QUESTIONS FOR TOPICAL REVIEW.

NOTE.

Some Properties of Bone.—The power of bone to resist decay is remarkable. Fossil bones deposited in the ground long before the appearance of man upon the earth have been found by Cuvier exhibiting a considerable portion of cartilage. The jaw of the Cambridge mastodon contained over forty per cent. of animal matter—enough to make a good glue—and others about the same. From this we see that a nutritious soup might be made from the bones of animals that lived before the creation of man. The teeth resemble bone in their structure, but resist decay longer; they are brought up by deep-sea dredging, when all other parts of the animal have wasted away. The bones differ at different ages, and under different social conditions. In the disease called "rickets," quite common among the ill-fed children of the poor in Europe, but somewhat rare in America, there is an inadequate deposit of the mineral substance, rendering the bones so flexible that they may be bent almost like wax. In females and weak men the bones are light and thin, while in a powerful frame they are dense and heavy. Exercise is as necessary to the strength of bone as to the strength of muscle; if a limb be disused, from paralysis or long sickness, the bones lose in weight and strength as well as the soft parts. Bone is said to be twice as strong as oak, and, to crush a cubic inch of it, a pressure equal to 5,000 pounds is requisite.

CHAPTER II.

THE MUSCLES.

Movements of the Body—The Muscles—Flexion and Extension—The Tendons—Contraction—Physical Strength—Relative Strength of Animals—Physical Culture—Necessity for Exercise—Its Effects—Forms of Exercise—Excessive Exercise—Walking—Riding—Gymnastics—Open-air Exercise—Sleep—Recreation.

1. Movements of the Body.—We have seen that, in some respects, the human body resembles a house built for the soul to dwell in. But, inasmuch as its walls are flexible and its foundation is movable, it is something more than a house; in some respects, it may be likened to a machine. The body has the power of motion, as when we swing the arm; it is also capable of locomotion, as when we walk or run from one place to another. The machinery which effects these and many other movements is the *muscles*. The word muscle means "a little mouse," and is supposed to refer to the peculiar sensation produced, as of a small moving body, when a muscle is felt in action; for example, grasp the upper portion of the arm while the elbow-joint is caused to move to and fro. The burrowing motion then felt in the front of the arm is caused by the action of the "biceps" muscle (Fig. 6). This is the muscle which, in the arm of the blacksmith, becomes so large and powerful.

2. The Muscles, or the Flesh.—The muscles, nearly four hundred in number, form the great bulk of the body external to the skeleton. They largely determine its weight and outline. They are nearly all designed to move the bones, but a few act

upon the softer parts; for example, those that move the eye, eyelids and lips.

3. The Tendons.—Tendons, or sinews, are the extremities of muscles, and are firmly fastened upon the bones. They are very strong, and of a silvery whiteness. They may be felt just beneath the skin, when the muscles are being used, as at the bend of the elbow or knee. The largest tendon of the body is that which is inserted into the heel, called the tendon of Achilles, after the hero of the Grecian poet, the fable relating that it was at this point that he received his death-wound, no other part of his body being vulnerable.

4. Structure of the Muscles.—The muscles are composed of a soft substance, of a deep red color, which closely resembles the lean meat of beef. Under the microscope, we observe that it is composed of layers and bundles of small fibres. And these are, in turn, made up of still finer fibres, called *fibrillæ* (Fig. 8). The fibres are beautifully marked by regular cross lines, or stripes, about ten thousand to an inch. These circular markings are always present in the voluntary muscles, and hence they are known as the "striped" muscles.

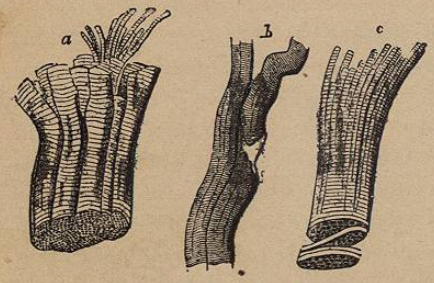

FIG. 6.—MUSCULAR TISSUE.
a, *b*, Striped muscular fibres; *c*, The same more highly magnified.

5. Voluntary and Involuntary Muscles.—The muscles are divided into two classes, the voluntary and the involuntary. In the first class are those which are used only when we wish or will to use them—as the muscles of the hand or arm. The second includes those which are not under the control of the mind. The heart is a muscle of the involuntary variety. We cannot change its action by an effort of the will. During profound sleep, when the will is entirely at rest, the heart continues to beat without cessation. The muscles concerned in breathing are partially under our control, but they are chiefly involuntary, and, therefore, continue to act while the mind is at rest or is fully occupied in work or play.

6. Muscular Contraction.—Whenever a muscle is caused to act it undergoes *contraction*, or a change of form by which its two ends are brought more nearly together. The raising of the arm, the bending of the finger and most of the ordinary movements of the limbs are effected by the will; but the will is not the only means of producing muscular action. Electricity, or a sharp blow over a muscle will also produce it.

7. Contraction is not the permanent state of a muscle. It cannot long remain contracted, but after a shorter or longer time, it wearies and is obliged to relax. After a short rest it can then again contract. For this reason, it is more fatiguing to stand for any great length of time in one position, than to be walking.

8. Relative Strength of Animals.—The amount of muscular power which different animals possess has been tested by experiment. It is found that man is able to drag a little less than his own weight. A draught-horse can exert a force equal to about two-thirds of his weight. The horse, therefore, though vastly heavier than man, is relatively not so powerful. Insects are remarkable for their power of carrying objects larger and heavier than themselves. Many of them can drag ten, and even twenty times their weight. Some of the beetles have been known to move bodies more than forty times their own weight.

9. Physical Strength.—The difference in strength, as seen in different individuals, is not due to any original difference in their muscles. Nature gives essentially the same kind and amount of muscles to every healthy person, and the power of one, or the weakness of another, arises, in great part, from the manner in which these organs are used or disused.

10. Importance and Effects of Exercise.—Action is the law of the living body. Every organ demands use to preserve it in full vigor, and to obtain from it its best services. Exercise consists in a well-regulated use of the voluntary muscles, but its effects are not limited to the parts used. Other organs are indirectly influenced by it. The heart beats more rapidly, the skin acts more freely, the brain is invigorated, and the appetite and power of digestion are increased.

11. The first effects of exercise, however, are upon the muscles themselves. If we examine a muscle thus improved by exercise, we find that its fibres have become larger and more closely blended together, that its color is of a darker red, and that the supply of blood-vessels has increased. Without exercise the muscle appears thin, flabby, and pale. On the other hand, excessive exercise, without sufficient relaxation, causes a similar condition. The muscle then becomes flabby and weak, because it is worn out more rapidly than nature builds it up.

12. Violent exercise is not beneficial, as strength is the result of a gradual growth. To gain the most beneficial results, the exercise should be at regular hours and during a regular period, the activity and the time varying with the strength of the individual and measured by it.

13. Different Modes of Exercise.—There are very few who have not the power to walk. There is required for it no expensive apparatus, nor does it demand a period of preliminary training. *Walking may be called the universal exercise.* With certain foreign nations, the English especially, it is a very popular exercise, and is practised habitually by almost every class of society. Running, leaping, and other more rapid and violent movements, are the forms of exercise that are most enjoyed in childhood. For the child, they are not too severe, but they may be so prolonged as to become injurious. Instances have been recorded where sudden death has resulted after violent playing, from overtaxing the heart: for example, we have the case of a young girl who, while skipping the rope, and

endeavoring to excel her playmates by jumping the greatest number of times, fell dead from rupture of the heart.

14. Carriage-riding is particularly well suited to invalids, and to persons advanced in life. Horseback exercise brings into use a greater number of muscles than any other one exercise, and with it there is an exhilaration of feeling which refreshes the mind at the same time. That form of exercise which interests and diverts the mind will yield the best results; and as many sets of muscles should be employed as possible, open-air exercise being the best. No in-door exercise, however excellent in itself, can fill the place of hearty and vigorous activity in the open air.

15. Excessive Exercise.—If neglect of exercise is injurious, so also is the excess of it. Violent exertions do harm; they often cause undue strain, and even lasting injury to some part of the body. For this reason the spirit of rivalry which leads to tests of endurance and feats of strength should be discouraged. Those trials of the muscles, especially, which are supposed to demand "training" should not be encouraged. Training, it is true, can produce a remarkable muscular development, so that nearly every muscle of the limbs is as large and corded as the arm of a blacksmith, but it is too often at the expense of some internal, vital organ. Large muscles are not a certain index of good health. It was well known by the ancients that athletes of their day were short-lived, notwithstanding the perfection of the physical training then employed. When a person overtasks the heart, or, in other words, "gets out of breath," he should regard it as a signal to take rest. It is well known that both horses and men, after having been brought into "condition" for competitive trials, soon lose the advantages of their training after the occasion for it has passed.

16. Rest.—We cannot always be active: after labor we must rest. We obtain this rest partly by suspending all exertion, as in sleep, and partly by change of employment. It is said that Alfred the Great recommended that each day should be divided

in the following manner: "Eight hours for work, eight hours for recreation, and eight hours for sleep." This division of time is as good as any that could now be made, if it be borne in mind that, when the work is physical, the time of recreation should be devoted to the improvement of the mind; and when mental, we should then recreate by means of physical exercise.

17. During sleep, all voluntary activity ceases, the rapidity of the circulation and breathing diminishes, and the temperature of the body falls one or two degrees. In consequence, the body needs warmer coverings than during the hours of wakefulness. During sleep, the body seems wholly at rest, and the mind is also inactive, if we except those involuntary mental wanderings which we call dreams. Nevertheless it is not an idle period. Nutrition, or the nourishing of the body, now takes place. While the body is in action, the process of pulling down predominates; but in sleep, that of building up is more active. If sleep is insufficient, the effects are seen in the lassitude and weakness which follow.

18. All persons do not require the same amount of sleep, but most men need from seven to nine hours. Frederick the Great required only five hours of sleep daily, and Bonaparte could pass days with only a few hours of rest. But this long-continued absence of sleep is attended with danger. After loss of sleep for a long period, in some instances, stupor has come on so profoundly, that there has been no awaking.

19. There are instances related of sailors falling asleep on the gun-deck of their ships while in action. On the retreat from Moscow, the French soldiers would fall asleep on the march, and could only be aroused by the cry, "The Cossacks are coming!" Tortured persons are said to have slept upon the rack in the intervals of their torture. In early life, while engaged in a laborious country practice, the writer not infrequently slept soundly on horseback. These instances, and others, show the imperative demand which nature makes for rest in sleep.

TABLE OF THE PRINCIPAL MUSCLES.

The Head.

Oc-cip'i-to—fron-ta'lis, moves the scalp and eyebrows.
Or-bic-u-la'ris pal'pe-brae, closes the eye.
Le-va'tor pal'pe-brae, opens the eye.
The Recti muscles (4 in number), move the eye-ball.
Tem'po-ral, Mas-se'ter, } raise the lower jaw.

The Neck.

Pla-tys'ma My-oi'des, Ster'no Mas'toid, } move the head forwards.
Sca-le'ni muscles move the neck from side to side.

The Trunk.

Pec-to-ra'lis, moves the arm forwards.
La-tis'si-mus dor'si, moves the arm backwards.
Tra-pe'zi-us, Ser-ra'tus mag'nus, Rhom-boi de'us } move shoulder-blade.
In-ter-cos'tals, move the ribs in respiration.
External Oblique, Internal Oblique, } move the trunk forwards.
Erec'tor spi'næ, move the trunk backwards.

The Upper Limb.

Del'toid, raises the arm.
Te'res ma'jor, lowers the arm.
Sub-scap-u-la'ris, Spi-na'tus, } rotate the arm.
Bi'ceps, bends forearm.
Tri'ceps, straightens forearm.
Pro-na'tor, Su-pi-na'tor, } rotate forearm.
Flex'or car'pi ra-di-a'lis, " " ul-na'ris, Exten'sor car-pi ra-di-a'lis, " " ul-na'ris } move the hand.

More than 30 muscles take part in moving the fingers.

The Lower Limb.

Il-i'a-cus, Pso'as mag'nus, Pec-tin-e'us, Ad-duc'tor, } move the thigh forwards.
Glu-te'us, Pyr-i-form'is, } move the thigh backwards.
Sar-to'ri-us (from *Sar'tor*, a tailor), crosses one thigh over the other.
Rec'tus, Vas'tus, } move the leg forwards.
Bi'ceps, Grac'i-lis, } move the leg backwards.
Tib-i-a'lis, Per-o-ne'us, Gas-troc-ne'mi-us, So-le'us, } move the foot.

Twenty muscles take part in moving the toes.

QUESTIONS FOR TOPICAL REVIEW.

NOTE.

The Ill Effects of Over-exertion.—"It should be recollected that the action of the muscles has limits, as well as that of every other organ of the body. The muscles and the heart may be taxed too severely, and permanent derangements may be produced by overtaxing the human body. The ancient gymnasts among the Greeks are said to have become prematurely old, and the clowns (or acrobats) and athletes of our own days suffer from the severe strain put upon their muscular systems." The effects of boat-racing in England have been thus described by Mr. Skey, an eminent surgeon: "The men look utterly exhausted. Their white and sunken features and pallid lips show serious congestion of the heart and lungs, and the air of weakness and lassitude makes it a marvel how such great exertion should have been so nobly undergone. We have repeatedly seen the after ill-effects—spitting of blood, congested lungs, and weakness of the heart from over-distension." "Persons should neither walk, run, leap, or play at any game, to the extent of producing permanent or painful exhaustion. All exercise should be attended with pleasurable feelings; and when pain is produced by proper exercise, those who suffer should rather seek medical advice than persevere in exercise."—*Lankester's Manual of Health.*

CHAPTER III.

THE INTEGUMENT, OR SKIN.

The Skin—Its Structure—Its Changes or Growth—The Nails and Hair—The Complexion—The Sebaceous Glands—The Perspiratory Glands—Perspiration and its Uses—Importance of Bathing—Different kinds of Baths—Manner of Bathing—The Benefits of the Sun—Importance of Warm Clothing—Poisonous Cosmetics.

1. The Skin.—The skin is the outer covering of the body. The parts directly beneath it are very sensitive, and without its protection life would be an agony, as is shown whenever by accident the skin is broken or torn off, the bared surface being very tender and sensitive even to exposure to the air.

2. The Structure of the Skin.—When examined closely, the skin is found to be made up of two layers—the outer and the inner. The inner one is called the *cutis*, or true skin; the outer one is the *epidermis*, or scarf-skin. The latter is also known as the *cuticle*. These two layers are closely united, but they may be separated from each other. This separation takes place whenever, from a burn, or other cause, a blister is formed; a watery fluid is poured out between the two layers, and lifts the epidermis from the true skin.

3. The Scarf-Skin.—Of the two layers, the outer is the thinner one, and has the appearance of a whitish membrane. It is tough and elastic; it has no feeling and does not bleed when cut. On the palm of the hand, where the scarf-skin is especially thick, a needle may be run in and out of it without causing pain or drawing blood. If it be magnified, it will be

found to be composed of numberless flat cells, or scales, arranged layer upon layer. Its thickness varies in different parts of the body. Where exposed to use, it is thick and horn-like, as may be seen on the soles of the feet, or on the palms of the hands of those who are accustomed to perform much manual labor.

4. The Cutis, or True Skin.—This layer lies beneath the scarf-skin. It is firm, elastic, very sensitive, and is freely supplied with blood-vessels. Hence a needle entering it not only produces pain, but draws blood. It is closely connected with the tissues below it, but may be separated by means of a sharp instrument. The surface of the cutis is not smooth, but is covered here and there with minute elevations, called *papillæ*. These are arranged in rows, or ridges, such as those which can be seen plainly in the palm and thumb; their number is about 80 to the square line (a line being one-twelfth of an inch). These *papillæ* contain blood-vessels and nerves, and are largely concerned in the sense of touch; hence they are abundant where the touch is most delicate, as at the ends of the fingers.

5. Changes in the Skin.—Like all other parts of the body, the scarf-skin is constantly being worn out; it dries, shrivels and falls from the body in the form of fine flakes, or scales. In the scalp, these scales form the "dandruff." As fast as it wears away, it is renewed from beneath. This seemingly simple process is very important, for by it a uniform thickness is secured to the covering of the body. If it were otherwise, this covering would grow thicker as it grew older, like the bark of a tree, until it became unwieldly; it would prevent perspiration also, and this, as we shall see, would be fatal to life. The growth of the true skin is provided for in the blood vessels which abound in it.

6. The Nails.—These are appendages of the skin. The nail grows from a fold of the cuticle at the root, and from the under surface. The rapidity of its growth can be ascertained by filing a slight groove on its surface, and noticing how the space between it and the root of the nail increases, in the course of a few weeks. When the nail is removed by any accident, it will be replaced by a new one, if the root be not injured. The practice of biting the nails should be avoided, not only because of the ugly shape which is produced, but because it impairs the sense of touch in the ends of the fingers. The nail serves as a protection to the end of the finger, and also enables us to grasp more firmly, and to pick up small objects.

7. The Hair.—The hair is produced in a similar manner, the skin forming depressions, or hair sacs, from the bottom of which they grow and are nourished (Fig. 7). The bulb, or root, from which the hair arises, is lodged in a small pouch, or depression in the skin. The shaft is the part which grows out beyond the level of the skin. Its growth is altogether in one direction, in length alone.

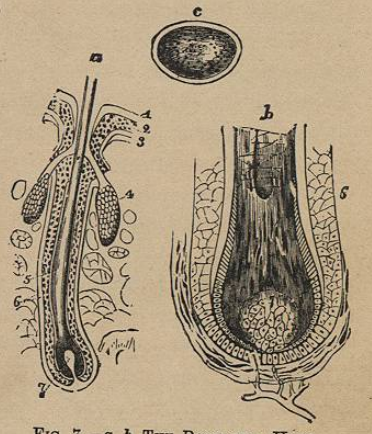

FIG. 7.—*a. b.* THE ROOT OF A HAIR. 1, 2, 3. The skin forming the hair sac. 4. Sebaceous glands. 5. The hair sac. *c.* TRANSVERSE SECTION OF A HAIR.

8. The outer part of the hair is quite firm, while its interior is softer, and supplies the nutriment by which it grows. The hair is a protection to the parts it covers. On the head, it shields the brain from extremes of heat and cold, and moderates the force of blows upon the scalp. On the body it is useful in affording a more extensive surface for carrying off the perspiration.

9. The Complexion.—In the deeper cells of the scarf-skin lies a pigment, or coloring matter, consisting of minute colored grains. On this pigment *complexion* depends; and its presence, in less or greater amount, occasions the difference of hue that exists between the light and the dark races of men, and between

the blonde and brunette of the white races. Freckles are due to an irregular increase of coloring matter.

10. The Sebaceous Glands.—In all parts of the surface where the hairs grow are to be found the *sebaceous*, or oil-producing, glands. These glands are little rounded sacs, or pouches, usually connected with the hair-bulbs; and upon these bulbs they empty their product of oil, which acts as a natural dressing for the hair (4, Fig. 7). A portion of the sebaceous matter passes out upon the surface, and prevents the cuticle from becoming dry and hard. It also sheathes the skin from the irritation by the acrid properties of the perspiration. The glands situated upon the face and forehead, open directly upon the skin. In these, the sebaceous matter is liable to collect, and become too hard to flow off naturally. The mouths of these glands, around the nose and on the forehead of young people, frequently appear as small black points, which are incorrectly called "worms."

11. The Perspiratory Glands.—The chief product of the skin's action is the perspiration. For the formation of this, there are furnished countless numbers of little sweat-glands in the true skin. They consist of fine tubes which measure about one-tenth of an inch in length. In diameter, they are about one three-hundredth of an inch, and upon parts of the body there are not far from three thousand of these glands to the square inch. Their whole number in the body is, therefore, very great; and it is computed if they were all united, end to end, their combined measurement would exceed three miles.

12. The Sensible and Insensible Perspiration.—The pores of the skin are constantly exhaling a watery fluid; but, under ordinary circumstances, there is no moisture apparent upon the surface, for it passes off in the form of vapor as rapidly as it is formed. This is called insensible perspiration. Under the influence of heat or exercise, however, this fluid is formed more abundantly and appears on the surface in minute, colorless drops. It is then termed sensible perspiration. Water is

the chief part of this fluid. The average daily amount escaping from the body by perspiration in the adult, is not far from two pints, or more than nine grains each minute.

13. The Uses of the Perspiration.—Besides liberating from the blood this large amount of water, with the worn-out matter it contains, perspiration regulates the temperature of the body. As evaporation always diminishes temperature, so perspiration as it passes off in the form of fine vapor cools the surface. In hot weather this function is much more active, and the cooling influence increases in proportion.

14. The importance of perspiration is shown by the effects that often follow its temporary interruption, namely, headache, fever, and the other symptoms that accompany "taking cold." When its flow is stopped for a considerable time, the consequences are very serious. Experiments have been performed upon certain smaller animals, as rabbits, to ascertain the results of closing the pores of the skin. When they are covered by a coating of varnish impervious to water and gases, death ensues in from six to twelve hours; the attendant symptoms resembling those of suffocation.

15. The Importance of Bathing.—From these considerations, it is evident that health must greatly depend upon keeping the skin clean. "He who keeps the skin ruddy and soft, shuts many gates against disease." For as the watery portion of the perspiration evaporates, the solid matter is left behind. There, also, remain the scales of the dead scarf-skin and the excess of sebaceous matter. The healthful action of the skin requires that these impurities be removed by the frequent application of water.

16. In warm climates and during hot weather, bathing is especially necessary. For a person in good health, a daily cold bath is advisable. To this should be added occasionally a tepid bath, with soap, water alone not being sufficient to remove impurities of a greasy nature like the sebaceous matter.

17. There is a maxim by the chemist Liebig, to the effect

that the civilization of a nation is high in proportion to the amount of soap that it consumes; and that it is low in proportion to its use of perfumes. In some degree, we may apply the same test to the refinement of an individual. The soap removes impurity; the perfume covers, while retaining it.

18. The different kinds of Baths.—All persons are not alike able to use the cold bath. When the health is vigorous, a prompt reaction and glow upon the surface will show that it is beneficial. Where this pleasurable feeling is not experienced, but rather a chill and sense of weakness follows, we are warned that the system will not endure cold bathing.

19. It should also be borne in mind, that the warm or hot bath cannot be continued so long, or repeated so frequently as the cold, on account of the weakening effect of unusual heat so applied to the body. For persons who are not in robust health, one warm bath each week is sufficient. Sea-bathing is even more invigorating than fresh-water bathing. Those who cannot endure the fresh water, are often benefited by the salt-water baths.

20. Time and Manner of Bathing.—A person in sound health may take a bath at almost any time, except directly after a full meal. The most appropriate time is about three hours after a meal, the noon-hour being probably the best. For the cold bath, taken rapidly, no time is better than immediately after rising. Those beginning the use of cold baths should first try them at 70° Fahr., and gradually use those of a lower temperature. From five to twenty minutes may be considered the proper limit of time to remain in a bath; but a sensation of chilliness is a signal to withdraw instantly, whether at home, or at the sea-side. Two sea-baths may be taken daily; one of any other kind is sufficient.

21. The body should be warm, rather than cold, when stepping into the bath; and after it, the skin should be thoroughly dried with a coarse towel. It is best to continue friction until there is a sensation of warmth or "glow" throughout the entire surface. This reaction is the test of the good effects of the bath. If reaction is still incomplete, a short walk may be taken, especially in the sunshine.

22. Bathing among the Ancients.—The Romans and other nations of antiquity made great use of the vapor-bath as a means of preserving the health, but more particularly as a luxury. The Thermæ, as the baths of Rome were called, were of great extent, built very substantially, and ornamented at vast expense. They were practically free to all, the cost of a bath having been less than a cent. It is related that some persons bathed seven times a day. After the bath their bodies were anointed with perfumed oil. If the weather was fine, they passed directly from the Thermæ into the gymnasium and engaged in some gentle exercise previous to taking the midday meal. Swimming was a favorite exercise, and a knowledge of it was regarded as necessary to every educated man. Their common expression, when speaking of an ignorant person, was, "He can neither read nor swim."

23. The Sun-Bath.—Some also were accustomed daily to anoint themselves, and lie or walk in apartments arranged for the purpose, with naked bodies exposed to the direct rays of the sun. We may judge somewhat of the benefits of the sun, by observing the unnatural and undeveloped condition of plants and animals which are deprived of light. Plants become blanched and tender; the fish of subterrannean lakes, where the light of day does not enter, are undersized, and have no eyes; men growing up in mines are sallow, pale, and deformed.

24. Clothing.—More harm arises from using too little clothing than too much, especially in a changeful climate like our own. Boerhaave says, "We should put off our winter clothing on midsummer's day, and put it on again the day after. Only fools and beggars suffer from the cold; the latter not being able to get sufficient clothes, the others not having the sense to wear them." The practice of exposing the limbs and necks of young children is quite hazardous. As the

skin is constantly acting, by night as well as by day, it is conducive both to cleanliness and comfort to change the clothing entirely on retiring for the night. The day clothing should be aired during the night, and the bedding should be aired in the morning, for the same reason.

25. Poisonous Cosmetics.—The extensive use of *cosmetics* for the complexion is a fertile source of disease. The majority of these preparations contain certain poisonous mineral substances, chiefly lead. The skin rapidly absorbs the fine particles of lead, and the system experiences the same evil effects that are observed among the operatives in lead-works and painters, namely, "painters' colic," and paralysis of the hands, called "wrist-drop."

26. Certain hair-dyes also contain lead, together with other noxious and filthy ingredients. These do not work as great harm as the cosmetics, since they are purposely kept away from the skin, but they rob the hair of its vitality. Eye-washes, too, are made from solutions of lead, and many an eye has been ruined by their use. They deposit a white metallic scale on the surface of the eye, which when in front, permanently blurs the sight.

QUESTIONS FOR TOPICAL REVIEW.

CHAPTER IV.

FOOD AND DRINK.

The Necessity for Food—Waste and Repair—Hunger and Thirst—Amount of Food—Renovation of the Body—The Sources of Food—Its Classification—Water and its Purity—Salt—The Necessity of a Regulated Diet—Milk—Meats—Fish—The Vegetables—The Fruits—Coffee and Tea.

1. The Necessity for Food.—Activity is everywhere followed by waste. During life, our bodies are ceaselessly active, undergoing a constant round of changes in nearly all their parts. Thus the wear is constant. The particles that are worn out are thenceforth useless, and must be removed from the body. Their loss must be made good by constantly renewed supplies of strength-giving particles. Hence the daily recurring demand for food and drink. In health, therefore, while the body is always wasting, it is constantly renewed, and does not greatly change from day to day either in size, form, or weight.

2. Hunger and Thirst.—When the system is deprived of its supply of solid food during a longer time than usual, nature gives warning by the sensation of hunger, to repair the losses that have taken place. The feeling of thirst, in like manner, is evidence that the system is suffering from the want of water. The length of time that man can exist without food or drink is estimated to be about seven days. If water alone be supplied, life will last some days longer; there being cases recorded where men have lived twenty days and over, without taking any solid food.