and ravelled lints, made, as their names indicate, from old linen cloths, are now mostly of domestic employment, having been superseded in the hands of physicians by the lint just mentioned and the now beautifully prepared "absorbent cotton."

Very similar substances are *tow* and *oakum*. The former is the tangled fibres heckled out in the production of linen fibre. The latter is the former soaked in tar, and adds antiseptic to the mechanical properties of the tow. *Henry H. Rusby.*

**LIPANIN.**—A fatty compound formed by the addition of five or six per cent. of oleic acid to fine olive oil. It has been proposed by von Mering as a substitute for cod-liver oil. Its use was suggested by the theory of Buckheim that the beneficial action of cod-liver oil was due to the fatty acids it contained. The proposed substitute is more palatable and is easily retained by the weakest stomach, and, when it is desired to do so, it may be readily formed into an emulsion. The dose for children is one teaspoonful before meals; for adults, one tablespoonful. *Beaumont Small.*

**LIPOGENESIS.**—Under this heading we have to consider how the abnormal accumulation of fat in the tissues takes place, and we divide the subject into two heads: 1. Fatty Infiltration; 2. Fatty Degeneration.

1. *Fatty Infiltration.*—In this process the fat which is formed outside of the cells, elsewhere in the body, simply accumulates in the cells. These contain larger or smaller droplets of fat. In perfectly typical cases the remaining protoplasm of the cell shows no degeneration, although the pressure of the fat droplets may produce a passive atrophy in other cases. Fatty infiltration occurs under normal as well as pathological conditions. Abnormal fatty infiltration of cells can scarcely be distinguished morphologically from those involved in fatty degeneration.

There is another phase of fatty infiltration, as seen in the heart, pancreas, etc., in which the fat accumulates in the cells of the interstitial connective tissue in a manner identical with that in which the normal panniculus adiposus is formed. In such conditions the accumulated fat may cause a secondary pressure atrophy upon the heart muscle cells, or upon the gland cells, etc.

Fatty infiltration and fatty degeneration may take place simultaneously.

2. *Fatty Degeneration.*—In this condition also of abnormal accumulation of fat in the tissues, it has been assumed in the past that the fat is formed by a retrograde metamorphosis, or degeneration, of the proteid elements of the cell protoplasm, by which process the integrity and capacity of the cell are injured. The correctness of this assumption has lately been called in question. It involves in large measure the solution of the physiological problem whether normally the fat in the body is formed from proteids or from carbohydrates. Many experiments and arguments have been made to solve this question, but it does not yet appear to have been satisfactorily answered. We need to know the following in connection with the processes known as fat metamorphoses (fatty degenerations): What are these fats? Do they differ from the physiological fats? Whence are they derived? To a certain extent the pathological questions await the solution of the physiological questions, but the interdependence need not be necessarily complete; for even were it shown that physiologically fats are or are not produced from proteids, the contrary would still be possible under pathological conditions.

Schäfer makes the following statement in his "Physiology": "That fat is formed from proteid has been almost universally accepted by physiologists." This is a question which was for many years held to have been settled by the experiments of Pettenkofer and Voit. But this view has been strenuously attacked of late by Pflüger, Taylor, Athanasiu, and others. When we come into the domain of pathology the subject is still more nebulous. The current pathological teaching is that in fatty degeneration the proteids of the diseased cells become converted into fats. Virchow and Klebs are largely responsible for this. Taylor remarks that in general pathological literature no explanation or discussion of worth attends this statement, and that a serious error has been made in thus dismissing with an unequivocal statement one of the most fundamental problems of biology. To those who would pursue the matter further, I refer, for critical review of the entire subject, to Taylor, "Critical Summary of the Question of Fatty Degeneration," *American Journal of the Medical Sciences*, 1899, cxvii., 569, and *Journal of Experimental Medicine*, vol. iv., p. 399, 1899; and to the article by Athanasiu in Pflüger's *Archiv*, 1899, lxxiv.

Taylor, after his critical review of the subject, draws the following conclusions: "1. The formation of fats out of proteids physiologically has not been demonstrated or made probable. 2. A formation of fats out of proteids pathologically has not been demonstrated. On the contrary, the weight of evidence is against it and in favor of the conception of the so-called fatty metamorphosis as infiltrations or formations of fat from carbohydrates."

"This position is provisional, and not conclusive. No one pretends to-day that the formation of fat from proteids is impossible; it has simply not been demonstrated or even made plausible. Future work must confirm or reverse our present conclusions."

In fatty degeneration there is an accumulation of larger and smaller fat droplets in the cell, sometimes so slight as to be scarcely visible, sometimes so great as largely to replace the protoplasm, crowding the nucleus to one side. These strongly refractile fat droplets are not changed by dilute acetic acid, are soluble in ether (being thus distinguished from albuminous granular degeneration), and when fresh are stained black by osmic acid. Macroscopically, organs affected with marked fatty degeneration are usually larger and softer than normal, have a grayish-yellow color, or are mottled with yellowish streaks or patches, and the normal markings of cut surfaces are more or less obscured.

Fatty degeneration may be associated with, or may follow, albuminous degeneration, and may occur under similar conditions. In addition to its local occurrence, as a result of local disturbances of circulation in the vicinity of inflammations or in tumors, etc., it is apt to occur in the liver, heart muscle, and kidney in chronic exhausting diseases, and in conditions and diseases to which profound anæmia is incident, or as the result of the action of certain poisons, such as phosphorus, arsenic, etc.

*Clarence Arthur McWilliams.*

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Delafield and Prudden's Pathology.
Schafer: Text-book of Physiology, vol. i., p. 934.
Taylor, as above.
Athanasiu, as above.

**LIPOMA.** See the Appendix.

**LIQUEFACTION NECROSIS.** See *Necrosis*.

**LIQUORICE ROOT.**—(Glycyrrhiza, U. S. P.; Glycyrrhizæ Radix, B. P.; Radix Liquiritiæ, Ph. G.; Reglisse, Codex.)

The dried root of *Glycyrrhiza glabra* L. (Spanish liquorice) and of *G. glandulifera* Waldstein and Kittaibel (Russian liquorice) (fam. *Leguminosæ*).

The liquorice plants are large perennial herbs, the different species either smooth or hairy. That first named grows principally in southern Europe, the second chiefly in southwestern Asia and adjacent Europe. Both are largely cultivated, the former much more extensively. The plant sends down a very long root, which is nearly vertical, but may have several smaller branches. From