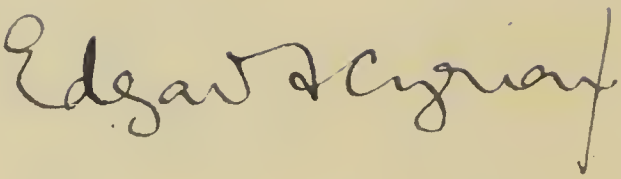
STRENGTH

HOW TO GET STRONG AND KEEP STRONG

RICHARD A. PROCTOR



THE APOLLO BELVEDERE.

STRENGTH

HOW TO GET STRONG AND KEEP STRONG

WITH CHAPTERS ON

ROWING AND SWIMMING, FAT, AGE, AND THE WAIST

BY

RICHARD A. PROCTOR

'Jin'yus! Jin'yus!
Tak' care o' your carkus!'—CHARLES READE

''Tis mighty plain
That the weakes' place mus' stan' the strain;
'N the way t' fix it, as I maintain,
Is only jest
T' make that place as strong as the rest'—WENDELL HOLMES

LONDON
LONGMANS, GREEN, AND CO.
AND NEW YORK: 15 EAST 16th STREET
1889

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INTRODUCTORY.

FROM youth to middle, and often to past middle, age, most men are apt to be too closely engaged in the struggle of life to pay due attention to the strength of the body. They may take daily what they consider a sufficient amount of exercise; but the exercise is not calculated to keep the various limbs and muscles, still less the internal organs, in proper working order. Amid the ordinary concerns of life the man may appear strong, even stalwart. But when occasion arises for some special muscular exertion, or taxing the action of some organ, he finds out his weakness. A sudden alarm may tell him that his heart is weak. A sharp run of two or three hundred yards, or even less, may show him that his lungs are not to be trusted. A walk rather longer than he is accustomed to, and taken at a sharper pace than usual, may leave him so tired during the next day or two as to show that his lower extremities are not in good working order Or he may learn a similar

lesson from a day's rowing or tricycling. In many more subtle ways, however, which often only an experienced doctor can recognise, the imperfect condition of the bodily mechanism, internal as well as external, may be indicated.

Now, in the present day, the men who are of most value to the community cannot afford time to acquire skill in athletic exercises. A man whose energies are wanted in his profession, be it law, medicine, literature, or preaching, or who has to attend keenly to business matters, either in his own behalf or in trust for others, might gain in some respects by a course of training such as would suit a prize-fighter, a wrestler, a runner, or a long-distance walker; but he would lose a great deal more. The energies cannot be heavily taxed in different ways, each sufficing to employ them fully, without bankruptcy of health. If, then, a man gives his energies in large part to bodily training, he cannot, without ruinous effects, devote his mind sufficiently to the business of his life, which we assume *not* to be the achievement of great feats of strength and endurance. It should even be, in fact, only with some degree of shame that a man who is not professionally employed in athletic work, should admit special skill in any sport or exercise which cannot be mastered save by devoting more time to it than his duties, properly discharged, would have permitted.

It is useless, then, or worse than useless, to endeavour to show members of the general community

how they can become athletes. They have not time for the necessary exercises, and if they had time they would be most unwise to use it in this way. But men, and women too, though they may have no occasion to acquire skill in athletic exercises, have great occasion to possess sound bodies,—unless they are passing absolutely useless lives, when they may do as they please so far as their value to the community is concerned. Even then, they add greatly to their own comfort and happiness by exchanging flabby muscles, too sensitive nerves, imperfect breathing apparatus, and feeble circulation, for a body healthy throughout —the *corpus sanum*, without which the *mens sana* is scarce possible.

I propose in this little treatise to show how, by devoting a few hours weekly to well-arranged exercises, this end can be attained. No violent exertions are necessary, no difficult feats need be attempted, no special form of exercise need occupy much of the time and attention; but each day a well-directed plan is to be followed, by which the weak and untrustworthy parts of the body are to be found out, and then steadily improved by exercise, until finally the body becomes like the "one-hoss shay" in Wendell Holmes's ingenious parable:—

——— In building of chaises, I tell you what,
There is always *somewhere* a weakest spot,
In hub, tire, felloe, in spring or thill,
In panel or cross-bar, or floor or sill,
In screw, bolt, thoroughbrace—lurking still,
Find it somewhere you must and will,—

Above or below, or within or without,—
And that's the reason, beyond a doubt,
A chaise *breaks down* but doesn't wear out.

What is true of chaises is true of animals, man included. What the worthy deacon did for his new "shay" we can do for our bodies, or come near to it. Said the Deacon:—

. . . . . 'Tis mighty plain
That the weakes' place mus' stan' the strain,
'n' the way t' fix it, as I maintain,
Is only jest
T' make that place as strong as the rest.

This is what we have to do with the vehicle in which we travel the road of life, if we would avoid premature collapse.

It is by no means necessary, as many imagine, to give much time daily to exercise in order to acquire a strong and hearty body. On the contrary, many who, dissatisfied with the condition of their health and strength, have begun to take more exercise than before, have defeated their purpose by taking too much exercise. To exhaust the frame by long walks and rides, or by undertaking some difficult and arduous system of training, would be unwise, even if the sole object were to acquire strength; but where the ultimate object is to increase the capacity for the work of life (as it must be with every man of sense), and this work is only indirectly dependent on bodily strength, it is utter folly to exhaust the frame by efforts for which it is unfit.

Let it be noticed, then, that apart from such exer-

cise as falls naturally into the day's work, an hour a day, or even four times a week, devoted to systematic exercise, will suffice, first to restore, and afterwards to maintain, the strength of the body. It was with this small amount of daily training that Maclaren obtained such remarkable results, adding girth to the chest and limbs, increasing the weight and muscular development, changing actually the shape of the bony framework of the body,—in grown men,—not in long periods of time, but in a few weeks.

Next, it is to be noticed that, for successful efforts in this direction, we do not want heavy dumb-bells and clubs, or gymnastic apparatus for the achievement of difficult feats. No apparatus at all is, indeed, absolutely necessary; but light dumb-bells (from 3 lb. to 6 lb.) may be used with advantage, and light clubs are still better; while by some simple contrivances, costing a few shillings, a bed-room, bath-room, landing, or hall, as may be convenient, may be turned into a temporary gymnasium, containing everything necessary for exercising every muscle of the body. It is always well, however, to include among the exercises some which require a certain degree of practice for their proper accomplishment, as this gives interest to the work. For this reason, ball-play (outdoor or indoor) was deservedly approved by ancient physicians. Fencing, single-stick, and other such encounters are good, if entered upon with due moderation, both as to time and as to the spirit in which they are carried on.

CHAPTER I.

THE CHEST.

FIRST and foremost in all exercises comes the development of the chest, because this development means the increase of lung-power and heart-power, improvement in the breathing and in the circulation. Scarce one in a hundred among men in middle life has his breathing apparatus in respectable order. A man in good health ought to be able to run a mile at a moderate pace without inconvenience. But how many can do this? I do not invite Paterfamilias to try the task, unless he is prepared to stop the trial so soon as he is satisfied that he cannot run the mile *without inconvenience.* For there is danger in the experiment, if the question is whether, by sheer endurance, he can get through the mile at any pace resembling a run. Let any man, even as young as twenty-five or thirty, who has let day after day pass for several years without duly exercising his chest, content himself by running until it would be distressing to him to continue the exercise: he will very quickly recognise how much beyond his power running a mile, without distress, has become,—entirely through his neglect of daily exercise.

Not a day should be allowed to pass without exercise by which—at least three times each day—every air-cell of the lungs has been filled to its utmost capacity. Once, at least, each day, this should be done by active exertion, such as a sharp, but not distressing, run, increasing gradually until two or three hundred yards are covered at full speed, or from half a mile to a mile at a steady swing. But any run long enough to set the lung bellows actively at work will suffice for this purpose.

Instead of running, however, some may prefer sparring. This is capital exercise for the chest, and is good also for the arms and shoulders. A live opponent is not needed—in fact, is not desirable; for where there is one the exercise is apt to be continued too long, and repeated only intermittently, whereas it should be carried on daily, and for a limited time only. A calf-skin bag, fourteen or fifteen inches in diameter,* hung by a stout cord from the ceiling (if there is a beam to it, or from a cord stretched between two high nails on opposite sides of the room), will make a capital dumb boxer. The bag should hang at about the height of the chin, so that its highest part is opposite the eyes and its lowest part opposite the

* There is no rigid rule as to size, or material, or make for this calf-skin bag or dumb boxer. A disused hair pillow, doubled and tied up, will serve very well. But, if you take nine or ten spindle-shaped pieces of calf-skin about 5 in. broad and from 18 in. to 2 ft. long, and sew together, they will form a bag which, filled with sawdust or stuffed with hair, will be somewhat handier for boxing at.

chest. Pound away at this as if it were the head and shoulders of a living opponent. Hit out from the shoulder so that it flies up to the ceiling; catch it "a good one" as it flies back towards you; advance a step, and hit it so that at the next rebound it flies over your head; spring sharply round, and meet it on that side; hit it upwards till the cord loops; hit it "round arm," so that, if you are not quick enough, it catches you on the back of the head. In five minutes' time (which, later, you may extend to ten), you will be puffing and panting like the conventional grampus. You can then rest, or turn to some other less active exercise among those to be hereafter described.

But there is an excellent and too much neglected exercise for the chest which requires no apparatus at all, and can be taken without leaving your room, or even your seat. It is simply the steady inhaling of air (at the nostrils) until the lungs are fully distended, holding the air there for a while, and then slowly expelling it. A timekeeper is useful with this exercise, so that its effect, in improving the capacity of the lungs and increasing the power of the breathing apparatus generally, may be tested. Mr. W. Blackie, in his treatise, "How to get Strong," cites the following case, illustrating the good effects of a practice in effect identical with this:—

"Some years ago, Dr. G., of Boston, showed us a photograph of himself taken several years previously. The shoulders were warped forward, the chest looked flat, almost hollow, and the face and general appear-

ance suggested a delicate man. He was inclined, he said, to be consumptive. Well, by practising breathing (not in an ordinary 'blowing machine,' where you empty your lungs of about all that is in them, but an inspirometer, from which, instead, you inhale every inch of air you can*), and by practising vigorous working of his diaphragm, he had so expanded his lungs that he could inhale three hundred and

* The breathing test, used at various places of amusement, though on a different principle, serves the same purpose when properly used. Very few people seem to know how to use this instrument. Most persons make very poor records with the breathing apparatus, compared with what they *can* make when they go to work properly. You will see a well-built man, standing some six feet in his stockings, who, advancing to the instrument, will begin to blow, watching the index with a look as if he would send it round to 400 at least ; he barely marks 200 ; yet there is nothing wrong with the big fellow's lungs, as from such a record for such a height one might judge. Tell him *how to do it*, and he will send the index well over 300. I have watched a score of men, who ought to reach 250, averaging not more than 150. Then I have taken the tube, and though below the middle height, and too fleshy for full breathing, have sent the index on beyond 200 to 250, to 300 (till people began to ask whether I was breathing out of my boots), and still on—the greatest I have reached being 347. Then one or two have asked me, apart, how the thing was done, and I have explained that, before ex-spiring, the breath is to be drawn in till you can draw in no more, and every atom of air so drawn in is to be let out steadily through the tube, none escaping beforehand. I have then seen a man who had just, with utmost efforts, reached 180, go easily above 300. It should be added to the usual instructions respecting the use of the breathing apparatus, that any addition to the weight beyond that due to fair condition, is certain to diminish the record with the breathing apparatus.

eighty cubic inches of air at one breath! Certainly, the depth of his chest at the later period was something astounding, it being, as nearly as we could judge without calipers, fully fourteen inches through, directly from breast-bone to spine, while it was a strikingly broad chest as well. An even more astonishing feature was the tremendous power of his voice. He said he could run two blocks (nearly a tenth of a mile) at one breath."

This case may, of course, be exceptional, still it is extremely significant.

The exercises for expanding the chest, hitherto considered, produce their effect chiefly in an indirect manner, so far as the expansion of the chest is itself concerned, though in a very direct manner as regards the act of breathing: the chest is made to expand because the lungs are expanded, either by the deep and quickened breathing resulting from rapid movement, or by the actual drawing-in of air in large quantity. We have now to consider exercises which act directly to expand the chest, and thus help the breathing-apparatus indirectly, by giving it room for freer action. For this purpose all exercises are good which carry the arms well over the head, all those which carry the arms out horizontally backwards, and all those which bring the elbows close into the side *with a backward motion of the shoulders and upper arms*. These last words must be specially noticed. Rowing, a capital exercise for many purposes, is *not*, as is commonly thought, a good exercise for the chest;

for, though at the finish of the stroke the elbows are drawn close in to the sides and carried backwards as far as possible, the shoulders and upper arms are kept rather forward and drawn rather towards each other, on account of the position of the hands on the oar, and also because in hard rowing no strength can be spared for a useless backward swing of the shoulders. In steady rowing for pleasure, the hands may be set a little further apart, and the shoulders thrown well back at each stroke with great advantage, so far as the health value of the exercise is concerned. Rowing in this way is delightful, though not at all suited for racing.*

* It will probably sound paradoxical, after the stress I have laid on the necessity for exercise, to say that I consider racing and other exercises, *as pursued by specialists*, undeniably bad for the development of a well-proportioned and thoroughly healthy frame. Take, for instance, any first-class eleven at cricket; select, if you please, an eleven such as the Australian, in which all-round aptitude is a characteristic feature, and you will invariably find so large a proportion of ill-shaped men as to show that thoroughly well-built cricketers owe their goodly proportions to exercises outside cricket. Despite the running involved in the game, four cricketers out of five have badly-developed chests. One would say a good bat should have good shoulders; but that batting does not tend to improve the shoulders is shown by two, at least, of the finest Australian bats. Take rowing, again. Unless a rowing man does other work especially intended to correct the defect, he has invariably poor arms above the elbow, a marked inferiority in the development of the chest as compared with the back, and he generally has round shoulders and a forward hang of the head and neck. Boxing is better, but it cannot be pursued with advantage as the chief exercise a man or boy takes, and it is entirely unsuited for girls and women. I write for girls, by the way, quite as much

Beginning with chest expansion by exercises taking the arms over the head—the best exercises of all for increasing chest-capacity—we note that there are scarcely any but artificial exercises nowadays for this purpose, that is, there are scarcely any exercises which thus work the arms, as rowing, boxing, fencing, &c., work them in other ways, or as walking and running work the legs. Climbing ropes is a rather severe form of this sort of exercise, not readily to be practised by most persons, and too severe for men past or nearing middle life, when the body is generally too heavy. The strain on the deltoid muscles tells heavily before much good has been done in the way of chest expansion. There is the same defect in hanging exercises on the parallel bars, or on the trapeze. These are for athletes, and even with them, more for the strengthening of the deltoid and other special muscles than for the expansion of the chest.

Sir Edmund Beckett wrote to me as follows when my papers on "How to get Strong" in *Knowledge* had reached this stage:—

"I know no exercise which tends so much to expand the chest as bell-ringing, being performed standing quite upright. I used to ring the heaviest bell, in peals at Cambridge and elsewhere, when I was young, and the nine o'clock at St. Mary's nearly every night, and I used always to feel that result."

as for boys and men, though for girls the dumb boxer may not be the most elegant of all chest-opening exercises: yet some girls look very pretty punching with their little fists at a calf-skin bag.

Bell-ringing would be just the sort of exercise wanted to open the chest: for here, the hands being close together (instead of acting, as in rowing, to contract the chest) act—at the most effective moment—to expand it. The construction I am about to describe for arm-above-head exercise to expand the chest, can very readily be used to give an effect akin to that obtained in bell-ringing—which is fortunate, because only a limited portion of the community can ring bells. (For 1,000,000 able-bodied men in London to get each half-an-hour's bell-ringing—peals of eight—per day, it would be necessary that there should be constant pealing from 2,600 steeples!)

Let A, B (Fig. 1) be two pulleys high up, on the same level, against one of the walls of a room, W and *w* two weight-boxes (of course, mere weights will do, without boxes) *a*AW, *b*B*w*, stout cords passing over the pulley and connecting *a* and *b*, the two ends of a stout rod *ab* (a broom-handle will serve) to the weight-boxes, W, *w*. The short cord, *cd*, is simply for drawing down the rod, *ab*, till the upstretched arms can reach it.

Now let the rod *ab* be grasped overhead, the arms being vertical, and therefore the hands separated by the breadth of the chest. It is best to stand with the back to the wall. Draw *ab* steadily down, till the hands and arms are in about the position they have just before the feather in rowing; let the bar go steadily up again, to your full reach. Continue this exercise about five minutes, being careful to let the

arms be drawn up to their full reach above the head each time. The weights at *W* and *w* may at first only be some 10 lb. each (so that the heavier dumb-bells tied at *W* and *w* will serve very well), but can be gradually increased as the arms gain strength: though this is not, be it noticed, the object of the exercise.

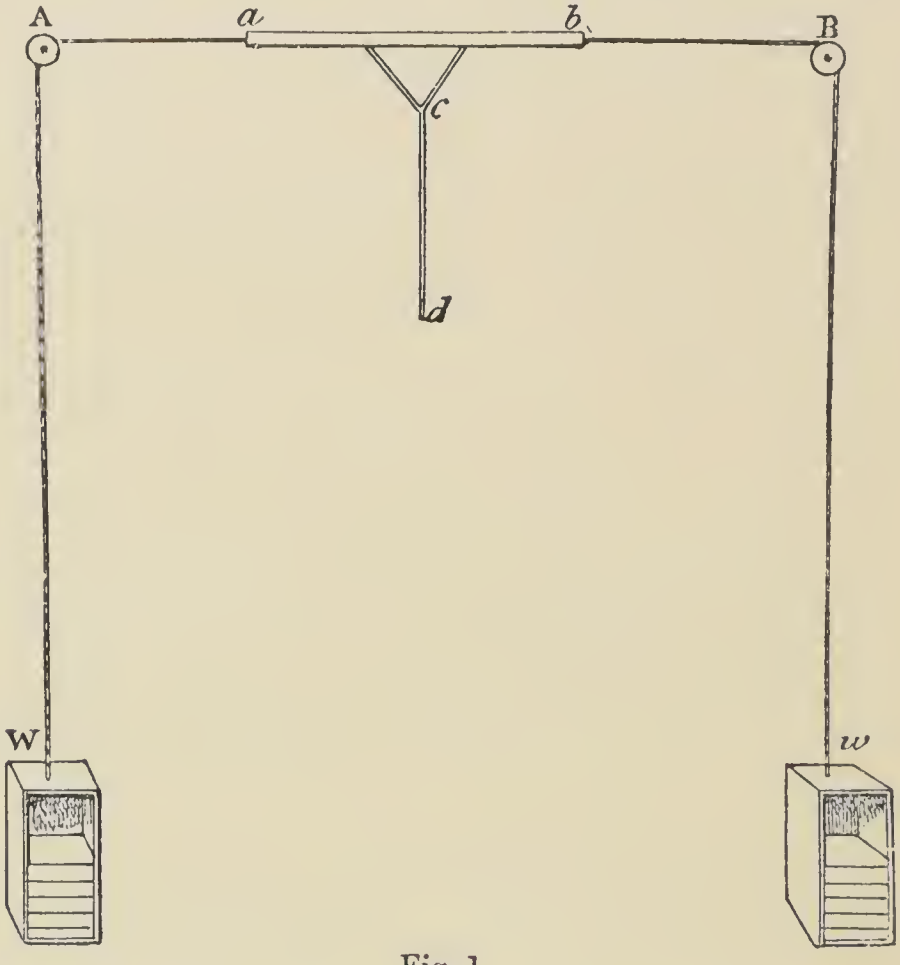

Fig. 1

For mere muscular work they might be increased until each amounted to nearly half the weight of the body; but this would not do for work in chest expansion. In this exercise draw in the breath fully as the bar rises, hold it till you cannot comfortably hold it

much longer, then begin to draw down the bar *ab* slowly, breathing out slowly as you do so, and after you have drawn the bar to its lowest position—just opposite the lowest part of the breastbone—breathe out the last particle of air you. can get rid of without drawing your shoulders forward. In this way you will get most benefit from each pull, so far as chest expansion is concerned. But, if you want more active muscular work, expand your chest fully when the bar is at its highest, and then pull it down and let it up steadily as often as you can without letting out your breath, which you can finally do in drawing the bar down, taking in a full breath as it rises again. Or you may take several pulls after exspiring before taking in another full breath. Only note that you ought always to let inspiration be completed when the bar is at its highest, exspiration being completed when the bar is at its lowest.*

* In regard to the arrangement described above, I wish it to be understood that in no case do I suggest the construction of special apparatus. The picture illustrates the kind of exercise to be taken for carrying the arms well over the head, with suitable "hauling" work. A couple of stout hooks fixed in the wall, or two rings fastened to stout nails, or any such contrivance which would suit the room or the wall, would serve to carry the cords which bear the weights. And for the weights, almost anything can be used—a couple of heavy volumes, dumb-bells, clubs, or anything giving about the right kind of work in hauling. Nor is it necessary to have the middle bar or stick. A stout cord flung over the middle of the horizontal part of the rope will give the required hold for the bell-pulling action. Or, almost all apparatus may be got rid of by hanging two "extensors" of vulcanised india-

Now take advantage of Sir Edmund Beckett's useful hint. Lay hold of the cord, *cd*, near *c*, at your utmost upward reach, and pull downwards, as if ringing a heavy bell. You can continue the downward pull till the hands, close together on the rope, reach about to the abdomen. Repeat these pulls, breathing in either of the ways described in the last paragraph, for from five to ten minutes. You will find (I have tried it, and know) not only advantage to your health, but absolute physical pleasure in this exercise. I have never taken part in bell-ringing, but I can now very well understand how this exercise, combined with the pleasant noise of well-matched bells, should have been regarded by the Puritans as a sinful recreation—somewhat on the principle which led some one to say that the only thing wanting to make strawberry-eating perfect was that it should be forbidden. I never before thoroughly understood that passage in Bunyan's life, in which we are told that, "having been mightily addicted to ringing, he was very unwilling, for all his reformation, to leave

rubber to two pretty high nails, and hauling on them, either one in each hand (the hands well apart), or holding both together, as in pulling at a bell-rope. But the exertion required when extensors are used varies too much to be comparable with the steady work of pulling up weights : it is a serious fault, too, of all work with extensors that the effort required increases from beginning to end of the pull. In all these cases it is a great point to be ready to devise and use rough-and-ready contrivances—not to find, in the absence of pulleys or framework, an excuse for shirking some useful exercise.

it; but, his conscience beginning to be tender, he thought the practice thereof to be but vain, and so forced himself to leave it, *yet could not keep his mind from hankering after it.* But then he was surprised with fears that possibly one of the bells might fall and kill him, so that he durst no longer go into the steeple, but would stand at the door; and even then

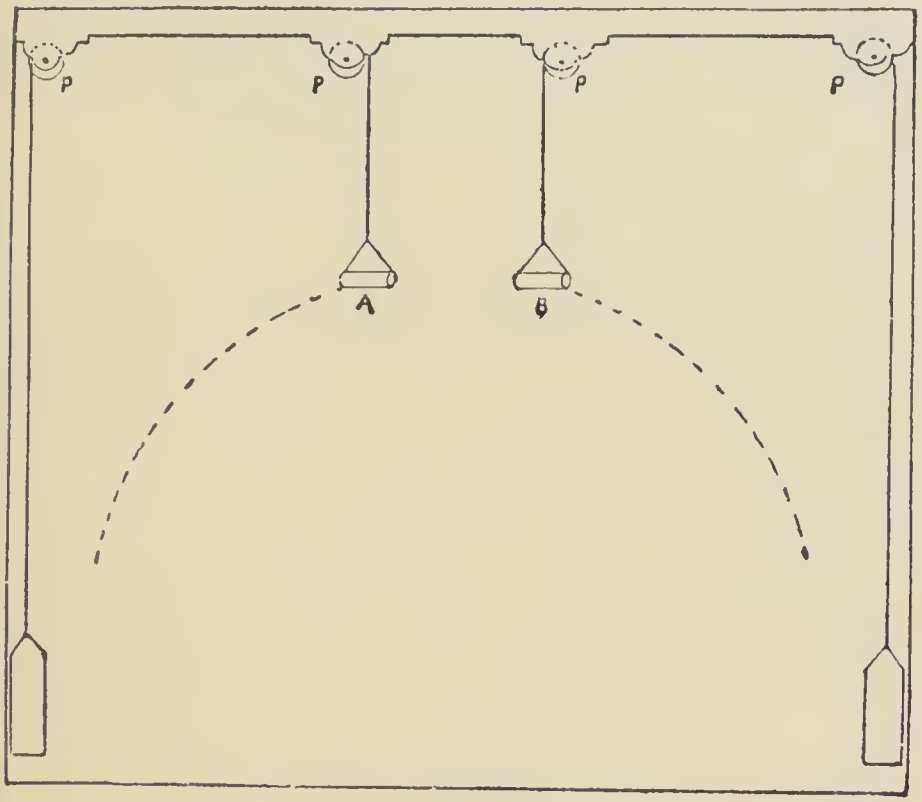

Fig. 2.

he was afraid lest the steeple itself should fall upon him." Yet, says the worthy chronicler, "this was only lopping off the branches of sin while the root of unregeneracy remained."

For expanding the chest, the contrivance illustrated

in Fig. 2 (due to the ingenuity of Dr. Sargent, of Boston, Mass.) is excellent. Over the pulleys PP cords pass from the weights to the handles A and B. The ropes are just long enough to let the handles be about a foot above the head when the weights are on the ground. Standing now between and directly under the handles, erect, the chest well filled, and the arms straight, grasp the handles, and slowly draw the hands along the course shown by dotted curves, raising the weights about 2 ft. from the ground. Let the weight slowly return to the ground, and repeat the process *ad libitum*.

The weight can be graduated to suit the strength of the person using this apparatus. The exercise should in no degree strain the strength, while it is continued, say, for about five minutes. Mr. Blaikie remarks that no better present could well be devised for one of weak or narrow chest than one of these appliances. Note, however, that though the picture shows a somewhat elaborate arrangement, this is not at all essential to the effective value of this method. Two pulleys will serve as well as four, the weights may be anything whatever, dumb-bells, clubs, bags or straps with books in them—anything. No pulleys at all need be used if none can be conveniently obtained, but a couple of short stout reels, with long brass-headed nails passing easily through the holes of the reels, will serve very well, the nails being driven into a suitable wall. In all these matters, a little ingenuity will readily enable any one to rig up something which

will practically serve as well as the best carpentered construction.

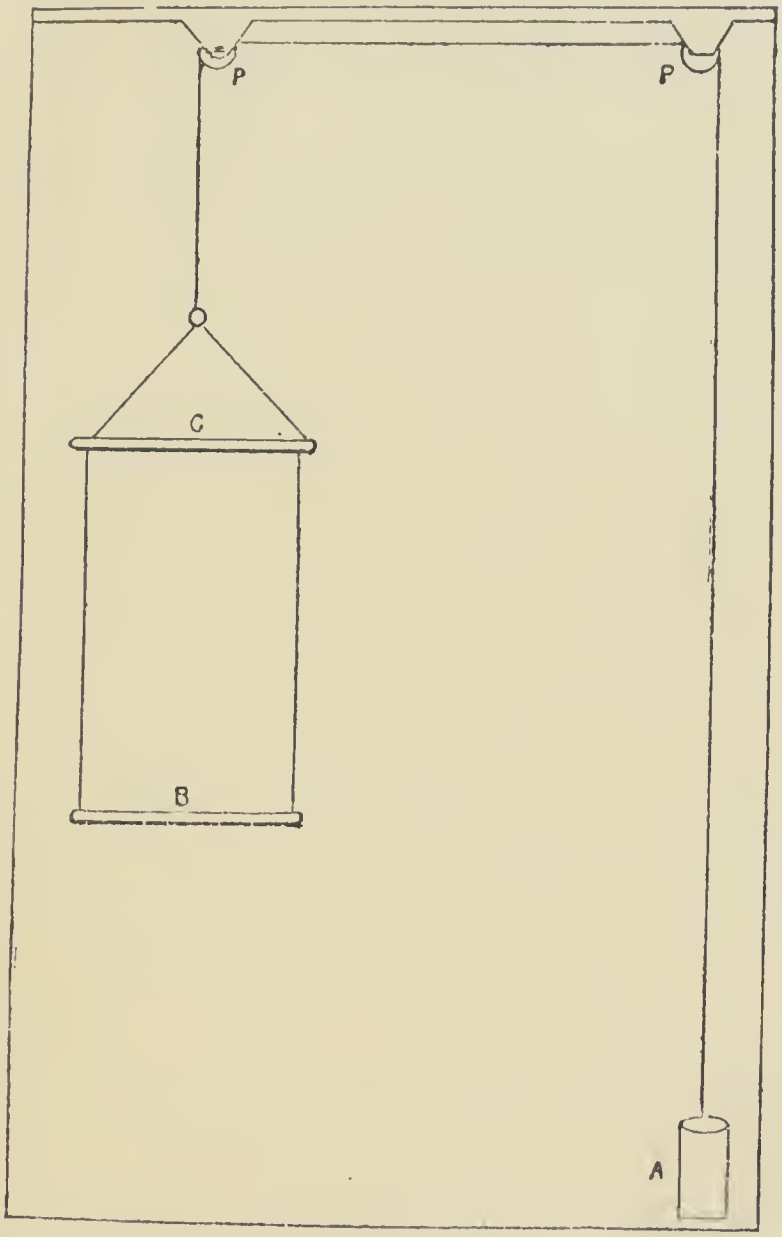

Fig. 3.

Another plan, also Dr. Sargent's, deepens the chest as effectively as the preceding expands it. In Fig. 3,

B and C are two bars (broom handles, or the sticks for single-stick will serve very well) suspended by a cord which passes over two pulleys PP (but one will serve, or the reels suggested for the last exercise), to a weight A. When A is on the ground, the bar B is about a foot above the head. The following are Dr. Sargent's directions (unfortunately these body-strengthening folk, drill-sergeants, fencing-masters, *et hoc genus omne,* write very queer English) :—" Standing, not under B, but about a foot to one side of it, and facing it" (he means, of course, a foot in front of B, and facing it), " grasp its ends with both hands, and keeping arms and legs straight and stiff, and breathing the chest brimful [!], draw downwards until the bar is about level with the waist; let the weight run slowly back and repeat, *ad libitum.*" (It will be seen that the contrivance does not require the rod C, any more than it essentially requires two pulleys.)

Lastly, for chest work, though many of the other exercises for obtaining symmetrical development will tell on the chest also, try the following with light—say 6 lb.—dumb-bells. Holding the head and neck back so as to look at the ceiling, the dumb-bells hanging at the sides, knuckles out, carry the arms, without bending the elbows, outwards and upwards until they are in a horizontal line, then onwards in the same wide sweep until they are vertical, lowering the hands then gradually until the dumb-bells nearly rest on the shoulders; carry them backwards by the same movements exactly reversed. Repeat this ten

or twelve times—twenty or thirty if you conveniently can; but keep the chest well expanded all the time, holding in the breath during the effort—if possible during the whole series of efforts (only not continuing to hold the breath when actual pain begins to be felt). This exercise has a splendid effect in making the chest full and deep; it also greatly strengthens the lungs.

CHAPTER II.

THE MUSCLES OUTSIDE THE CHEST.

THE exercises hitherto considered have been directed to the enlargement of the chest itself—first, directly, by actual expansion of the frame enclosing the space we call the chest (I do not here limit the word to the front of the trunk, or breast); secondly, indirectly, by their action on the respiratory organs. We have now to consider how those muscles may be strengthened and enlarged which lie outside the chest, viz., the pectoral muscles, which have their origin near the breast-bone and inner edges of the upper ribs and are attached to the upper arm, and the dorsal muscles, which, rising from near the lower two-thirds of the vertebral column, are also attached to the upper arm. Speaking roughly, we may say that the pectorals carry the arms forward, as when we bring them upon the chest, while the dorsal muscles carry the arms backward, as when we finish the stroke in rowing. In boxing, both sets are very freely used; the dorsals when we prepare to hit out from the shoulder, the pectorals when we carry that laudable purpose into execution.

It should be noticed in passing that the develop-

ment of both these sets of muscles often gives to the chest the appearance of being very well developed when in reality it may not be so. This is especially the case with the pectoral muscles, which often are so developed as to suggest the idea of splendid chest development, when in reality the chest is flat and small. Blaikie very well remarks on this point, and I have repeatedly noticed the fact in the gymnasium, that "whoever knows many gymnasts, and has seen them stripped, or in exercising costume, must occasionally have observed that, while they had worked at exercises which brought up their pectoral muscles until they were almost huge, their chests under their muscles had somehow not advanced accordingly. Indeed," he adds, "in more than one instance which has come under our observation, the man looked as though, should you scrape all those great muscles completely off, leaving the bare framework, he would have actually a small chest, much smaller than many a fellow who had not much muscle. There hangs to-day—or did some time since—on the wall of a well-known New York gymnasium, a portrait of a gymnast stripped above the waist, which shows an exact case in point. The face of such a man is often a weak one, lacking the strength of cheek-bone and jaw so usual in men of great vitality and sturdiness—like Morrissey, for instance—and there is a general look about it as if the man lacked vitality. Many a gymnast has this appearance, because he takes so much severe muscular work that it draws from his vitality, and

gives him a stale and exhausted look, a very common one, for example, among men who remain too long in training for contest after contest of an athletic sort."

It has been for this reason chiefly, that I have set first the exercises for enlarging and deepening the chest itself, as a matter more vitally important than the enlargement of any special muscles whatever. We can now, however, turn with advantage to exercises directed to enlarge particular sets of muscles.

The most effective exercise for strengthening the pectoral muscles is one which cannot be safely taken until these muscles are already tolerably well developed, viz., dipping from the parallel bars, or between the backs of two stout chairs. This exercise is usually given specially for the triceps muscles; but it depends even more on the action of the pectorals, insomuch that, while men with strong pectorals and moderately strong triceps muscles can accomplish these dips pretty well, men with strong triceps and only moderately strong pectorals often fail to accomplish a single dip without pain.

To take the simplest form of the exercise:—Set two strong and rather heavy chairs back to back (you may with advantage put half-a-dozen heavy books on the seat of each). Rest one hand on each, and lifting the feet from the ground, steadily lower the body, till the chin is nearly on a level with the hands. So far all is fairly easy; but now comes the work. Steadily lift the body to its former position. Then, if you can, repeat the dip, and continue dipping till you have had

enough of it: it is not likely to take long at first. (The feet must not touch the ground from the beginning of the first dip to the end of the last.) But *do not attempt even a single dip unless you find, after lowering yourself, that you can, without very great effort and without pain near the breast-bone, begin and continue the rising movement.* You will only hurt yourself, and stop for several days all exercises directed to that strengthening of the pectoral muscles which is what, in this case, you particularly want.

Some such exercise as the following may be used, before attempting the dips, to test and afterwards to enlarge the pectorals:—

Using the instrument already described at p. 17, Fig. 2, but the weights much heavier than for the exercise there described, stand under the handles A and B, draw them down till they reach the chest, and then change the hold, so that you can thrust them down on each side of you—that is, till the arms are extended straight down from the shoulders. Now slowly raise the hands, carrying them up slightly in front of the body till they reach nearly to the shoulder; then thrust them down again to their full extension. Repeat, making all the movements steadily and slowly, till you are comfortably tired. After a short rest, or turning for a while to other exercises, return to this work, till you are tired with it yet once more. After a fortnight of such work, you can safely try the first dip; and once you have begun dipping exercise, there is no limit to the

amount of work you can give the pectoral muscles in that way.

The following exercise is good for the upper parts of the pectorals:—Hold out a pair of tolerably heavy dumb-bells, one in each hand, so that the arms are extended horizontally on either side of the body; then slowly lower the dumb-bells a foot, and as slowly raise them two feet. Repeat this for as many seconds as you find convenient. Do not try minutes, unless you feel that you *must;* but if you time yourself, using 10 lb. dumb-bells, you will feel no absolute obligation to continue the exercise after the first half-minute or so, especially in your earlier trials.

So much for the pectoral muscles. We have now to consider how the muscles of the upper back and shoulder—the dorsal muscles—may be strengthened.

Here, for the first time, we are considering muscles which are more apt to be over-developed, relatively, than to have insufficient amount of exercise. It is much more common to see men round-shouldered, in consequence of undue development of the muscles of the upper back, than to see the muscles of the arms or legs, or of the front of the chest or abdomen, too fully developed. The deformity—for such it unquestionably is—may, indeed, generally arise rather from insufficient development of other muscles than from excessive use of the dorsal muscles. Still, it remains the case, that probably of all the muscles of the body those which in this country are generally attended to best are the muscles of the upper back and shoulders.

The reason of this is that the favourite forms of exercise in this country are such as encourage the development chiefly of these muscles. "Rowing," says Maclaren, "is the chief of all our recreative exercises; no other can enter the lists against it; in fact, it has collected and concentrated in itself all the attractions and all the emulative distinctions of all others." Next to rowing, boxing used to be a favourite exercise, and it still holds a place in our gymnastic system. Now, boxing is good for the chest and pectoral muscles, and in rowing the muscles of the legs *may* be very actively employed. But in both exercises, and in others which are in high esteem in this country, the dorsal muscles are actively used. In rowing especially this is the case—insomuch that you can tell any rowing man when his shoulders are stripped, and some rowing men even when they wear their usual clothing, by the way in which the muscles of the upper back and shoulders outweigh, so to speak, the muscles of the front of the chest.

The idea that rowing expands the chest is as absurd in reality as the cognate mistake that it specially strengthens the biceps muscles. Yet both mistakes are so common that if you tell most rowing men that their exercise is better for the shoulders than for the chest, better for the fore arm than for the upper arm, and better (if properly managed) for the legs than for the arms, they will think you are laughing at them. It has been demonstrated, however, by actual measurement that this is the true state

of the case. "Rowing," says Maclaren, "gives employment to a portion of the back, more to the loins and hips, and most of all to the legs, but it gives little to the arms, and that little chiefly to the fore arm; and least of all to the chest." He was speaking, however, of rowing in light racing-boats. In ordinary river-boats, the fore arms get a good share of work, and the dorsal muscles probably get more work than the legs. As for the chest, it gets so little work that it seems, in the case of many persons who devote a great deal of their time to rowing, actually to shrink.

We cannot direct attention too strongly to what Mr. Maclaren has said on this point, because what he says is true of every kind of rowing, from pulling a heavy, "inrigged tub," to rowing in the lightest outrigged craft which has ever yet been constructed. "*The part of the body which receives the smallest share of the exercise in rowing is the chest,*" he says; "it has little or no employment in the muscular effort required for the propulsion of the boat; and *this is impressively evident in the results. Not only does the chest make no advance in development in this exercise, but, if it be exclusively practised, an absolutely depressing effect is produced.*"

No single result of "systematical exercise," he proceeds, "can be more fully substantiated than this. Take any crew in the University, just as it stands, and at any stage of its practice, and it is possible, in a given space of time, by varied systematised exercise, to

increase the chest of every man by a given number of inches, with a proportionate development of power; let this cease, and exclusive rowing exercise be resumed, and the progressive development of the chest will also cease; nay, its muscles will lose their condition, and their power will decline, in obedience to the organic law that power is in relation to employment, for here they have virtually none. I could at this moment point to men who have had rowing for exclusive exercise since they came to the University, —men endowed with an organisation capable of the finest development, whose chests have been almost stationary for years, the years during which they should have made the greatest advancement,—who have now, in fact, the same development in this region which they brought from school, lingering at thirty-six or thirty-seven inches, when forty or forty-one was fairly within their reach."

It may be well to show here the effect of much rowing exercise on the configuration of the chest, and secondly the proper shape of the chest when duly developed by the three classes of exercise which are good for it:—1st, exercises expanding it by acting on the breathing apparatus itself (the most healthful exercises of all); 2ndly, those which strengthen and develope the pectoral muscles; and, 3rdly, those strengthening and developing the dorsal muscles. Exercises of the two latter orders do not in reality develope the chest at all, except indirectly by their action on the breathing; they simply enlarge the

muscles which overlie the chest in front and at the back.

Fig. 4 is from a photograph (the face altered, however,) of an eminent American oarsman. The weakness of the chest muscles and upper arms of this powerful sculler will be noticed at once; but this is

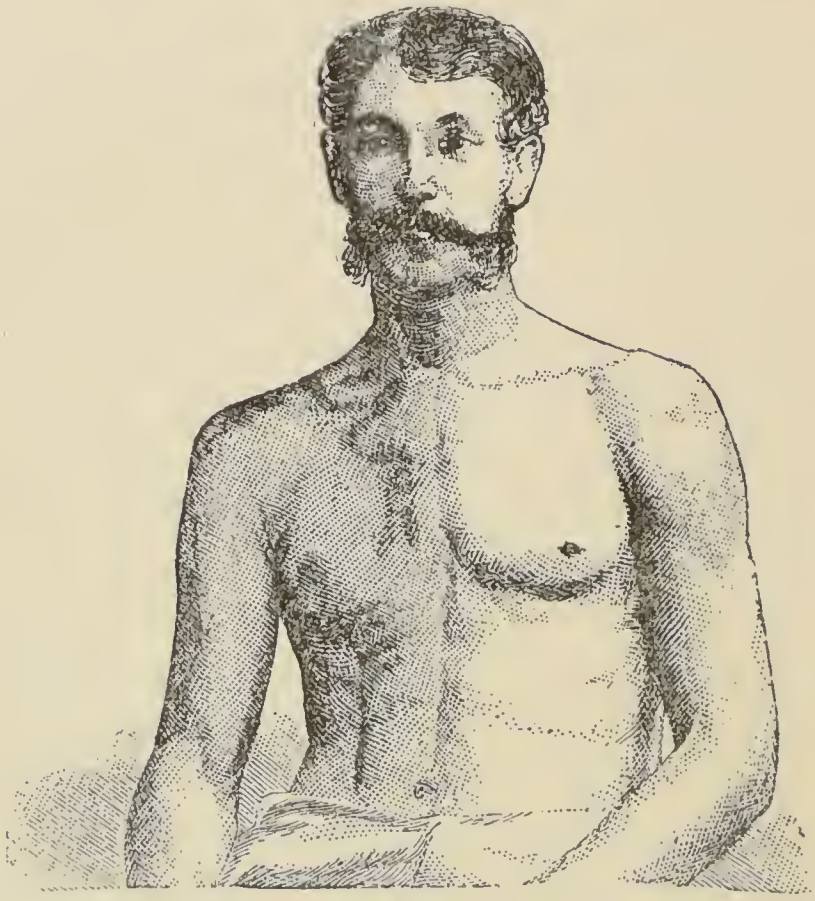

Fig. 4. From a Photograph of a well-known Rowing Man.

a much less serious defect than the hollow, overhung chest, and especially the depressions over the collar-bones. This configuration of the chest we should be disposed to regard as peculiar to rowing men,—not,

indeed, to rowing men as a class, but to those rowing men who do not correct the unequal effects of their favourite exercise by the use of such chest-developing exercises as I have described in the preceding pages.

For comparison with Fig. 4 I give three well-known Greek figures, viz., Fig. 5, the Theseus of the Parthenon (as much of it as the "unspeakable Turk"

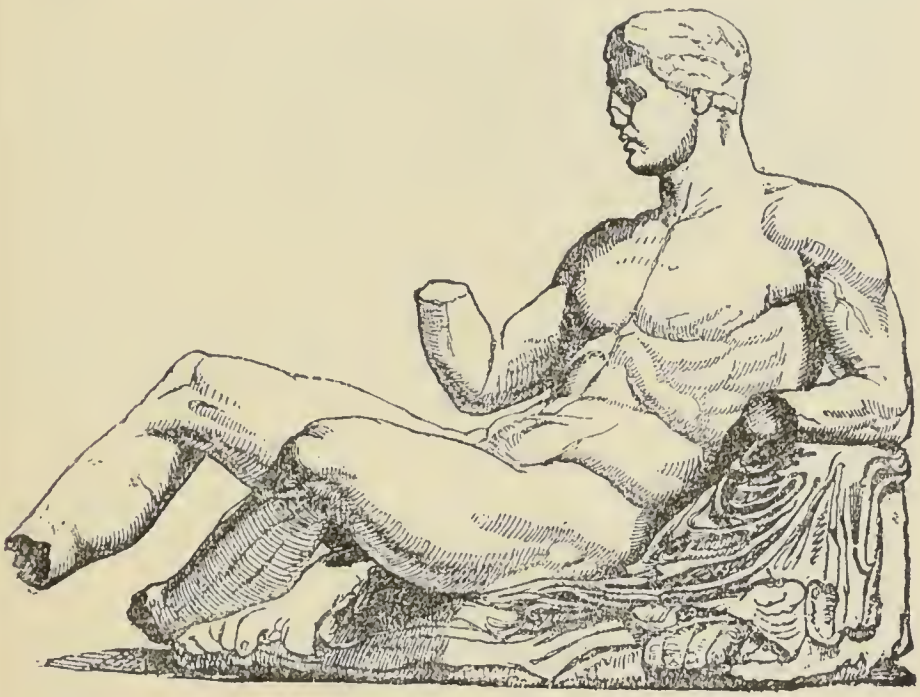

Fig. 5. The Theseus (supposed) of the Parthenon.

left after his musketry practice at these noble sculptures), and Figs. 6 and 7, showing four chests in the upper halves of two Metopes from the same Temple. I would especially call attention to the wonderful diversity of chest development in these four chests.

The left-hand figures in each are Lapithæ, and the contrast between their well-developed but elegant frames and the coarser types of the Centaurs is worth careful examination, both as an artistic and as an anatomical study. But the two Lapithæ are also dis-

Fig. 6. From a Metope (Parthenon).

tinguished from each other, as are the two Centaurs. Of the two former, the one in Fig. 6 is the more

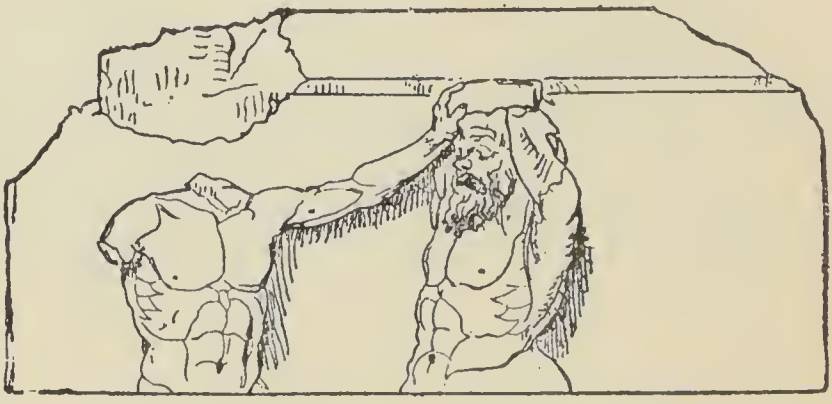

Fig. 7. From a Metope (Parthenon).

powerful, but the other in Fig. 7 is more perfect. I know nothing in ancient or modern sculpture surpassing in beauty this perfectly-developed trunk.

CHAPTER III.

MUSCLES OF THE ABDOMEN.

WE come now to certain muscles which are usually very much neglected in this country, especially by the fairer, and in this respect certainly the weaker, sex. When we hear men talking of wearing stays, or find that they are even thinking of such an absurdity, we have in reality the clearest evidence that the abdominal muscles have been neglected. A man in decent condition should as soon think of taking to crutches as to corsets.

Weak abdominal muscles are readily detected in walking. If a sense of distress across the abdomen and around the loins is felt after moderate walking exercise, especially after a slow walk, if the shoulders begin to hang forward, or the trunk lean forward from the hips, we may be sure that the waist muscles want attending to. This also shows that walking affords them exercise. But it is not the best exercise for them.

Wearing a corset, or shoulder-straps, or a back-board, will prevent you from feeling this sense of distress about the waist. So will lying on your back all the time. If you like, you can adopt these mea-

sures. In that case we are writing, not for you, but for others not quite so lazy or so unwise.

Taking, first, walking exercise, directed to the special purpose of strengthening the abdominal muscles, observe that a long wearisome walk will do more harm than good in the long-run. Take a sharp, steady two-mile walk, at not less than three and a half miles an hour, and not more than four; keep the head up, shoulders well back, the body erect, the abdomen slightly forward, but not enough to hollow the back. Half a mile walked in this way will do more good than four or five miles at a dragging pace. The heart and lungs have good space to act in, and you presently find that they do act, and with energy. It is in maintaining this attitude that the muscles around the waist are exercised.

In running, which ought to be a daily exercise with all men in good health (though, as I have said, not suddenly or rashly begun, but moderately), the waist muscles are called into play if the style of running is well chosen—shoulders held well back, body upright, and strides long and energetic.

Turn now to indoor exercise.

Here is one which will very quickly harden the abdominal muscles. Sit on a bed with the toes hitched under the cross-bar of the foot-board (you can pad the bar if it hurts your instep at all), so that when you lie back your head falls on the pillow. (Pitch the pillow out, however.) Sway the trunk steadily backward, till you are lying in a horizontal

position. Then steadily draw it upwards again, and sway it over till the shoulders are well over the knees, keeping the trunk straight throughout both movements. Draw in the breath as you sway backward, and expel the breath as you sway forward—doing each to the full extent of your lungs. Thus you combine good chest exercise with excellent work for the waist muscles. The exercise need not, of course, be taken on a bed. You can sit on the floor with the feet held by a strap, or by the lower part of a sufficiently solid and heavy piece of furniture (be very careful on this point). Or in pleasant weather you can take this exercise in the open air,—as indeed most of the exercises suitable for waist-strengthening.

Here follow two forms of exercise which are recommended by Blaikie. They *can* be taken in the open air, but most would prefer to limit their use to indoors, especially the first one:—(1.) Lie flat on the back. Taking first a deep, full breath, draw the feet upward, keeping the legs straight and close together, until the legs are vertical. Lower them *slowly* till horizontal, then raise and repeat, till you find you would much rather stop. (2.) Keep the legs down, and first filling the chest, draw the body up, keeping the trunk quite straight, till you are erect. Then sway slowly back; repeat as often as you find it convenient. You need not go on for half an hour, or even a quarter, unless you like. With practice you will find that you can not only do this pretty often, but lift a heavy weight along with you.

I may add to the exercises I before mentioned rowing, jumping, vaulting, and leaping. I am told that mowing acts very effectively to strengthen and harden the abdominal muscles, and I can well believe it; but, as I have never mowed a square yard in my life, I cannot answer from experience. I should take some exception to mowing on the ground of its one-sidedness. For symmetrical development of the body, and for the increase of grace and lissomeness of movement, which I take to be much more important points than mere local development of strength, all exercises should admit of being interchanged from right to left. Thus the movements of fencing, though not conveniently altered in actual foil play (for every fencer will in actual contests put his best hand foremost), should be systematically repeated with the foil or a substitute for it in the left hand, and the right leg supporting the body's weight. So with sparring exercises, and others in which usually the sides of the body are differently employed. But in mowing one cannot well reverse the action without having a scythe specially prepared for left-handed work. However, very few persons care to practise mowing, so this particular objection need not trouble us much.

There is one very trying exercise for the abdominal muscles which I would not recommend any except those already very strong-stomached to attempt. Sit on one of the parallel bars and carefully place both feet under the other; now steadily lower the body

backwards, until you are lying horizontally athwart one of the bars and prevented only from going over by the hold of your feet under the other. Then steadily raise the body to the sitting position from which you started. This exercise may seem in effect much the same as one already given, in which sitting on a bed with legs horizontal and the feet placed under the lower bar of the foot-rail of the bed, you lower the body till it is horizontal and then raise it again—repeating as often as you may find convenient (not too often at first). But, as a matter of fact, you will find the parallel bar form of the exercise very much more trying than the other. Moreover, on a bed, if you feel unwilling to make a final rise from the horizontal position, all you have to do is to lie still and rest. But if on the parallel bars you lower yourself after you are nearly used up, you cannot well avoid the effort necessary to come upright again. You certainly cannot rest comfortably across a horizontal bar, with so much of your weight on one side of it that only the catch of the feet under the other keeps you from falling over backwards. On the whole, I refrain from advising this particular exercise for hardening the abdominal muscles. When they are hard enough to stand it, they are about as hard as you need them in ordinary life; and it should be remembered that exercise given unnecessarily to a set of muscles already well developed may be regarded in most cases as exercise unwisely withheld from muscles which need strengthening.

And now to consider those exercises which, instead of giving the abdominal muscles energetic contractile work, tend to stretch them and limber them up. These are especially desirable for all who lead a sedentary life; for the abdominal muscles get contracted and weakened in the sitting attitude, and especially in sitting over a desk. For this reason, and because there is no time so good for spinal exercises as the very time when undue rest, resulting in the contraction of muscles, has to be corrected, I give as many exercises as possible for stretching and limbering the waist muscles without apparatus or occasion to leave the room,—sitting-room, study, or even counting-house,—where the abdominal muscles are losing strength and activity.

It is a natural instinct after long sitting over a desk to extend the arms outwards upwards and backwards, throwing the shoulders back, and projecting the stomach a little forward. It is the movement seen in vigorous yawning; and many restrain it in themselves or check it in others as if it meant laziness. Probably if a merchant were to see half a dozen of his clerks simultaneously engaged in this natural and wholesome movement, he would be disposed to feel angry with them,—the action *is* so lazy-looking. But if he knew what was good for them, and therefore for him, so far from checking these movements, he would encourage his clerks to systematic stretching of this wholesome kind. To take off the lazy look, he might invite them to get

off their high stools, and standing well erect, to go through the backward-stretching steadily and strongly several times in succession before resuming their sedentary work.

As a muscular exercise this stretching is excellent, and any one who has an artistic eye, and notes carefully from week to week the effect which it has on the figure of the chest, shoulders, and abdomen, will see that it is a beautifying exercise also.

Let us consider how the stretching, to be most effective, should be managed.

Stand well erect, with arms hanging straight down, and the feet somewhat apart, to give a firmer stand. Draw a long breath, continuing the inspiration while the arms, in the movement to be described, are carried so as to expand and deepen the chest. Bring the arms from the sides steadily forwards, upwards, backwards, and then downwards, with the backs of the hands towards the ground. Breathe out now slowly, letting the arms sink still lower, but keeping them as close together as they can be brought in their backward position, — till they are hanging straight down as at first. Repeat the process four or five times, being careful to take as full a breath as possible in the first part of the stretching movement, and to breathe out as fully as possible during the latter part.

Next, slightly modify the exercise. Stand erect as before. Then, keeping the arms down, incline the head and shoulders backwards as far as possible, arching

the body forwards and hollowing the back, until the hands go as near as they can go to the heels. Recover slowly and steadily the erect position. Repeat this exercise half a dozen times,—or a dozen if you feel equal to it. If you give a little time and attention to this exercise every day, you will not only find the abdominal muscles wonderfully improved, but that your lower limbs have felt the strain, and benefited by the exercise.

At pantomimes you may see the extent to which, by such backward bending, the muscles of the abdomen may be stretched and made elastic. But it is not essential to your happiness, or the happiness of those around you, that you should be able to touch your heels with your head, or, going a little farther that way, to bring your head forward between your feet and smile upon your friends from that comparatively low level. But though this, judged by the test of happiness, is not necessary or even desirable (for, as Bishop Peter of Rum-ti-foo remarked, such contortions viewed by your friends, might "pain them very much"), yet the abdominal muscles, cramped by much sitting over books and manuscripts, will be all the better for so much of this sort of exercise as may stretch and well loosen them.

There are many other exercises without apparatus, or with only dumb-bells or clubs, which have an excellent effect in the same direction.

In using clubs (Indian) for the backward swing, the ordinary way, and an excellent way for its par-

ticular end, is to keep the body rigidly upright. The work then tells chiefly on the chest, shoulders, and arms; in so far as it acts at all on the waist muscles, it tends rather to harden and contract than to limber them. But now change the mode of swinging, letting the body yield as the clubs are swung forward overhead and backward,—so that, as the clubs end their backward sweep, the body is well arched forwards and the ends of the clubs almost strike the calves or even the heels. (But avoid actually striking, for, while the blow will cause discomfort, it will not help the development of any particular set of muscles.) Now, after the full backward swing has thus been reached, swing the clubs well over the head to the front, making all the stretched muscles of the front of the waist take part in the beginning at least of the pull. Do not mind the shoulders and chest coming well forward as the clubs swing down past the feet and backwards. In fact, throughout *this* club exercise give up the firm upright position which is essential in the ordinary form of the overhead swing. Make your body bend well forward as the clubs come down in front,—even so far if you like that the swing of the club backwards beyond the feet may be necessary to save you from toppling over forwards. Contrariwise let your abdomen come well forward as you send the clubs backwards over your head,—so far that there is an elastic back pull available from the abdominal muscles as you begin to bring the clubs up again.

This exercise has a splendid effect in correcting the

defects of most of our English exercises. You will find the arms get less work than you might expect, though they are not idle. The shoulders are well worked; but the waist muscles, front and back, are those most benefited. (We will look after the side waist muscles later on.) The hardest work of all, however, is generally done below the knee in this fine exercise.

The dumb-bells can be similarly used with a swaying body, bending forwards and arching backwards alternately. But they do not give the same pleasant sensation as well-chosen Indian clubs (not too long). Growing lads in particular get much more benefit from the swaying exercise with the clubs than with the dumb-bells. Indeed, it is said that the use of heavy dumb-bells is apt to check growth.

Blaikie mentions rightly as good for the extension and limbering of the abdominal muscles "all work above the head, such as swinging an axe or sledge; putting up dumb-bells, especially when both hands go up together; swinging by the hand from a rope or a bar, or pulling the body up till the chin touches the hands; standing with back to the pulley weights" (described in former papers), "and taking the handles in the hands and starting with them high over the head, then pushing the hands far out forward; standing two or more feet from the wall and placing the hands side by side against it almost as high up as your shoulders, then throwing the chest as far forward as possible," besides the work of special trades,

such as ceiling work by the plasterer and painter, hauling down ropes by sailors, and so forth.

Sparring and fencing are both excellent exercises for the front abdominal muscles. You get the best exercise in this way when practising alone; because you can work systematically, using right and left sides equally. The part of the work which tells most in the way we are considering is not the lunge in fencing nor the delivery of the blow in sparring, but the recovery in the former and the drawing backward of the head and shoulders in the latter. Quickness in all such movements is well worth acquiring, apart from mere muscular development.

A capital plan for sparring is to face a mirror too far from you to be struck, and to deliver your blow sharply in such a way that your fist hides whatever part of your image in the glass you may wish (as forehead, eye, nose, mouth, neck or chin); then recover sharply, bring the striking arm (elbow bent) down to your side, and throwing up the other sharply as if to ward a blow aimed at your face.

CHAPTER IV.

MUSCLES OF THE LOINS.

PROBABLY there is no set of muscles telling more on the strength of the body as a whole than those of the loins, or the muscles in the small of the back, along either side of the spine. In nearly every form of exercise these muscles are taxed; so that if they are weak a man cannot do well in rowing, leaping, running, lifting, or any exercises akin to them.

But perhaps the most important consideration in connection with these loin muscles is that at any time we may be called on to use them in such a way that if they are weak they may be strained and perhaps permanently injured. Some one falls in a swoon, perhaps, and must be lifted; but in the effort to lift even the light form of a delicate girl the muscles of the loins, if at all weak, are severely taxed. Or you may be obliged in travelling to haul a heavily-loaded valise into a railway carriage, or out of it, or across a platform, or up steps, no porter being about who will do the work for you.

I have known a man apparently strong disabled for four or five days by a strain of the loin muscles

caused by unwonted labour of this sort. On another occasion a friend of mine (who certainly was tolerably weak all round) "ricked his back," as he called it, in trying to pull off the top of a wooden case: it is true that in this case the effort would have been futile if his strength had been thrice what it was; but, had his loin muscles been in reasonably good condition, he would not have hurt them even by trying to do more than they were equal to. One of the greatest advantages of all training for the muscles, indeed, resides in this, that they as it were learn their own strength, and are not easily persuaded to overtax themselves. Ladies, for instance, who seldom take pains to strengthen their wrist muscles, though these are, at least, as useful to the fair sex as to us of the rougher sort, are much more apt to sprain their wrists in simple every-day work than men who are constantly taxing their wrists' strength. Yet men are not commonly troubled with any thought of the fitness of their wrist muscles to do the work they want from them; they will strain these muscles to their full strength and get no harm. The weaker-wristed carefully refrain from anything likely to tax their wrists, yet quite often make mistakes and get a sprain.

The best steady exercise for the loins is one which most of us have "handy by"—gardening. Digging, especially, is splendid work for the loins, though trying if they are weak. Best begin with lighter work,—raking, hoeing, dibbling, planting, any work

in the garden almost, for nearly all garden work involves leaning over and moving that which one has to stoop, more or less, to reach. After a while, digging will not overtax the loins: and then nothing better can be recommended for giving strength to the muscles of the loins and the small of the back, than a good spell with the spade. Not necessarily every day,—once or twice a week will do very well. The exercise may be made interesting by studying floriculture a little; and skill in gardening work gives by no means slight pleasure. To be able to take an effective turn at digging, hoeing, and so forth, is as pleasant as to be able to pull an efficient oar. It is useful, to boot. If there is no garden for flowers, one can nearly always find digging work which will not be wasted. For instance, one can level a piece of ground which had been irregular; or dig out trenches; or make ridges; or otherwise alter the contour of the ground as one may find convenient.

Even if nothing is wanted in this way, the strengthening of the loins will be well worth the trouble. Then legs, arms, and wrists gain strength during the work. The chest is not benefited; and would indeed probably suffer in the long-run, if such exercise were not counterbalanced by such others as I have already described for developing the upper part of the trunk.

This, perhaps, is the reason why so few care for garden work of the heavier sort; those who get too much of it are always round-shouldered and thin-chested. But almost every exercise is open to a

similar objection. Tricycling is not good for the chest, and does harm if uncorrected; yet tricycling is splendid exercise. Rowing is equally harmful alone, yet rowing deserves the esteem in which it is held. So with digging; it is splendid work for the loins, and ninety-nine men out of a hundred want their loins strengthened, and go about at their proper peril with the relatively weak loins they have. Take, then, this or some kindred exercise, being careful, however, to get all the good it can give, and avoid any harm by duly expanding the chest in over-head work.

Failing gardening or like work out of doors, how can the loins be strengthened by indoor exercises? Very readily. A bedroom chair with a rail half a foot from the ground is the very thing for loin work. Standing before the chair, its back towards you, lean over (legs straight), and grasp the lowest rail of the back with the right hand. Then raise the chair steadily at arm's length (the hand and wrist getting plenty of work); then steadily lower to the ground, raise, lower, raise again—until you have had enough. Set the chair down again, square the shoulders, and draw a full breath or two; then repeat the process, using the left hand instead of the right.

Fill a small hand-bag pretty heavily; then, standing with the legs straight but pretty far apart, and the bag just in front of you, raise it with both hands, swing it between the legs, and, so soon as it has gone as far back as you find convenient, sway it

forwards so as just to clear the ground, and continue the sweep upwards till you are holding it out at arm's length in front of you. Lower it (arms straight) steadily till it passes again, just clearing the ground, between your legs; and continue the process till you have had enough to satisfy your loin muscles for the time.

Then, leaving the bag on the ground in front of you, go through some of the chest exercises, drawing long breaths, squaring the shoulders, and striking out to right and left. This arrests any tendency the other exercise may have had to contract the chest.

So soon as the loin muscles are ready again, give them another spell of the bag exercise. That will be enough for one day. And so much work, done twice a week or so, will soon make your loin muscles feel and know their strength. You may not be able, perhaps, as every fairly stalwart man should be, to lift a prostrate person of average weight from the ground (a fainting lady, for instance, or one who has fallen in the way of some vehicle); but, at any rate, you will no longer be apt to sprain your back in trying. There are, in truth, however, no muscles better worth training (and tuning even to athletic pitch) than the commonly-neglected muscles of the lumbar regions.

In the gymnasium, or in any convenient open space, another form of exercise is available and excellent. Set in a row a number of weights,—say, each a stone weight to begin with, but you may easily go

on till you can substitute 56 lb. weights. Standing at one end of the row, which extends straight in front of you, stoop to the first weight, and, seizing it with the right hand, swing it forward, upward, and over your head, pitching it as far behind you as you can. Do the like with the second weight, using your left hand and arm instead of the right. Then the third with the right; the fourth with the left; and so forth; till you have Deucalionised the lot. (It is not considered essential that any one should watch this exercise close behind to see that it is correctly done, —in the gymnasium the master, however anxious he may be to see that the exercise is symmetrically accomplished, selects a different position.)

As Mr. Blaikie, who is rather silent about specific exercises for the loin muscles, says, "in many of the heavier grades of manual labour these muscles have a large share of work to do. All stooping over, when lifting is done with a spade, or fork, or bar, whether the knees are held straight or bent, or lifting any weight directly in the hands, horizontal pulling on a pulley-weight, rope, or oar,—in short, nearly every sort of work where the back is thoroughly employed, keeps these muscles active. You cannot bend over without using them. Weed awhile, and unless already strong in the loins, they will ache."

Among more familiar forms of exercise, cricketing and lawn-tennis may be mentioned as excellent for the loins, though rather by way of limbering the loin muscles than of adding greatly to their strength.

Yet such exercises do undoubtedly strengthen them too. Bowling is also excellent exercise for the loins.

Specially for limbering the loin muscles, the toe-touching exercise common in school drilling is among the best. Every one ought to be able to touch his toes with the fingers without bending the legs; yet very few men can do this comfortably. A few minutes given to dips towards the toes every morning and evening will wonderfully limber the loin-muscles. Don't strain; the power to dip to the toes themselves, or even (as I find my boys can easily manage) to touch the ground with the knuckles or with the palm of the hand, will come gradually. Every day you advance a little. But straining does harm. Just keep steadily dipping, each time just so far as the loins allow you to go, and you will find after awhile the power to dip to the toes will come. To measure your rate of progress in this direction, you may set a book or two on the ground, which you can just dip to,—then day after day put thinner books, until at last you will (probably) be able to dip to the ground without inconvenience.

So may the loin-muscles, strengthened by the former exercises, be rendered limber and elastic.

CHAPTER V.

SIDE MUSCLES OF THE WAIST.

IF the muscles of the abdomen and loins are neglected, even by men, in this country (many women cause *all* the waist muscles to become atrophied by carefully packing them inside corsets), the muscles at the sides of the waist are still more thoroughly disregarded. Of course, even in holding the body erect, they are in some sort employed; but nothing is done to give them systematic work. Our sculptors, save as they follow Greek models, seem almost to have given up the idea that there any side muscles to the waist; and certainly a man who should be seen in the bathroom with such muscles as the Greek sculptors show at either side of the waist would be at once recognised as probably a professional athlete.

Yet these side muscles of the waist are of great importance. It is owing to their weakness that we so seldom see an erect and graceful carriage, especially in walking. If our women wobble in walking, as most of them do, it is chiefly because of the weakness of these muscles. Of course, in their case, stays are the true cause of the weakness, and they are, for the most part, to be pitied rather than blamed, since

ninety-nine out of a hundred of those who have been brought up to trust in stays are unable to get rid of them without an interval of discomfort which few are brave enough to undergo. But men (not being among those military monstrosities whose figures are sometimes commended to our approval*) can very readily correct this side weakness, which so seriously impairs their gait. Alike in open-air exercise and in indoor work, the proper means of correcting this weakness can easily be obtained.

Thus, even in walking, if attention is directed to the uprightness of the body, especially when one side is loaded, as when a heavy hand-bag is carried, the side muscles get useful exercise. Hopping has been recommended as very useful for these muscles; but hopping is not an exercise which can be pursued with any great amount of zeal in public, especially by those who most need the steady development of the neglected waist-muscles. A middle-aged gentleman hopping, as Mr. Blaikie recommends, half-an-hour at a stretch (on his way to his office, for example) might conceivably attract some degree of attention. Even in a garden, he might be suspected of kinship to that next-door neighbour who exercised in this way his side waist-muscles, on a wall, for Mrs. Nickleby's edification.

The best way of carrying weights for the special

* In the columns of KNOWLEDGE pinched military waists were praised by some writers!

purpose now in view, namely, by shouldering them (which is also the easiest and most graceful), is not available for business men, giving too much the look of the hired porter. The superiority of the attitude artistically may be recognised by asking your graceful (though I fear corsetted) daughter to walk across a room with a jar poised on her shoulder, holding it above by the hand and arm curved into such a form as Miss Anderson has shown us, and afterwards asking the same young lady to carry the same jar across the room dangling by her side. But possibly a rather stout City man poising, however gracefully, a valise on his shoulder, would look less lovely, and might invite unpleasing comment from the ubiquitous street-boy.

Within the house, however, even paterfamilias may attitudinise gracefully without attracting undesired admiration. The number of exercises available for increasing the development (but not necessarily the size) of the side muscles of the waist, is considerable, and most of these exercises are pleasing. Here is one. Place a hand palm upwards, under the cane seat of a light bedroom chair. Then raise your arm steadily till it extends horizontally—beside you, not in front. Now holding the body steadily, but not too rigidly upright, raise and lower the hand with the chair on it, while with the other hand and arm you make graceful wavings *ad libitum*. Next, keeping the palm of the hand horizontal, bend the arm and hand so that the fingers point backwards. Then

push the hand steadily upwards till your arm extends straight towards the ceiling. Lower the chair and revert to the former position,—arm horizontally extended beside you,—easily and lightly, keeping the other arm and hand moving freely and easily about, not resting the hand on your hips as you feel tempted to do owing to the strain on the weak side muscles of the waist on that side. Next go through the same movements with the other arm and hand. After a little practice, you may take a light chair on each hand, and go through the same movements with both at once. Skill in doing these exercises neatly and gracefully is worth acquiring in itself, and aiming at it makes the exercises interesting.

Lighter, but very pleasant and amusing exercise for the side muscles of the waist, may be obtained by throwing a light, soft ball (at first, or you may use a hard one if you have no objection to raps on the head) from one hand to the other over the head. The swaying motion of the body as you reach out to take the ball on one side and on the other gives capital work to the side muscles of the waist. Practise till you can throw the ball over the head and catch it without looking at it. This is not so easy to do as it looks when done: probably before you attain certainty in the art you will find your waist muscles have been effectively strengthened and also limbered: for this exercise does both at once; one set of side muscles is tautened while the other is relaxed, and *vice versâ*.

Now for an exercise of a severer type.

Take the clubs one in each hand. Standing with the legs slightly apart, sway the clubs upwards towards the right, so that starting from being both near the ground in front of you they are swung till your arms are both directed some 45 degrees above the horizon, the clubs touching each other and both pointing the same way as the well stretched arms which bear them. The body of course must yield to the sway of the clubs, and leans well over towards the right. Then sweep down the clubs in front of you (by which time the body has come upright) and over upwards towards the left, in the same position that they had before had on the right. Then back to the right, then to the left, the body swaying well over each time towards right and left as the clubs are alternately swung upwards on one side and the other. Note that at the end of each swing the face should be directed full towards the side to which the clubs have been swayed. Continue the exercise as long as you find it pleasant. The swaying motion is agreeable enough till you are getting tired, and the exercise is as pleasant as profitable,—unless you are awkward enough to catch your toes with either club, in which case you may desire a pause for rubbing and reflection,—the reverie leading to the resolution to avoid that error in future.

Putting up tolerably heavy dumb-bells, that is thrusting them straight upwards from the shoulder, is another exercise admirably adapted to strengthen the side muscles of the waist. It is best to push

them up alternately, and as each approaches its highest point to sway the body over towards the other side so that the upraised hand comes vertically over the other which should then be close to the chest. The upraised hand may then be lowered till it almost reaches the contrary shoulder. It is then brought to the chest on its own side, and the other hand is raised. And so on alternately. The steady swaying of the body from side to side in this exercise is at once pleasant and beneficial.

CHAPTER VI.

MUSCLES OF THE ARMS.

IT is commonly supposed that the exercises of which most Englishmen are fond, and especially rowing, develop the muscles of the arms and shoulders in greater degree than they develop the muscles of the body. This, however, is a mistake. As a rule, Englishmen are better in loins and legs than in shoulders and arms. Rowing in particular affords very insufficient exercise for the arms. Of course, many rowing men assert that rowing exercises every muscle of the body, an assertion which needs no contradiction, for the very best forms of exercise cannot do more than give employment to a portion of the body. Rowing in heavy boats gives exercise to the shoulders and arms, no doubt; but even in these the work falls more on the back, loins, and legs than on the arms, while in the lighter kinds of boats, and especially in racing boats, the fore arm and upper triceps alone get any work worth considering, the biceps and the rest of the upper arm getting scarcely any work at all. The biceps will gain more from a week's steady work with the dumb-bells and the clubs than from a year of rowing; nay, so far as the

shapeliness of the arm is concerned, rowing positively injures the biceps, by making it look relatively smaller than it had been before. Cricket and lawn-tennis give more exercise to the arms; but, if too exclusively used, they destroy all symmetry. I never yet saw a cricketer of the very enthusiastic sort with well-shaped arms.

Let us now consider the arm in detail, from the shoulder to the hand.

THE SHOULDERS AND UPPER ARM.

For strengthening the shoulder muscles exercise with the clubs is invaluable. So are some of the pulling exercises already considered. But no apparatus of any sort is really necessary.

Standing upright, the arms hanging down, carry the arms from the sides forwards and upwards and then backwards as they pass down to a horizontal position, turning the palms of the hands upwards. Continuing the motion, let the arms be lowered to the sides till the hands strike the backs of the thighs. Repeat the process twenty or thirty times. You will soon feel that the muscles around the shoulder are doing good work and getting well limbered up. With dumb-bells the work is heavier, but if the dumb-bells are too heavy, the work is less effective in making the shoulder muscles quick and active. With clubs the centrifugal tendency is somewhat too marked, until the shoulder muscles have been

strengthened by exercise without them; but later, this exercise with the clubs will be found excellent, and the slow lowering of the clubs from the horizontal position on each side, and rather backward, is particularly beneficial. In fact, in nearly all exercises with the clubs, slow movements of lowering and raising, while the clubs are held far out, are capital for strengthening and steadying the muscles of the upper arms and shoulders.

Next, standing upright, with the arms raised vertically, lower them steadily forwards till they are at the sides, forcibly continuing the motion till they have been carried as far back as they will go, keeping the body upright. Repeat this a score or so of times, each time holding the arms as far back as they can be carried, while you count ten slowly. You will find the muscles of the upper back near the shoulder considerably exercised even without lifting dumb-bells backwards in this way. But as you get accustomed to the work and it grows lighter, use dumb-bells, or any other convenient weights. To limber up the same muscles carry light clubs from over the head forwards, downwards, and so backwards, as far as they will go, keeping the body all the time rigidly upright.

Flinging the hammer, or any other weight which can conveniently be flung hammer-fashion, is capital work for the muscles of the upper back, and the inner portion of the triceps, while the weight is being swung backwards; in delivering the weight by

swinging it upwards and forwards, the muscles over the shoulder and the deltoid are brought into play still more effectually.

Exercises in which the arms are flung horizontally backwards are good for the muscles at the sides of the shoulder. The action in delivering the broadsword cuts 5 and 6 is what is specially to be aimed at for these muscles. These cuts as delivered in the cavalry sword exercise,—in which the body is swayed over (the legs somewhat apart) to the right in delivering cut 5 (from right to left) and to the left in delivering cut 6 (from left to right), while the body is held vertically in delivering cut 7 (downwards, at the enemy's crest),—are still more useful for developing the shoulder muscles. In fact the whole of the cavalry broadsword exercise, as practised on foot, the legs a little apart and the body swaying from side to side between cuts 1 and 2 (slantingly downwards), between cuts 3 and 4 (slantingly upwards), and between cuts 5 and 6 (horizontal), is splendid for the right upper arm and shoulder. It comes rather awkward at first to most persons to go through the same exercise with the left arm; but after awhile it is easy enough; and undoubtedly both arms should be exercised equally in this way, if symmetry of development is required. It affords good exercise to go through the broadsword exercises both for infantry and cavalry, with a light club, say 6 lb., instead of a broadsword, first with one arm, then with the other. It is particularly hard work to check stroke 7

at the right time, if it has been given with the full swing of the club.

Rowing is a good exercise for the shoulder muscles, but tends to round the shoulders forward, and should be corrected by the frequent use of exercises such as those just described. The same remark applies to lifting work, which is apt to injure the shapeliness of the back. There is good work for the shoulder muscles in gardening, also, but it must be corrected by work tending to throw the shoulders back. Swinging the clubs well back so that in their swing they come almost to touch the calves, as already described for another purpose, is an excellent corrective for all such forms of exercise as tend to warp the shoulders forward.

For the deltoid muscles (over the top of the shoulder) there is no better exercise than climbing up a rope. But this work, like that of drawing the body up to a cross-bar, is too severe for the lax muscles of the untrained. It should be preceded by steady work at lifting weights by a downward pull, as by hauling on a rope passed over a pulley or horizontal bar overhead. You can make half your weight serve for lifting practice by sitting on a crossbeam attached to a rope which passes over a pulley. Hauling on the free half you seem to lift your whole weight; but in reality you only lift half, though you raise the whole. This may sound somewhat paradoxical; but if you consider how when thus raising the body by hauling on a rope the weight is divided equally between two

portions of rope, one held by the hands, the other attached to the cross bar on which you sit, you will see that the hands sustain in reality but half your weight. Note also the evidence derived from the rate at which the body rises. If you haul in two feet of rope the supporting rope is shortened by two feet, but this shortening being equally divided between the two portions of the rope, each is shortened one foot, which is the distance by which the body rises. By practising on the half weight daily you will soon be able to lift the whole weight as in climbing. If, however, you have opportunities for either exercise, be very careful when hauling up the weight by a rope passing over a pulley that the rope is of adequate strength, and that it runs truly and freely over the pulley; a hitch when you are several yards above ground is an awkward and annoying *contre-temps*.

A man in good condition ought to be able to lift his body steadily by the action of the arms till the chin touches the knuckles, then lowering himself, raising himself again, and so on, ten or twenty times. With practice and training one arm will lift the body easily. Athletes can lift the body from a single finger; but those for whom I am writing may be content without achieving that feat.

Holding out weights at arm's length in front and on either side, and swaying weights (dumb-bells preferably) from the front to either side, the arm remaining all the time horizontal, will be found good exercise

for the muscles on the front and side of the shoulder. Putting up weights from the shoulder is better exercise for the arms than for the shoulder muscles: but is good for correcting the effects of too much exercise in lifting weights.

Boxing and single-stick are alike excellent for the shoulder and upper arm muscles. Broadsword and single-stick with the hanging guard, now always used in England (in America the old-fashioned inside guard is still in vogue), are better for this purpose than fencing. But all such exercises are good for the shoulder muscles. It is a pity they are one-sided, though that can be corrected at the will of the players.

The biceps is strengthened by the last-named exercises; but this muscle is specially strengthened by all exercises in which weights are raised by bending the arm at the elbow, and bringing the hand towards the shoulder or chest. It is for this reason that bad rowing, in which the arm is bent while it should be kept straight, the rower striving to do with the arms the work which he should do with the back and loins, developes the biceps muscle much more than good rowing. For in good rowing the biceps is only at work during that short and comparatively easy part of the stroke towards the end, after the body has already swung back to the upright position. If the captain of a boat finds that any member of his crew is developing the biceps muscle too rapidly, he may be tolerably sure that there has been too much

arm work on the part of that oarsman at any rate. If the whole crew row too much from the arms, the effect on the biceps will be noticeable all round.

Work with the hammer or mallet, especially on a vertical surface, as in hammering nails into a wall, is excellent for the biceps muscles and also for the muscles at the back of the upper arm. It should be distributed between the two arms, however, or a marked inequality of development will result. Lifting weights with bent arm, pitching weights over the head, and all work in which the arms are freely bent, will be found excellent for developing the upper arm.

No work done by pulling or hauling with straight arms can benefit the upper arm in any appreciable degree.

THE FORE ARM AND WRIST.

The exercise which I have found tell most directly on the fore arm is that of lifting a chair at arm's length, the chair's back being vertical and the chair held by a hand-grip on the lower rung either of the back or front. The grip required to keep the rung from slipping ensures the proper action for developing the fore arm; otherwise swaying up dumb-bells at arm's length would be as effective: but when the grip is loosened, in the case of dumb-bells, the work falls as much on the upper arm as on the fore arm.

A splendid exercise for the muscles of the wrists and fore arms is to hold the clubs out at arm's length

hanging vertically down, the palm side of the wrists being uppermost, and the shoulders of the clubs next to the thumb, then steadily raising the clubs to the horizontal position in a line with the arms, lowering them slowly, raising them again, and so on till you have had enough of the exercise. Another good exercise is to raise the clubs from the same hanging position to the horizontal position at right angles to the arms and turned from the body, and carrying them on till they are vertical, then till they are horizontal again but turned athwart the body, and yet a quarter turn further till they are hanging vertically down. After this carry them back again to their first position, repeating the double movement as long as you conveniently can.

A pleasant relief after the last exercises is obtained by holding the clubs in the same hanging position, but with the shoulders of the club next the little finger,—that is, dagger-wise instead of sword-fashion. Work the clubs from this position to the horizontal position on either side—that is, swing them as pendulums athwart the body. Again, holding them rigidly at right angles to the fore arm, bend the arm at the elbow till the club is horizontal. Straighten the arm again to the horizontal position; then carry it down to the sides and as far back as you can, still keeping the club held rigidly dagger-fashion.

The broadsword exercise done with a club, first in the right hand, then with the left hand, as described in the preceding section, includes excellent exercise

for the fore arm as well as for the upper arm and shoulders. It also exercises the wrist finely, especially the parades by which in actual broadsword practice the first, second, and third points are respectively met.

I used often when a lad at Cambridge to carry in my right or left hand a heavy stick, or a medium-sized poker, or even a club, while I walked about my room reading (not always the remarkable subjects which college authorities have selected in their wisdom for the life-training of men). Swaying such implement about with plenty of wrist-work I got my wrists, which were never large, so limber and supple, that when I took part in single-stick encounters, I could get in certain wrist-strokes with a rapidity which would rather astonish my opponents. In fact, an ordinary single-stick feels like a very light switch after a few days' steady use of the exercise with the heavy rods or clubs.

Fencing gives good exercise to the fore arm and wrist, especially the movements used in the parades, and still more specially the action in disarming an opponent. Batting, whether at cricket, base-ball, or lawn-tennis, is also good exercise for the fore arm.

THE HAND.

The hand requires special exercises to correct the effects of some of the work by which the upper arm, forearm, and wrist are best strengthened. So far as

gripping is concerned, nothing need be added to what has been already suggested, for a number of exercises for the arm and wrist require strenuous hand-gripping. But hand-opening and finger-working exercises are much needed.

Observe that lifting weights by the fingers tends to crook the fingers if the work is done in the usual way, the pressure being against the inside of the fingers. This may be corrected by lifting weights in such a way that the outsides of the fingers feel the pressure. I notice here, by the way, a singular mistake in Mr. Blaikie's advice for correcting the cramped state of the fingers resulting from much hand-gripping work. He recommends the use of the fingers in pushing, as when the body is allowed to rest on the outstretched arms, the fingers pressing against a wall or the floor, and pushing the body back to the erect position. The muscles used in this pushing action are not the muscles which oppose the gripping muscles, but are these very muscles—the hand-closing not the hand-opening muscles. After much work in finger-pushing in this way (that is, by pressure against a flat surface) the hand tends to a hooked and cramped state, not exactly the same as, yet resembling, the hooked hands so often seen among oarsmen.

After all, the hand is more of a grasping instrument than anything else, and we do not find many exercises suitable for correcting the effects of too much gripping work. Exercises in which the fingers are forced open, as in the beginning of the pushing work last

considered, and *not* subsequently called upon to resist the pressure by closing towards the palm, are good by actually pressing the hand into straightness, not by exercising any counter muscles.

Here is a simple exercise for the muscles which oppose the gripping muscles. Place the tips of the fingers under a heavy book, or the nearer half of a writing desk, then work the fingers as in playing the piano, so that each finger is called on in its turn to lift the weight. A very little work of this kind will go a long way, showing how unusual is such exercise, and how weak and unpractised are the hand-opening as compared with the hand-closing muscles.

CHAPTER VII.

THE MUSCLES OF THE LEGS.

MANY seem to imagine that the muscles of the legs get all the development they require from walking, with such more active exercise as may be obtained from casual running, or an occasional game of lawn-tennis or the like. The result is that we seldom see the lower limbs nearly so well developed as they ought to be, and very readily might be. Few muscles respond more quickly and satisfactorily to training than those of the legs, and though our costume does not, like that of the savage, allow the well-developed and shapely legs of the athlete to display their proportions very openly, yet even in that remarkable development of modern civilisation the "straight trossers" (*Shakespeare*), a well-formed leg (or preferably a pair) will manifest a marked superiority over ill-shaped lower extremities. It is not, however, so much on the shape of the legs as on the grace and elegance of their movements that exercise tells most effectively. In the street and on the lawn, in the parlour and in the dancing-hall, the owner of active and lissome legs has a marked advantage over stiff and weak-legged beings. You will note the difference

even in the way in which one or the other will stoop to pick up—let us say—a lady's fallen handkerchief. In all social exercises, within doors and abroad, the difference is marked. A man may be awkward with his arms, and no one will much notice the circumstance, but he who is stiff and awkward on his feet, shipwrecky about the knees, and cramped in the thighs, appears altogether ungainly and uncouth even if his arms, shoulders, chest, and waist are well developed and shapely.

THE UPPER THIGH.

Let us begin with the muscles of the upper thigh, taking first those in front.

The most easily obtained exercise for the front thigh muscles is fast walking. In this respect there is all the difference in the world between a quick walk and a slow one. Walking sharply, with the body held well upright, and taking hills with special energy, the thighs are well exercised; but in slow walking they hardly get any exercise at all. Running is good too, especially long-distance running, with a long stride. Mr. Blaikie recommends that the heel should never touch the ground; but Mr. Muybridge's instantaneous photographs have shown that runners who believe that they run without bringing the heel to the ground do really touch the ground first with the heel, in the long striding run we are considering.

The following exercises should be practised daily by all who wish to have good thigh muscles.

First, standing upright with the feet close together, lower the body pretty sharply, till the tips of the fingers touch the ground on either side of the feet, on which spring sharply upright again. The heels rise in this exercise as the body descends. Repeat the dip from ten to twenty times. At first there is a tendency to topple over, but this will soon be corrected. (Note how the muscles and tendons in the knee regions are limbered by this exercise). The shoulders should be well squared as the body rises to the upright position. Gradually the dip may be carried farther until the whole inside of the finger part of the hands touches the ground, the body being sent up more sharply by the resulting pressure against the floor.

Secondly, go through similar movements without lifting the heels from the ground. The hands now touch the ground a little farther forward, and as the dip increases, the backs of the fingers touch the ground, and even after awhile the backs of the hands as far as the wrists can be brought to the floor. The dips in this as in the preceding exercise should be made neatly and sharply,—in this way the knees get well exercised, as do the calves and loins, while the quickened respiration shows how the chest takes part in the work.

Thirdly, both forms of exercise may be gone through with dumb-bells in the hands; and the dumb-bells thus used may be tolerably heavy.

Fourthly, there is a form of exercise for the upper

thigh muscles which belongs rather to the nature of an athletic feat than to that of systematic exercise. It may therefore be used or let alone as may be preferred. It is not suited altogether perhaps to middle-aged gentlemen (or ladies) of obese tendencies. Standing on the left foot, hold out the right leg at right angles to the body; now steadily sink till you are sitting on the left foot: you may perhaps sit unexpectedly on the floor; but persevere for all that, until you can comfortably sit down on one foot and steadily rise therefrom with the other leg all the time parallel to the horizon. When you can do this comfortably on either foot, you can invite your friends to do likewise, and if they have not practised they will interest you by their inevitable failures.

The upper thigh gets exercised also in the familiar feat of lowering the body on the left or right foot while the right or left foot is held by the right or left hand; the knee of the upheld leg being brought to the ground. This is in reality an easier exercise than the last; at least it always seemed so to me; though many who can do neither suppose this the harder. The difference between the two consists chiefly in the circumstance that in the former the sole of a foot rests all the time wholly on the floor, while in the latter the heel rises from the ground just before the knee touches it.

Jumping is an excellent exercise for the upper thigh muscles. It is far better to practise easy jumping for some time than to try for a short time how

high one can jump. The Hon. Geo. Lawless's practice (see "Frank Fairlegh"), however unsatisfactory as a cure for a wounded heart, may be confidently recommended as a remedy for weak thighs. Put a light stick across from one chair-seat to another, placing it so that it will fall if not cleared, and then if your room is large enough run lightly round and jump over the stick, continuing your circuits till you begin to feel tired and out of breath. Mr. Lawless, if I remember rightly, placed the stick across the tops of the chair-backs, and ran backwards and forwards, instead of round and round. But then he was probably in better jumping condition than most of our readers, who would be content with his number of jumps (100) over the height of the chair-seat. Take the jumps as lightly and easily as possible. Try to do it so that any one in the room underneath would not know you were jumping at all; you will probably fail in that, but your efforts will not be unrewarded nevertheless.

Steady running, not too far, but carried on daily, is excellent for the thighs. Hopping also is good; and dancing might be recommended, but for the difficulty of persuading any one, especially any young person, to attempt so distressing an exercise. Let them take courage, however, and they may find even dancing bearable in the good cause they have in view: I could tell wonders of what some young folks have endured in this way. Walking up hill and skating are both good for the thigh muscles. Un-

fortunately it is impossible to get much skating in this country.

All such work as digging, shovelling, lifting, and so forth, strengthens the upper thigh muscles. Some who have much work of this kind to do, get these muscles over-developed, and rather stiffened than properly strengthened. But probably few of those for whom we are writing are likely to injure themselves this way. We know dozens of weak-legged folk—especially weak about the upper thigh—who could do themselves a world of good by digging for half an hour or so every day.

Fencing, with plenty of good lunging, is admirable for the thighs. It is astonishing how few are able to go through even the extension exercises properly. Note that both legs are exercised in passing from the second to the third position in fencing, or sword exercise generally. In the first position the weight of the body rests on the left leg, and the right, though advanced and touching the ground, should bear scarcely any of the weight. Standing in this position, the swordsman ought to be able to carry the right foot backwards by the balance-motion (not that this movement belongs to fencing) without in any way changing the bearing on the left foot. The balance movement should be executed thus several times, the left leg and foot remaining simply at rest. Next the body should be lowered and raised steadily on the left foot, the balance-movement steadily continuing. Then the right leg and foot should be made

to take their turn, the left foot being swayed steadily backwards and forwards in the balance-movement. After both right and left leg and foot have been well exercised in this way, the third position should be assumed, in which the right leg is thrown forward as in lunging, the greater part of the weight of the body resting well on it (the right leg from the knee down forms the short upright leg of a right-angled triangle, of which the longest side is formed by the left leg and the thigh part of the right leg). In this position the gradual alternate lowering and raising of the body give splendid exercise to the right thigh and knee. The right leg from the knee downward sways through a slight arc round the foot as a centre; the left foot remains still,—unless it slips, as it is apt to do on a carpet or smooth floor. Repeat this exercise with the left knee forwards. The arms can be exercised conveniently in divers ways at the same time, or may be crossed behind the waist, the hands holding opposite elbows.

If instead of such exercises, which are a trifle dull, you prefer actual fencing and singlestick, which may be made exceedingly lively, you should be careful to use the left hand as well as the right. It is just as good fun, and the exercise tends much more to symmetry when thus balanced.

Riding is also good exercise for the thighs. Blaikie recommends walking with short steps, as more likely to render the thighs stout and strong than walking with good stride which makes the step easier; but I

cannot recommend the adoption of a short stumpy walk. Possibly, as an American, Mr. Blaikie thinks it desirable to be much on the stump. But what is worth being done at all is worth being done well, and stumpy walking is not good walking.

THE THIGH NEAR THE KNEE.

The sedentary man seldom has the muscles of the ower thigh, that is, of the part of the thigh near the knee, properly developed. Walking lazily does not call these muscles into action. But if any one who has been in the habit of walking with limber legs, and knees rather bent, will try the experiment of straightening the knees as he walks, he will soon find the muscles of the lower thigh telling him emphatically how weak and how easily tired they are.

One of the best exercises for these muscles is that of touching or trying to touch the ground with the fingers without bending the knees. This exercise should be pursued steadily for a short time every day. I have already referred to its value in limbering and strengthening the waist muscles both front and back. It is excellent for most of the back muscles of the legs, and it is convenient to be able on occasion to reach to the ground without bending the legs. A little steady practice every day will astonishingly increase this bending power.

Walking uphill is splendid work for these lower

thigh muscles, and good in many ways besides. Going up stairs is good work too, and though it is not easy to go in steadily for this sort of exercise—because there are always people who want to use the stairs—one can often get a good deal of exercise this way in the regular day's work. Not every one knows how to go up stairs properly, by the way. A man's way of walking up stairs affords a good measure of his intelligence. The average servant, if you notice, goes up stairs as if kicking through the top of the step were the object to be specially aimed at. Children and boys up to fourteen or fifteen—girls, I am afraid, quite as long—adopt the same unreasoning stair-top-kicking gait. I would have the art of getting up stairs taught at school before drilling and the average absurdity known as calisthenics. What can be more pleasing than the springy gait of an intelligent person on his or her way up stairs. The foot is not driven at or along the top of each stair, but rested on it lightly; the weight of the body then brings down the spring of the foot nicely until, when the other foot has taken its stair in the same easy plantigrade way, the spring recovers itself and lightly lifts the body on. I would as lieve for my own part see a man hauled up stairs like a sack as see (aye, and hear and feel) him shuffle and kick himself up in the average way of "getting up stairs." (*Such* a getting up stairs, indeed!) The reward of adopting this light, springy, clean-treading way of going up stairs, is that you go up with less labour, yet with

more useful exercise, especially for the muscles of the foot, ankle, knee, and lower thigh.

But my own constant practice for the last twenty years, and the practice I mean to follow till gravity begins to get the better of me, is to go up stairs (as well as down) two steps at a time, aiming at such a movement, by a slight relative lowering of the body at each rising of the feet, that the actual motion of the centre of gravity is as near as possible on an inclined straight line. Going up stairs this way is capital exercise, and is satisfactory to the intelligence, as well as pleasing to the understanding.

FROM KNEE TO TOES.

However absurd some of the common notions about shapeliness may be—as for instance that a small hand or foot is to be admired merely because small, though possibly too small and altogether ill-shaped—there is good reason for the common prejudice in favour of a well developed calf (or preferably a pair). Although footmen and ballet-dancers shame most of us as regards this particular development, and yet are not the most esteemed products of civilisation, there can be no doubt that the shapely calf indicates racial advance. The lower races of savage man are calf-less. The higher savage races have very queer calves, to say the least of it. In civilised races the lower types have the worst calf development. It is only in the highest civilised races, and in the best specimens of

these races, that we find the shapely calf shown in Greek sculptures.* I take back indeed what I said just now, or seemed to say, about footmen and ballet-girls. Their development of calf is great, but to the artistic eye unsatisfactory, There is something manifestly wanting in intellectuality about this portion of their understandings. Their limbs below the knee are as out of proportion as a blacksmith's arm; and though as I wander through galleries of modern sculpture I am sometimes led to suspect that artists have occasionally taken such calves as footmen and ballet-dancers possess for their models, I am sure no sensible sculptor would take the legs of John Thomas or of Signorina Toanheli as samples of masculine or feminine perfection of form, any more than he would copy the arm of a blacksmith in fashioning the statue of an Apollo.

I do not advise a series of energetic exercises for the calf; but I do strongly advise that so much exercise should be systematically given to it that it may be developed in due proportion. Where the calf is small and weak, it may with advantage receive a larger share of attention.

The first exercise I would suggest is a very simple

* We may recognise the significance attached to the calf as one of the most characteristically human developments, in the old custom referred to in Tennyson's "Princess," in words which many readers have found perplexing—"Married to a booted calf." Obviously the calf, well booted, was regarded as aptly symbolising the man himself.

one, but instructive as showing what is the work for which the calf muscles are intended. The exercise is also good for the knees. (I may remark in passing that many of the exercises I have suggested for the thighs and body, and many of those which I am about to suggest for the leg below the knee, are good for making the knees supple, lissome, and strong, so that I do not think it necessary to describe special exercises for this purpose.) Walk a hundred steps (in your bedroom or sitting-room, if you like) on the toes, letting the body sink well at each step as the heel draws near the ground, and be springily raised as the heel rises. There is no exercise in this, you probably think, as you take the first ten or twelve steps; but by the time you have taken a hundred steps you will find your knees beginning to be rather tired (if you have kept up properly the alternate rise and fall of the body). The calves have not apparently been very much tried. Yet as you rest after the exercise, a certain something suggests that the calves have been "got at."

It is the rising and sinking of the heels which has given the calves work. Therefore, attend now especially to this particular movement. Standing with the head well up, chest out, and shoulders thrown back, the knees set as if you were about to begin the toe-touching exercise already described, and the feet pretty close together but not touching, and *the toes turned out*, steadily rise on the toes, after the ballet-dancer's fashion, as high as you can. Then

slowly lower your heels till they touch the ground, keeping the knees all the time well back. Steadily rise again till you are standing on tip-toe. Sink again. As you next rise, slacken your knees a bit and lower the body till you can feel the calf-muscles, and note how they tauten as the body is being raised. Resume the straight-knee condition, and steadily rise and sink from the toes as before. Repeat as long as convenient—forty to fifty times the first day, but later you may take several hundreds.

No exercise more directly affects the calves than this. "A gentleman of our acquaintance," says Blaikie, "of magnificent muscular and vital developments, was not satisfied with the girth of his calves, which was 14¼ inches. At our suggestion, he began practising this simple raising and lowering of the heels. In less than four months he had increased the girth of each calf one whole inch. When asked how many strokes a day he averaged, he said, 'from fifteen hundred to two thousand,' varied some days by his holding in each hand during the process a 12-lb. dumb-bell, and then only doing one thousand or thereabouts. The time he found most convenient was in the morning on rising and just before retiring at night. Instead of the work taking much time, seventy a minute was found a good ordinary rate, so that fifteen minutes at each end of the day was all he needed. But this was a great and very rapid increase, especially for a man of thirty-five; far more than most persons would naturally be contented with,

yet suggestive of the stuff and perseverance of the man who accomplished it."

However, the exercise is rather a slow one, though effective enough. Many others are available which, if they do not act so directly on the calf, are better for the general development of the leg.

Quick walking, with hard pressure of toes and soles against the ground, will be found very capital work for the feet and calves. Walking up hill in the same way is even better. Blaikie strongly recommends running on the fore part of the feet. But as running, on this part of the feet only is not good running and it is a pity to spoil the style, I would simply recommend the careful avoidance of flat-footed running. It is neither well to run with too much foot action nor with too little, as when running flat-foot. By aiming at a style between the two, you get the most effective form, and at the same time develop well the muscles of the calf and of the upper thigh. Note that in the actual drive back with the lower limb, by which forward propulsion is accomplished, the heel should come first to the ground (whatever runners may say, and doubtless believe, about the heel not touching the ground at all), then the mid-sole, and finally the ball of the foot and the toes, the last forward coming from the front of the foot. In this part of the leg stroke the knee should be well back. If special attention is directed to this part of each stride, the calves will get an extra allowance of work, while the running style will be perceptibly

improved. But if you care to get a quick style, avoid over-springiness. The spring of the gait should only suffice to reduce the vertical impact to a minimum, taking off the jar which is perceptible in flat-footed running; but any springiness by which an unnecessary rise and fall of the body are produced is a fault of style, and involves more or less waste of strength, or loss of velocity, or both.

Blaikie further recommends hopping, which is, no doubt, the most effective of all exercises for enlarging and hardening the calf. But skill in hopping is not worth very much in ordinary life. The accomplishment is one which most persons would prefer to avail themselves of in private; and even in a bedroom persistent hopping might be regarded as a rather objectionable practice. The only advantage of hopping is, that it tells very quickly and tires very soon.

Jumping is far more satisfactory, being in the first place much more useful, tending to strengthen and improve more limbs and muscles than hopping, and having a saner aspect in public. You can often get the chance of taking a good run across a heath or common presenting abundant opportunities for light leaping.

The ankles and feet, to the toe-tips, will be sufficiently worked by the exercises given for the legs generally, and, indeed, by many of those recommended for the upper half of the trunk.

CHAPTER VIII.

HOW TO REDUCE FAT.

THOSE who are not troubled with undue adipose deposits need not imagine that therefore what is said here about reducing fat can have no interest for them. Most of the plans to which I refer are such as are good for those who wish simply to be strong in body. These methods depend on the avoidance of whatever overtaxes or weakens the system; and though the strong may be able to dispose of an extra amount of food, or to resist influences which injuriously affect the weaker, they will be none the worse for following those rules by which the energies of the body are increased, or developed, or saved from being unduly taxed. Yet of course some parts of a system for reducing fat need not be followed by those who have no tendency, or little, to become obese.

It would be difficult to say whether corpulence is to be regarded as a greater nuisance in its direct or in its indirect effects—whether it is worse to be loaded constantly with the weight of five or six suits of clothes, to have the circulation impeded, the liver obstructed, and the lungs oppressed, or to be

rendered almost unable, and quite unwilling, to take such exercise as would open the lungs, free the liver, and stimulate the circulation. The mischief of corpulence works in a very vicious circle. It is an evil in itself, and it tends to increase its own evil effects.

At the very outset, then, of any system of exercise for those who are oppressed with much fat comes the inquiry, how that excess of adipose tissue is to be reduced. Observe, I say "fat," not "flesh." It is absurd to speak of fat men as fleshy men. No one is the worse for flesh; nor can there well be excess of it, for flesh is muscle. It is excess of fat only which is obnoxious; and because, amongst other reasons, wherever there is excess of fat there is defect or deterioration of flesh.

Now, with regard to the reduction of fat, there are a dozen or so of methods which are in more or less favour with those whom Dr. Dio Lewis calls the "wobblers," though in England, at any rate, many fat men walk as steadily, in appearance, as the lean ones. I do not, for my own part, believe in any one of these methods; but I believe in all or very nearly all of them. This sounds like a contradiction; but it is not. I think the fat man who pins his faith on this, that, or the other cure for obesity, is not only unlikely to get rid of his extra fat, but is very likely to do himself serious mischief. But I think also that the man who pins his faith on this, that, *and* the other cure, is very likely, if he is patient and resolute, to be successful in reducing himself to reasonable

proportions. It is by applying all the proper remedies (for some are obviously bad) at the same time, and in due proportion, that fat may be reduced most safely and most effectively.

But in the struggle with obesity, resolution, self-restraint, and patience are all-important. Unfortunately, fat is very often an evidence of impatience, weak will, and want of self-restraint; also of want of wisdom. The pleasure of a goodly meal, swallowed hastily (that is, without due patience in mastication), washed down (hateful, but in such cases too appropriate expression) by draughts of wine, or beer, or spirits, and followed by fat-engendering repose, seems greater than the enduring pleasure of good digestion, active frame, and light spirits, with the power to limit sleep to sleep's proper hours. A quiet read in a soft arm-chair by the fireside in winter, or in the cool, softly-lit study in summer, seems a greater good, even when taken at the expense of exercise which the body needs, than the less-noticed, but longer-lasting sweetness of health and cheerfulness secured by a wholesome regimen.

The necessary resolution, patience, and self-restraint to reduce excess of fat can be obtained in no other way, that I know of, than by reasoning. Let a man consider within himself what he pays for those indulgences which keep him fat, and he must be foolish, I take it, if he is unwilling to give them up or to reduce them in such degree as may be necessary. Nay, let him even consider the matter in the light of

such indulgences. Does he enjoy his food as much when over-burdened with fat as he would if he were in better condition? Does he enjoy the rest he takes unnecessarily as he could enjoy the rest he would *want* if he were more active? In fact, does he know the real pleasure afforded by either feeding or resting? One meal sauced by hunger is worth a dozen eaten when the system is already overloaded. One rest earned by exercise is worth any amount of lounging laziness. Then again, consider the work a fat man has to do as a direct result of shirking work he ought to do. The man who has been unwilling to walk four or five miles a day when of reasonable weight, has no choice later (unless he summons resolution and patience to his aid) but to carry about with him wherever he goes a load of perhaps forty or fifty pounds of useless, muscle-encumbering fat. A man who is unwilling to put on a suit of flannels and a "sweater," weighing, perhaps, two or three pounds more than his usual dress, to work off a pound or two of his weight, carries about with him (groaningly, it may be, but still unresistingly) the weight of five or six complete suits of clothing.* A man who is unwilling to sweat for his health, sweats daily four or five times as much as leaner men, though what he so loses he replaces by heavy draughts,—not always of innocuous water.

* A summer suit of clothes for a man of medium size (height and stoutness) weighs about 8 lb., including boots and hat. A fat man not only carries 40 lb. or 50 lb. more weight of his own than he needs, but has to have rather heavier clothing.

So much premised, and noting also that to follow at once several fat-reducing methods is much easier, as it will be found much more effective, and therefore much more encouraging, than to follow one, I proceed to consider the various methods available for attacking superabundant fat, hoping that many overweighted persons among my readers may take courage to enter systematically and patiently on the profitable work of fat-reduction.

MEDICINE.

I begin with medicinal systems as on the whole the least useful methods, and those which need to be most cautiously applied, where applied at all. (I say nothing of corset or busk wearing, partly because I have elsewhere said enough of that foolish plan, only fit for those whose resolutions need bolstering up artificially, partly because I hope and believe that there are few so foolish as to expect to gain by applying so obviously unnatural a method.)

Nearly all medical methods for the reduction of fat depend in reality on the amount of mischief which may be done by medicines to the digestive system and to the appetite. If a man took an emetic four or five times a day and a strong aperient twice or thrice a day, he would probably be considerably reduced at the end of two or three weeks, supposing he survived. It is easy to devise medical systems which, without being quite so obviously pernicious, would do so much mischief that a man's weight would

soon be much reduced, and also his strength. Of such systems nothing good can be said.

Akin to these are such methods as depend on dosing the food with vinegar, or otherwise making it either unpalatable or unprofitable.

Yet medicines may sometimes be used, especially at the beginning of a course of fat-reduction, with advantage; but this should not be done without medical advice. The fat man is in an unwholesome state, and though he may be able to get better without medicine, he may save some trouble by taking such medicines as a sensible doctor may consider suitable to help the action of the stomach, the liver, the kidneys, and the skin. Albeit, recourse should only be had, in my opinion, to the doctor, in very bad cases, or where, as sometimes happens, the first application of other and better methods leads to constipation, chills, headaches, and other forms of mischief. These are so apt to dishearten the struggler against fat, that it may often be well to give the disordered, impeded, or congested organs a little help from judiciously selected drugs.

Not the slightest reliance, however, should be placed in patent medicines or prescriptions for reducing fat without change of regimen or increase in the amount of exercise taken daily. Of all these preparations, it is to be observed that they are advertised solely to make money. In every single case which has thus far been brought under my notice, the unfortunate heavy-weight is invited to spend a large

sum of money in the purchase of many bottles of some preparation in order that he may after many weeks find his weight notably reduced. Either the medicine is offered without any account of its ingredients; or in reply to letters the advertiser gives a prescription such as no chemist would be likely to mix, and such as the advertiser asserts that few chemists can mix properly even if willing. In one case, the corpulent are told in so many words that a number of bottles of the medicine are to be bought and consumed before any good effects will begin to be recognised. In the other, the advertiser seems to offer a prescription gratis; but it comes really to the same thing: he knows that the persons who answer his advertisement will apply to him for the medicine; and in the cases which have come under my notice he asks a monstrous price for a preparation probably quite worthless and possibly (when used, as recommended, in large quantities) most mischievous. As to the value of any medicine for reducing fat, it should be noticed that only a long course of experiments conducted on a great number of persons, and under very various conditions, could possibly prove that a preparation was a specific against obesity, and certainly no such experiments have been made in the case of any of the advertised medicines. If there were any medicine by which fat could certainly be diminished in a few weeks or months, it is *almost certain* that the constitution would be injured far more seriously by the medicine than it had been by obesity. And whereas

undue fat can be removed by patient perseverance in health-giving regimen, the mischief done to the constitution by the long-continued use of nostrums for reducing fat would probably be permanent. Unquestionably it is most unwise for persons troubled with obesity to use any nostrum without medical advice; and I believe no medical man would advise the use of any one of the advertised cures.

DIET.

We come next to the consideration of those methods of reducing fat which depend on quantity and quality of food.

So much attention has been directed of late to special forms of diet for the reduction of fat, that the comparatively less pleasant, but not less effective, method of diminishing the quantity of food taken seems in danger of escaping due attention. In the system—really a very old one—with which Mr. Banting's name has been associated, the question of quantity is scarcely considered at all. Many meals may be taken each day and at each meal much solid and liquid food, so long as certain prohibited articles are not touched. It is the same as other dietary systems. Now, there can be very little doubt that such systems have in them something of the mischievous character of medicinal methods. They depend in part, for their action in reducing fat, on the disturbance which they cause the troubled body. The

absolute absence of certain articles of food to which we have been long accustomed causes something like a shock to the system, and through the distress caused by this shock there comes a sort of drain on the body as certainly as when we take exercise, but not as advantageously. Diminishing the quantity of food, both solid and liquid, taken daily, is at once safer and better. We may either reduce the number of meals, or the quantity taken at each, or effect the reduction in both ways, as may best suit the constitution. For most, the third system will be found to act best. One who has been accustomed to four meals a day may take three without harm from the change. Where two cups of tea or coffee have been taken, and two glasses of water or of other liquids at a meal, a single cup and a single glass may be taken, the change being scarcely noticed at all. The solid food may be diminished at each meal by the omission of that last slice, or serving, or course, as the case may be, which changes satisfaction into repletion. In a day or two the change will have become a habit, and no inconvenience will be felt. I do not lay down, be it understood, the rules, When eating, leave off hungry, When drinking, leave off thirsty. There is a good deal of sound sense in what Charles Lamb said about these rules—that one might as well say, When washing, leave off dirty. But there can be no doubt that most of us continue both to eat and to drink, at meals, after the appetite is really satisfied.

The same carelessness—for the fault arises more

from carelessness than from greediness—causes us to eat between meals, a most mischievous habit for all, except those few whose constitutions require that they should eat little and often.

Any one who pays attention to the matter for a few days, or until habits of sensible eating and drinking have been established, will be surprised to find how much of his daily supply has been altogether unnecessary, and can therefore be dispensed with. The extra meal, the extra platefuls and glassfuls at each meal, and the mischievous snacks between meals, which most of us take, would suffice for the whole day's food of a moderately abstemious man. The wonder is that more of us are not overweighted with fat. But Nature benevolently gives to most a power of disposing of more than we ought to take—though the power is used at the expense of the working energies. Those who have not the power are those who when they take more food than is good for them become overweighted with fat—not wholly the product of the extra food, but partly (and chiefly) resulting from the extra work put on the bodily organs by the unduly large supplies taken into the system. For fat is a proof among other things that the forces of the body have been overtaxed in such ways that the digestive organs, the circulation, the respiration, and the excretory organs, have been unable to do their fair share of work.

Yet undoubtedly great good may be done by attending to the quality as well as to the quantity of

the food. Those articles of food which certain mischievous and rather dangerous fat-reducing systems would dispense with altogether may most advantageously be reduced, and there are some articles of food which persons of corpulent tendency may altogether discard. Bantingism excludes beer, butter, and sugar, bread, potatoes, and milk. Of these, beer alone should be absolutely excluded. Butter and sugar should be taken in very small quantities. Of bread, potatoes, and milk, the fat should take about half as much as they generally do. To many it is beneficial to go almost entirely without butter, milk, and saccharine food. The sudden disappearance of headaches, especially of the so-called bilious headaches, show the benefit of the change. But it will not suit all. Bread and potatoes can be diminished in amount without any particular trouble. But potatoes should not be altogether excluded. They form an important item of food, as food is taken in Europe and America. By taking one half of the quantity which has been usual with him, the fat man gets all the good he needs from potatoes, and avoids the mischief they have been doing him by adding to his fat. Taking tea without milk or sugar is pleasant enough, though the tea should then be weakened and cooled by the addition of a little cold water instead of milk. Coffee and cocoa without milk or sugar are medicine to most. But coffee and cocoa are not good for the corpulent, though they act mischievously in an indirect way only. All such wines as port, sherry, madeira, champagne,

and sweet wines generally, are unsuitable for the obese. Claret is better; whisky and water better still. But the less of any alcoholic stimulant taken the better. Best to take none. The control of the appetite, especially for flesh food, is much greater when no alcohol at all is taken into the system. If the health suffers from going entirely without alcohol, then one tumbler of whisky and water—at least four parts water to one part whisky—*per diem* is all that should be taken. Even that should be reduced as the health improves.

Any one who, being corpulent, is unwilling to go without port, sherry, and other heavy wines, or without beer, or without undue draughts of spirits and water, need not read these articles. He must be one who has definitely decided that health and strength, lightness of spirits, as well as lightness of body, are not worth even a small sacrifice. He is as one who, knowing a cup contains poison ruinous to body and mind, drains it because the poison is diluted in a sweetly-tasted liquor.

I am aware, let me note in passing, that the advocates of special systems of diet for reducing fat insist on a rigid adherence to certain rules, a rigid abstinence from certain articles of diet. They are right according to their lights. If we are to trust to Bantingism alone, for instance, to reduce fat, we must be rigid followers of the Banting system; we must take no potatoes and no bread, no beer and no milk, no butter and no sugar. And so of other systems. But if we

are following a broader system, or rather a system of systems, we may take the good from each, and reject the bad.

Just here I may introduce a most important point, not noticed as yet, so far as I know, in any system for reducing corpulence. It is related closely to the question of quantity in food ; but it is also related to that particular point on which, as I have said above, the development of corpulence in great part depends —the insufficient action of organs because of overwork —I refer to the proper mastication of food. We most of us eat a great deal too quickly, gulping down mouthfuls which have not received half or even a quarter of the amount of mastication due to them. From this gross fault two serious evils follow. We eat much more food than we should if we masticated all we eat properly, and the food we eat does us much less good than the right amount would do if properly masticated. We throw on the stomach much extra work, besides leaving some work undone which the stomach was never meant to do and is not competent to do. The overburdened stomach, consequently, leaves a part of its own work undone, so that the mischief is passed on to other organs, and the whole system is thrown out of gear. Let it be remembered as we eat that the teeth and the salivary glands have special work to do which they leave undone if we bolt our food. By making the jaws do their proper work, we make a smaller quantity of food supply our wants, and we send that smaller quantity to the stomach in

a fit state for the stomach to work properly upon it. Hence a considerable saving of energy, and a corresponding reduction of those waste products which result in the formation of fat.

A lesser mistake, but still a noteworthy one, is to gulp down great draughts of liquid food, instead of quietly imbibing suitable quantities.

SLEEP.

After the food question comes naturally the question of sleep, which—like food—acts as a restorer of what Nature's wear and tear has removed.

In regard to sleep I take the same line as in regard to food. I consider it unwise to trust wholly or largely to wakefulness and want of rest to reduce fat. That to cut short the hours of sleep does tend to diminish fat is undoubted. The method is a very unpleasant one; but it is effective if one has but energy to follow it. Resolutely limit the sleeping hours to—say—the night hours between eleven and six, and certainly, if you have been in the habit of lying in bed till nine or ten, and perhaps taking a two hours' snooze in the afternoon, you will find your weight diminishing. You lose weight because you are subjecting the body to a trying ordeal. Seven hours' sleep may be ample for most men, but the allowance is not ample for one who has fallen into the habit of sleeping daily nine or ten hours or more. Punish the body more by depriving it still further of sleep and there will be more rapid reduction of weight. But there will probably be other

mischief too. Besides, if a man has energy to apply this method, the most distressing of all fat-reducing systems, he can well adopt others, and he will assuredly do well to apply others to do part of the work of fat-reduction.

Yet a share of the work can be left to this method —with great advantage all round. An undue amount of sleep is injurious in other ways than in encouraging the development of fat. It weakens the body, dulls the mind, and cuts away a considerable slice of life. Fat folk could not be wrong in steadily resisting and overcoming the habit, even though in so doing they did not—as they will—assist whatever other methods they employ for reducing their weight.

The first step in regulating sleep is to adopt regular hours for it. There should be a fixed time for going to bed and getting up. Nature presently becomes accustomed to such hours, and then there is no lost time in bed. A man in average health should be asleep a few minutes after his head is on the pillow, and should wake a few minutes before the time which he makes his rising hour. It is well to wait till these few minutes after waking have passed ; though jumping out at the moment of waking may do very well when the habit of regular rising at a certain hour is first being formed. Immediately after rising it is well to fill a basin three-fourths full of cold water, and to plunge the face and fore part of the head in it several times till nearly out of breath. Recover breath, and repeat the process. Again, and yet again. Then

dry,—regular washing being attended to later. You are now wide awake, and able also to enjoy being so.

As to afternoon sleep, the rigid would say, Stop that at once. I do not agree with them. To a man who has fallen into the bad habit of sleeping after a mid-day meal, suddenly breaking the habit is very trying, and in my opinion mischievous. Careful observation has satisfied me that the evening is passed unpleasantly by one who has thus resisted a habit which, though bad, has become for awhile a part of his nature. The temper is tried; the sleep at night is not improved; and if after a week or two fat is reduced by this particular part of fat-attacking discipline, it is because the body is punished. One can get rid of fat and other mischiefs without punishing the system.

I would advise those who have fallen into the bad habit of sleeping in the afternoon, to resist each day for a time the heaviness which comes over them at the hour when they are accustomed to sleep. When the effort becomes painful, let them, instead of lying on a sofa or bed, sit comfortably in an arm-chair, loosing collar, cravat, and wristbands (also if necessary the waistband). Then let them sleep for about half-an-hour. I don't mean that they should give folk instruction to waken them, but that they should mentally resolve as they yield to the influence of sleep that it is to be but for half-an-hour or so. Without being wakened they will wake within a few minutes of the time. At least it will be so before

long. Then let them stroll to bedroom or lavatory, and repeat the face-plunging process as in the morning performance. They will be wide awake, yet all the better for the sleep. As time progresses the sleeping time may be shortened, and probably before long the afternoon nap altogether discarded.

It will be found that the change of diet, both in quantity and quality (p. 91 *et seq.*), will greatly help in giving mastery over sleep, especially over afternoon sleep. The active exercise advised in what follows may at first encourage the desire for sleep; but not long. By helping to make sleep sounder it will rather tend to shorten the sleeping hours in the long run.

We consider next, however, not exercise, but the treatment of the skin, on the condition of which the value of exercise in great part depends. Probably there is no surer and sounder system of fat-reduction than that which is based on due encouragement of the healthy action of the skin.

BATHING, &c.

We come now to the measures by which the healthy action of the skin may be encouraged, and so fat reduced through increased perspiration. Exercise, of course, encourages perspiration; but I am for the moment speaking, not of exercise, but of direct stimulation of the sudatory action.

First, the question may be asked whether Turkish

baths, vapour baths, hydropathic treatment, and so forth, tend to reduce fat.

We may take the Turkish bath as a typical process for directly reducing weight by increased perspiration. Many have taken Turkish baths with the idea of diminishing their weight, and have been disappointed. I believe that those who most warmly advocate the use of the hot-air baths, including those who are commercially interested in establishments where these baths can be taken, claim no fat-reducing effect from them. It is certain, as I know from my own experience, that you may take a Turkish bath five or six times in a week, and for several weeks in succession, without appreciably affecting the weight. Two or three pounds may be lost in the hot rooms, but then two or three pounds will be added to the weight through increased drinking during the next few hours.

Yet Turkish baths may be effectively used for the special purpose of reducing weight, if we remember that we are not to trust to the loss of weight by increased perspiration in the hot rooms, but to the improved condition of the skin. I have taken as many as twenty Turkish baths in a month without loss of weight, though probably some forty pounds' weight may have been actually parted with in the hot rooms; and I have lost as much as fifteen pounds of weight in ten days, indirectly through the action of five or six hot-air baths. This sounds paradoxical; but it is strictly true. In one case I had been ill,

and I took so many Turkish baths as an easy way of keeping the skin in a healthy state when I was unable to take much exercise. In the other case, I wanted to reduce weight, and I took much exercise, especially just after each hot-air bath. The same amount of exercise by which one would lose a pound's weight under average conditions will remove two or three pounds' weight after a Turkish bath. Thus hot-air baths, used as subsidiary to active exercise, are effective fat-reducers; used as a substitute for active exercise, they do not reduce fat at all.

But the best method of at once improving the health and reducing the weight by increasing the action of the skin is one which involves no expense, and, properly followed out, supplies as much exercise in itself as one could get from a small gymnasium.

Every morning, after washing and thoroughly drying the head and neck, sponge with cold water (and a little soap, but not much if this is done every day) the arms, shoulders, chest, and back, to the waist, carefully rinsing. Then with a moderately rough, large towel, commence steady but brisk and energetic friction. *Tire* the right arm in drying and rubbing the left, then *tire* the left arm in doing the same by the right. Next tire both arms in drying and rubbing the chest. Now fling the towel over the right shoulder, and, holding it with the right hand in front (over arm), and with the left hand behind (under arm), draw it steadily backwards and forwards across the neck, right shoulder, and upper back, till

both arms are again tired. Do the like with the neck, left shoulder, and upper back, interchanging hands. Throw the towel over both shoulders, and alternately pull with right hand and left hand. Keeping the towel still behind, let it fall to a little above the waist, and repeat the steady, alternate hauling with right and left hands and arms. You now want a little rest. Take it while you sponge with cold water and a little soap from the waist to the knees, and carefully rinse. Tire both arms drying, rubbing, and polishing from waist to knees in front. Pass the towel behind the back, as in the last movement of the former series, and haul away alternately with right and left hand, till the back, from waist to "small," is glowing and almost burning. Next, let the towel hang under the right thigh, and haul alternately upwards with right and left hands till the back of the right thigh, from seat to knee, is as nearly red hot as possible. Do the like with the left thigh. Again a rest is wanted. So take it while you sponge and rinse both legs from knee to foot. Then, lastly, tire thoroughly both arms in drying, rubbing, and polishing both legs from knee to heels and toes. You can now dress at your leisure. There is no fear of taking cold, though you are likely to be rather slow at first, for the arms are, or ought to be, thoroughly tired out for awhile.

In the evening, just before going to bed, it is a capital plan to repeat the rubbing, without the sponging; or, if you sponge at all, it should be with

warm water, drying before there is any time to feel cold; for the body is not able to bear cold well at night.

By a vigorous rubbing daily, in this way, and still better by two, the skin is kept not only clean, but as soft and free from rugosities as kid, its action is healthily stimulated, and the liver and kidneys are thus relieved from the overwork they have to accomplish when the sudatory glands are left clogged and hampered (as they are with many even of those who daily sponge and daintily dry the whole skin surface).

EXERCISE.

As a general rule it may be said that the most effective exercises for reducing the weight are those which act most effectively on the respiratory organs. Running, for instance, is far more quickly effective in this way than walking, though quick walking is a very excellent exercise for the purpose. A steady run taken every morning before breakfast, and another taken every evening shortly before retiring to rest, will be found to produce a marked effect on undue deposits of adipose tissue. But here a word of caution, such as I used in the beginning of this treatise, should be repeated. To any one who is thoroughly out of condition, especially if he has long been so, running is rather a dangerous exercise. To run a couple of hundred yards at a moderate rate might do serious injury to a man well advanced in

middle age who has long been fat and unwieldy. But even a man of forty not very much out of condition, who has for several years taken little active exercise, ought to be careful how he starts to run more than a few hundred yards, except at a very moderate pace. The best plan is to begin for a week or two with about two hundred yards (unless very heavy) run steadily, but each day a little more sharply. By the time that distance is run at a good sharp pace, the second wind will come easily. Then the distance can be safely increased, until after a while the morning and evening run is from half a mile to a mile in length. It is well to walk out whatever distance one proposes to run (pacing two hundred yards, for instance, at about a yard a pace) and to run home, going then to bedroom or dressing-room to make any necessary changes of dress and to rub down. Although no man should consider himself in decently good condition if he cannot run half a mile at a moderate pace without being obliged to change his inside clothing (on account of the freedom with which he has perspired), yet a fat-reducing man is not likely to get through his morning or evening runs without freely perspiring over his work. He should never suffer his wet flannels to remain on him to dry.

Riding and rowing are both good exercises for reducing fat, and tricycling is even better. Boxing, fencing, and single-stick, are also excellent. Bowling and quoits are good, and skittles first-rate. Paterfamilias will find bowling for an hour or two to his

boys at their cricket practice, very good exercise for reducing fat, and very pleasant if he chances to have any bowling skill. If he has not, then it would be perhaps rather wearisome. Capital exercise can be obtained by removing from a good-sized room all easily breakable objects, and then playing with a light elastic ball, thrown in such a way against the wall that some activity is necessary to take it, either by catching or with stroke of hand or racket. In an open-air court this is of course much better. And it is hardly necessary to say that lawn-tennis, racquets, and all such exercises are excellent for reducing undue weight. But I am here specially considering those who, being unwieldy, are not particularly anxious to exhibit their unwieldiness before the eyes of friends and acquaintances by taking part publicly in such games as lawn-tennis or cricket. Even rowing is not a very soothing exercise to the obese if the ubiquitous 'Arry welcomes the athlete's exertions with cries of "well rowed, fatty," or other uncomplimentary comments on his volume.

Taking too much exercise is a ready way of increasing fat—paradoxical though it may sound to say so. A man not in good condition will, perhaps, take two or three days of very active or even violent exercise, drinking so much more than is necessary, on account of the unusual solicitations of thirst, that he can register very little loss of weight. Then he "caves in" for several days, being used-up and feverish. During these days he eats, drinks, and sleeps more than usual,

takes less exercise even than he had taken before he thus suddenly roused himself to exertion; and ere he is quite himself again, he finds, on weighing, that he has added to his bulk instead of diminishing therefrom.

In regard, then, to exercise as to all other methods for reducing undue fat, I advocate moderation on the one hand and steady perseverance in well-doing on the other. Do not go in for great feats of strength or endurance to be followed by long spells of rest, but for steady exercise continued systematically. If the other methods for reducing weight (all but the medicinal one, which is only to be adopted, and that cautiously and with medical advice, at the beginning) be followed steadily and moderately, for weeks and months, not for a few days only, the weight will be reduced safely to its proper amount, the health and spirits improved, and the value of life notably increased.

THE THIRST CURE FOR CORPULENCE.

The effectiveness of thirst in curing, or rather in preventing, corpulence has been recently considered. By taking but three half-pints of liquid daily, a correspondent of the *Standard* found his weight reduced a pound a week, and without any special restriction upon the amount of solid food. Moreover he found that he soon became accustomed to the reduction in the quantity of liquid food. A physician

a few days later confirmed the experience of the former correspondent.

There can be no doubt that the method indicated is a sure and rapid cure for corpulence. But it is one which ought not to be adopted without medical sanction by persons of gouty diathesis, or probably by those having any constitutional tendency to excess either of acid or alkaline secretion. As to the gouty or lithic tendency, I speak from experience. In the spring of 1868 I followed most successfully the thirst cure for corpulence. I was not, indeed, very corpulent at starting, though my weight—13st. 4lb.—was greatly in excess of that fairly due to my height (or shortness) and breadth. In the course of two months I reduced my weight to 11st. 3lb. But a constitutional tendency to a form of gouty trouble showed before that time most unpleasant readiness to increase and multiply tortures whereunto I strongly objected. Unfortunately I did not for awhile recognise the connection between this result and the system by which I was so successfully reducing my weight. When I did, and resumed a more generous liquid treatment, I soon got rid of my lithic troubles.

In 1874, speaking with Dr. J. W. Draper on the subject of similar troubles experienced by him to a much greater degree, I mentioned my experience, showing what a valuable medicine water is. Although physicians are apt to regard lay suggestions with indifference, he noted my experience,—and when I met him in 1876, he told me he had enjoyed two years

of freedom from the sufferings which had formerly been so severe.

It may be that by the use of appropriate medicine the thirst cure for corpulence may be made as safe as it is sure. For instance, a person of gouty tendency might take a certain small quantity daily of the bicarbonate of potass (or the bicarbonate of soda) in his pint and a half of water or whatever other beverage he took. But I venture to warn the obese not rashly to adopt the thirst remedy, lest haply, in their unwillingness to "bear those ills they have," they

"—— fly to others that they know not of.

CHAPTER IX.

ADVANCING YEARS AND WEAKNESS.

IN the last chapter I have considered how fat may most effectively and at the same time most advantageously be reduced. It will be seen on a careful reading of my remarks, that nearly everything recommended for fat persons is good also for those who are not in the least troubled with obesity, nay even for those who are positively lean. My suggestions for reducing weight are nearly all in reality suggestions for increasing flesh. A great deal of fat may in the case of the corpulent be removed while little flesh is put on, and so the weight may be greatly reduced; but it is almost impossible to follow any sound regimen for reducing fat without adding flesh.

Indeed, testing methods for reducing fat by merely weighing is not satisfactory. Taking two corpulent men of equal weight and equally fat, one shall by potions, unwholesome food, undue sweating (without exercise), and in kindred ways, take twenty-five pounds off his weight in a month; while the other will in the same time by healthy exercise, cold bathing, and attention to the points touched on in the preceding

pages, lose no more perhaps than some five or six pounds; yet the former shall feel weaker and more oppressed by his weight than before, while the other will be altogether heartier and more vigorous, lighter and more active, than he had been. In one case perhaps some twenty pounds of fat and some five pounds of flesh have been lost; in the other, some ten pounds of fat only may have been lost, while five pounds or so of flesh have been added. It is not difficult to see which of the two has gained most by his fat-reducing efforts; or rather one has gained all round, while the other though twenty or twenty-five pounds lighter is a much weaker man than before he lost the weight.

When we consider the effect of one and the other process on inferior organs such as the heart and lungs, &c., we see still more clearly the superiority of a system by which while fat is reduced flesh is increased. The fat man's heart for instance is not only overloaded with fat, but the heart-muscle is weaker than it should be; to reduce or even remove the fat by a process which at the same time weakens the muscle, is to do at least as much harm as good,—probably more. But a regimen which gradually removes the fat, while increasing not only the quantity but the quality of the muscle, is good all round.

In the long run such regimen leads to the more complete and permanent reduction of fat also. For the man who has simply wasted is not in a fit state to resist the return of fat which begins so soon as the

wasting process has ceased.* He is far more likely to be simply prostrate during the enemy's approach, and unable to prevent it from re-occupying all the positions whence it had been expelled. On the other hand the wiser regimen gives vigour to circulation, respiration, and digestion, increases strength of will and purpose, and makes the attack on such undue deposits of fat as may remain not only effective but pleasant work. And the good habits by which this result has been obtained are not likely afterwards to be dropped,—at least, to be dropped long enough to allow undue obesity to return.

But, it may be asked, whether in middle and advanced life either the regimen or the special exercises which I have recommended for the increase of strength or (where necessary) for the reduction of weight, can be pursued. I answer unhesitatingly that they can, due regard being had to such moderation as experience and common sense alike enjoin. Moreover, in proper degree, they are suitable for the weakly.

I quote here a letter from a man who was eminent for literary ability and business capacity, who lived a full life as well as a long life, and who wrote what we are about to quote at the age of seventy-seven.

"I promised some time since," wrote the poet Bryant to a friend in 1871, "to give you some account of my habits of life, so far at least as regards diet, exercise, and occupations. I am not sure that it will be of any use to you, although the system which I have for many years observed seems to answer my purpose very well. I have reached a pretty advanced period of life without the usual infirmities of old age, and with my strength, activity, and

bodily faculties generally in pretty good preservation. How far this may be the effect of my way of life, adopted long ago, and steadily adhered to, is perhaps uncertain.

"I rise early ; at this time of the year about half-past five ; in summer, half an hour, or even an hour earlier. Immediately, with very little encumbrance of clothing, I begin a series of exercises, for the most part designed to expand the chest, and at the same time call into action all the muscles and articulations of the body. These are performed with dumb-bells (the very lightest, covered with flannel), with a pole, a horizontal bar, and a light chair swung around my head. After a full hour, and sometimes more, passed in this manner, I bathe from head to foot. When at my place in the country I sometimes shorten my exercises in the chamber, and going out, occupy myself for half an hour or more in some work which requires brisk exercise. After my bath, if breakfast be not ready, I sit down to my studies till I am called. . . . . After breakfast I occupy myself for awhile with my studies, and then, when in town, I walk down to the office of the *Evening Post*, nearly three miles distant, and, after about three hours, return, always walking, whatever be the weather or the state of the streets. In the country I am engaged in my literary tasks till a feeling of weariness drives me out into the open air, and I go upon my farm or into the garden and prune the fruit-trees, or perform some other work about them which they need, and then go back to my books. I do not often drive out, preferring to walk."

Seven years later, soon after Bryant's death at the age of eighty-four years, Mr. William G. Boggs, who knew the poet intimately for many years, gave the following reminiscences to a representative of the *American Evening Post* :—

"During the forty years that I have known him Mr. Bryant has never been ill—never been confined to his bed, except on the occasion of his last accident. His health has always been good. Mr. Bryant was a great walker. In earlier years he would think

nothing of walking to Paterson Falls and back, with Alfred Pel and James Lawson, after office hours. He always walked from his home to his place of business, even in his eighty-fourth year. At first he wouldn't ride in the elevator. He would never wait for it, if it was not ready for the ascent immediately on his arrival in the building. Of gymnastic exercises he was very fond. Every morning, for half an hour, he would go through a series of evolutions on the backs of two chairs, placed side by side. He would hang on the door of his bedroom, pulling himself up and down an indefinite number of times. He would skirmish around the apartment after all fashions, and once he told me even 'under the table.' Breakfast followed, then a walk down town; and then he was in the best of spirits for the writing of his editorial article for that day. . . . . He was a constant student. His daily leading editorial constituted, and was for many years, the *Evening Post.* Sometimes he would not get it written until one o'clock. 'Can't I have it earlier?' I asked him one day. 'Why not write it the evening before?' 'Ah,' he replied, 'If I should empty out the keg in that way, it would soon be exhausted.' He wanted his evenings for study. 'Well, then, can't you get down earlier in the morning?' He said, 'Oh yes.' A few months afterwards he exclaimed, with reference to the change: 'I like it. I go through my gymnastics, walk all the way down, and when I get here I feel like work. I like it.'"

Mr. Boggs also stated that Mr. Bryant's sight and hearing were scarcely impaired even up to his death.

The inquiry how far those in advanced and middle-life can desirably practise exercises intended to maintain or increase strength and (what is apt to be more markedly deficient in middle-life) suppleness, is important for many who though neither old nor middle-aged require exercise of the same class. Many young men, and men who have not as yet reached or passed the prime of life are, yet not able to take very ener-

getic exercise, to run long distances, box, fence, ride far, row many hours at a stretch, or the like, but require such moderate and easy exercises as suit men in advanced and middle life.

The question presents itself, Is it well for the weak to take active exercise? Ought not (many ask) weak arms and legs to be left untaxed by systematic exercise? Is it wise or even safe for men of weak lungs to attempt running, or other exercises which call the lungs into active play? And many similar questions are asked, in tones implying that those who ask them think the best way to deal with all the weaker muscles and organs of the body, is to employ them as little as possible.

Nature answers for us such questions as these in a very decided and emphatic manner. Persons who exercise those powers which they possess in large degree, and avoid exercising those in which they are in greater or less degree deficient, find her rule to be that to the kind of strength they have is added, and from that which they want is taken even so much of it as they had possessed. The muscles and organs used grow stronger and more active, those disused grow weaker and less efficient. When, therefore, a man says, I will not row because my arms and loins are too weak, or I will not run because my lungs are weak and my legs soon tire, he is running directly counter to the teachings of Nature, though he may be responding to her promptings.

Nature has an ugly way, sometimes, of eliminating

inferior things altogether; and what is held to be natural, as the disuse of weak muscles, the resting of weak organs, and so forth, is sometimes only a yielding to this way of Nature's,—leading to the deterioration of what is already inferior, the weakening of what is already wanting in strength. Her real teaching is clear enough. It simply is, Be specially careful to exercise, but with due watchfulness and moderation, those muscles and organs which are weak: those which are strong will take care of themselves; you cannot help exercising them. Nor is it an idle assertion that Nature punishes by elimination, when her teachings are overlooked. There are organic diseases, specially liable of course to affect the weaker, which are best resisted and may be cured by proper exercise of the feeble organ attacked, but make rapid progress, and finally destroy the organism (along with the being to whom it belongs) when it is left simply to rest.

It is quite true that for weak organs and for weak muscles (which more particularly concern us here), violent exercise may be more directly and quickly mischievous than disuse. For a man with weak lungs, or perhaps in an early stage of some lung disease, to run at his hardest as long a distance as he possibly can, might very likely cause death within a few minutes, where carefully resting his lungs, and taking no exercise which could in the slightest degree hasten respiration, would not very obviously encourage the progress of pulmonary mischief. A man with weak

arm-muscles, again, might easily, by attempting to lift great weights or to sway unwieldy clubs or dumb-bells, so strain and injure the muscles and tendons of his arms, as to weaken himself much more in a few moments, than he would by months of laziness with his arms. There is reason in all things, and the wise rule must be obeyed even in things good—*Ne quid nimis.* But within the limits suggested by reason and moderation, the rules remain sound,—Where there is weakness, whether of muscle or organ, there exercise is the right thing; Where there is stiffness, not rest but movement is required.

The great difference between those still young but wanting in strength or lissomeness, and those in advanced life, is, of course, that in one case exercise may be undertaken with the reasonable hope of increasing strength or activity, in the other, the aim is rather to check the changes by which, in accordance with natural laws, the strength and activity gradually diminish with advancing years. Though, even with men in middle and advanced life. we often find that muscles and organs which through disuse have been prematurely weakened, may be restored to a degree of vigour much nearer the vigour of the prime of life than is commonly supposed. I know a man who, ten years ago, was much weaker and much less active, and in effect was, at least in one sense of the words, much *older,* than he is at the present day. He saw that laziness (bodily laziness, at least,) was doing more to age him than years; and by steady and even

active exercise he has been able to throw off the burden of a round dozen of years at least.

To sum up, the rule which should be followed by those who are advancing towards old age, or who are not naturally strong, is to take moderate but systematic exercise, and rather to aim at preserving activity and lissomeness, than attempt feats taxing strength and endurance. Varying the exercises used for this purpose, so as to distribute the benefit as widely as possible—to chest, waist, loins, arms, and legs—will be found even more important for the weakly than for the stronger and younger.

CHAPTER X.

NATURE'S WAIST AND FASHION'S.

THE CORSET.

I APPROACH a difficult question, though not a doubtful one. Who shall by argument depose false tastes? And who can deny that the recognition of something beautiful (Heaven knows what) in a pinched waist, has prevailed very widely and very long? "'Tis true 'tis pity; and pity 'tis 'tis true." There can be no manner of doubt as to the just proportions (with a certain limited range of variation) of the human frame, masculine or feminine. Not Art has settled that (though Art assents) but Nature.

I do not say that when wild in woods the noble (but generally beastly) savage runs, he or his "squaw," or "gin," or whatever he pleases to call the woman of his race, presents the perfect type of human beauty. The savage manner of life prevents this, save in a few very exceptional cases. Your average savage is apt to be lank and ill-shaped—especially about the calves; his body is as coarse in type as his face.

Still, even among savages of certain races the typical form of human beauty is occasionally ap-

proached. You see the man with well-knit and fully developed muscles, moderately-sized hands and feet, narrow flanks, chest deep and broad, the surface of the abdomen nearly straight from the chest downwards, but with that slightly greater curve from side to side (leaving depressions along either side of it) which the corset ruthlessly squeezes into the ridiculous and hideous circular waist of the stayed ones.

Savage women, even of the families of the chiefs, are usually, for at least the greater part of their lives, still less shapely than their generally brutal lords (so astoundingly remote—are they not?—from any of the animals to which Darwin says they are akin). Treated in many cases as cattle, they do not develop into the graceful, lissome forms which the artist admires. Yet, even in their case, among some races, and in special instances, we find the artistic idea of feminine beauty approach during the short—usually the very short—time that the women of savage races are in fully developed womanhood but as yet not mothers of baby savages.

It is not among savages, however, any more than it is among highly-civilised races, that we must look for beautiful and shapely forms;—observe, *not* for ideal beauty, which is not what we are inquiring about, but for those proportions which are developed in the healthiest, and strongest, and best representatives of a race, under the most favourable conditions, and during the stage of life at which the kind of beauty we are considering can alone be looked for; from

early youth (boyhood past) to the prime of manhood in men; from the end of girlhood to a few years only beyond the time of first motherhood in women. There is an intermediate stage in the development of a race, as there is in the lifetime of each member of the race, when the greatest physical beauty and grace are attained. This stage is that period of early civilisation, when as yet the natural has not been wholly absorbed in the artificial.

Taking that stage of the development of the race which stands first for beauty of form as well as feature—the ancient Greek race—we find the type which the greatest sculptors the world has known —Greek, Roman, and modern—have delighted to represent. The Greeks in particular selected as their models (though not in our modern sense) men and women, youths and maidens, whose beauty of form was the result of adequate exercise (with little encumbrance of clothing), modelling forms belonging already to the best types. They show us, first, what Nature has selected as shapeliest; and next, what the artistic mind at the time when art was at its highest, approved as most beautiful.

That the proportions of the human body (naturally developed) in other races, or even in the present descendants of the Greek race, may be somewhat different, and still be beautiful, may be admitted. That Phidias and Praxiteles, if they lived now, still possessing all that observation had taught them in their own time, but with the power of comparing

therewith other forms than those they studied, might slightly modify their views as to the most perfect types of manly and womanly beauty, may readily be granted. There is a range of variation within which perfect ideal beauty exists. (I do not use the word *perfect* carelessly, but mean it in its full sense. For, as there is no law of beauty which assigns a certain exact number of inches in height to a man or woman, so is there none which assigns exact relative dimensions to trunk and limbs.)

We may even go a little further, and admit that a sculptor of the palmiest days of Greek art might be ready to acknowledge, *now*, that some of his conceptions of ideal beauty admitted of improvement—that, for instance, an Apollo or a Venus of his (a Phœbus or an Aphrodite, I should say), might have gained in delicacy and beauty had her hands and feet, her wrists and her ankles, been slightly smaller in proportion. He would have ridiculed, doubtless, the idea that the smaller the hands or the feet the more beautiful they are; and he would certainly have recognised in the very smallness of the hands and feet of many beautiful women of our western races (especially in America) a defect instead of an excellence; still he might have admitted that, without appreciating these artistically imperfect forms (no more beautiful than a wizened arm is beautiful), the goddess of Melos, and the fair statues of Aphrodite, Artemis, Hebe, Phœbus, and so forth, might have had rather smaller hands and feet, with gain rather than loss of beauty.

He might even have acknowledged, though I think it doubtful, that waists somewhat smaller than those regarded as most beautiful in his day, might be as shapely, at least for certain types of masculine or of feminine beauty.

But these are questions of proportion, and even these changes or varieties can only be considered by an artist as admissible within certain limits. If a Greek or Roman sculptor had been asked to take two such forms—masculine or feminine—as are shown in the Apollo Belvedere (Fig. 8, frontispiece) and the Diana of the Louvre (Fig. 9), and without altering other dimensions, to modify the waist measurement, so as to make these correspond with what many women and a few men try to attain by the use of corsets, he would have judged the task hopeless. With all his skill, he *could* not have given beauty to an Aphrodite, representing a woman 5 ft. 4 in. in height, and 18 in. round the waist. He might have made a quaintly effective statue, but it would have been in his eyes only a Grotesque.

Yet that would be a mere nothing to the attempt to model a statue from a corset-marred woman of the height and waist-measurement just mentioned. The ancient sculptor's work, though grotesque, would represent a human being as Nature might fashion one—who does not give to all animals perfection of proportion. The corset-spoiled waist does not err in being out of proportion, but in being deformed. It is not merely the ellipticity of the natural waist that

is wanting, but all the curves which a well-shaped waist possesses. A perfectly-formed waist, of man or woman—as, for instance, the waist shown in Fig. 7, p. 32 (not the centaur's), the waist of the Diana of the Louvre, Fig. 9, and the waist of the Apollo Belvedere, Fig. 8—Frontispiece—may be compared to perfect music, so beautifully are its proportions harmonised; a grotesque waist, such as I imagined above, might give pleasure like a quaint air; but a corset-made waist is sheer discord to the artistic mind. Consider it in a Book of Fashions, and shudder!

Like the crushed foot of the Chinese lady, the compressed head of the savage, pierced lips and nostrils (aye, and pierced ears, too, fair ladies), the waist made by stays is not ill-proportioned, it is malformed. Yet even the waist thus distorted—the waist made by stays—is not so hideous as the waist when actually in its corset enclosure. For, enfeebled though the stays-pinched woman is about the waist, she can still bend her waist a little when the stays are removed. The movement is, of course, ungraceful; there are no gentle curvings and undulations as when an undeformed woman bends her shapely waist: but still there is a possibility of bending. With a well-tautened corset there is none; when the waist moves it moves all in one piece. The wearer may walk or even run (at her proper peril), or dance, or ride; the trunk, as a whole, may move in a variety of ways, just as the arm may, if you put it in splints; but there is no more possibility of curving the trunk

between the hips and the chest than there is of bending an arm at the elbow when it is in splints from shoulder to wrist.

Yet Nature probably did not provide abdominal and lumbar muscles for nothing, any more than she fashioned elbow-joints and knee-joints to no purpose.

THE CORSET DISCARDED.

BY A LADY.

Having read with interest everything on this subject that has appeared in the columns of *Knowledge*, it seemed to me that it would be an easy experiment, and might be a useful one, to try the effect of leaving off stays, and using the divided skirt. The results of my experience may, perhaps, be of interest to your readers.

I must confess that I left off stays with some misgiving, having the idea that the support they give is absolutely essential, and that, as I had become thoroughly accustomed to them (as is the case with most), I should not be able to hold myself upright or walk well without their aid. I may mention that my waist measurement with stays was 24 in., my age is 27, height 5 ft. 4 in., chest measurement 39 in. I was married when I was 18. I have had four children, the last of whom was born ten months before I left off stays. It will be admitted that the experiment was made under very fair conditions for testing it.

My first experience was simply delight at my new

freedom. I could bend at will, take a long breath without discomfort, sing songs I had been unable to sing for years, and walk much further with much less fatigue. I was surprised to find how little I missed the support my stays had given me. But I must admit I thought I should very soon have to wear them again; for my skirts tired my waist and hips when I was standing or walking. I became less tired than before, but more uncomfortable round the waist; also the skirts dragged the dress out of shape.

So soon, however, as I tried the divided skirt, all these difficulties were removed. I had felt great reluctance in assuming this new kind of dress, as I had thought it was something quite noticeable and conspicuous. The pictures in *Punch*, in particular, must have been drawn by people who had never seen the skirt. They give an entirely wrong idea of it. In fact, it is not, strictly speaking, a dress; that is, it forms no part of the visible dress. It is neither more nor less than a pair of such trousers as little girls used to wear forty or fifty years ago; only, instead of the frilled edges showing below the dress they are completely hidden—unless the wearer should prefer to have the dress unusually short. They are trimmed with deep plaiting, and in walking, if visible at all, which is quite optional, appear like a petticoat. They are not suspended from the waist, but from a calico band—to use this word for want of a better; but in reality this support is fitted to the figure round the hips, and the divided skirt is buttoned to it.

DIANA OF THE LOUVRE.

I should think that no one who had tried the new dress would ever resume her heavy petticoats and stays. The gain when I had left off the stays was great; but when the petticoats were left off, the gain was very much greater. The sense of lightness and freedom was truly enjoyable. The warmth of the divided skirt is equal to that of at least three petticoats. There is, indeed, no comparison between them as regards protection from cold. I have tried them for walking, running, dancing, and tricycling, and have as much comfort again in all these exercises as I had before; or rather, discomfort is replaced by perfect comfort.

It may, perhaps, be supposed that the change has caused my waist to grow larger. But this is not the case. On the contrary, my waist now measures two inches less. Dresses which were made before the change are now quite loose, and have had to be refitted. My dressmaker, however, finds it easier to fit me without the stays, and dresses made since the change fit much better and look much nicer.

I do not suppose that ladies who are so unfortunate as to have no waist would care to leave off stays, for the general prejudice has been, and is, in favour of some slight diminution of circumference at the waist. But that need not prevent them from trying the divided skirt; indeed, I should imagine that it would be possible, though I do not say it would be wise, to lace tighter when wearing the divided skirt than when, in addition to the bad effects of undue compression, the weight of several heavy petticoats is

dragging the body down. The dress can be made as fashionably as the wearer pleases—in point of fact, I am sure no one would know that a lady, whether seen in the drawing-room, or in the ball-room, or taking exercise, was a follower of the new fashion except by the improvement of her figure, and the greater grace and lightness of her movements.

THE DIVIDED SKIRT.

BY A LADY.

FIFTEEN MONTHS LATER.

When I wrote, some fifteen months ago, on this subject, I had only worn the divided skirt a few months. I felt even then, however, the good of the change, and how much good it promised to do. I can now write after nearly two years' experience, and I think what I have to say may be of use to many.

In the first place, I wish strongly to correct the mistaken idea which many have of the divided skirt,—first, from pictures in the comic papers, supposed to represent it, and secondly (and chiefly), from the dresses with divided skirts shown at the Health Exhibition. The divided skirt need not and ought not to be a divided *dress*. It should simply be a divided *petticoat*, and practically assumes the form of a pair of trousers with deep frilling. In *this* respect, some of the divided skirts at the Health Exhibition are right enough; but even in their case, every chance of their being ever *generally* adopted by ladies is destroyed

by their being only half hidden by the skirt of the dress. They should be fully hidden, precisely as a petticoat would be.

In saying this I am expressing no opinion as to the dress being more or less artistic, or more or less hygienic, when the few inches necessary to hide the divided skirt are added to the shortened dress-skirts of Mrs. King. I assert simply, what I am sure to be the case, that ladies never can be persuaded, and ought not to be willing, to wear the dress advocated by Mrs. King and Viscountess Harberton. Mrs. King is doubtless right enough in saying that ladies, and especially young ladies, do in fact dress with a wish to be, in a sense, conspicuous; there is certainly no harm in a lady desiring to be attractive (which is really what Mrs. King meant) by the elegance of her dress, its grace and style, its well-chosen combinations of colours, and so forth. But not one lady in a thousand will suffer any peculiarity in her dress to appear which will excite ridicule or rude remarks; and the thousandth, who imagines she is helping to introduce improvements in dress when she exposes herself to insult in the streets, is quite mistaken. I believe (from my own experience and the experience of others) that thousands would now be wearing the divided skirt if they had not been deterred by the conspicuous appearance of the arrangement recommended by Mrs. King. (The Turkish trouser form exhibited at the Health Exhibition is simply *impossible*, no lady outside Oriental countries could wear it.)

Now, to give some results of my own experience :—

I have already explained how I came to discard corsets. As to the divided skirt, I first tried it for the sake of warmth and lightness. I travelled a great deal, and no matter how many skirts I might wear, I found my lower limbs, from the boot-tops to the knees, suffered always from cold. My husband never suffered in that way, though he had not half so many clothes around him. It seemed to me that I might, without any one noticing the difference, adopt, under the dress (unchanged in length and appearance) the same plan for keeping me warm that he and other gentlemen follow. Mrs. King very kindly let me have one of her divided skirts as a pattern. I made a skirt for myself. I found it just what I had wanted, —warm, light, and comfortable in every way. I was able to leave off all heavy petticoats, and felt at once relieved from a great burden, able to walk farther and more easily, and much more active.

But the greatest advantage I derived from the divided skirt was in this, that for the first time I could go comfortably without stays. Like most ladies who have been accustomed to wear stays since girlhood, I found it very difficult to do without them. When I walked my skirts were such a drag—now I had left off stays—that unless I made some change with the petticoats, I must soon have put my stays on again. I was very reluctant to do this, for though I had never laced tightly, or even closely, I felt much freer in many ways, could bend or stoop without fear of whale-

bones breaking, besides being able (which is, after all, of some importance) to *really* breathe,—for the first time (I suppose) since I had begun to wear stays. The change to the divided skirt came to my rescue. With divided skirt and without stays, I was perfectly free. I found, rather to my surprise, that whereas when I wore stays I often felt inclined to depend upon them for support, and so would not always sit or stand quite upright, it now seemed to come naturally to me to hold myself well up. And in passing, I may remark that this is one of the first points which ladies who have left off stays should attend to, if they wish their dresses to set properly; they cannot expect this if they "double up;" but I can answer for it the fault does not lie with the removal of their stays, though it may have been in part caused by the constant wearing of very tight stays.

In the case of fat persons of the mile-stone persuasion, I know not what to say. I really cannot expect them to go without stays, when I think how they would look at first. But possibly they might find that, relieved of their burden, they would be inclined for more exercise, and in that way get a figure considerably better than they get from stays.

And now, after nearly two years, I can answer with great confidence the assertion, very confidently made by many ladies, that it is impossible to do without stays. At the end of the first week I was convinced that I could do very well without them. Other

members of my family, who soon after tried the experiment, had the same experience. Among the ladies I have persuaded to try it, some have been well advanced in life. With children the effect is delightful, and pleases every one. Nothing would ever induce me (or my friends who have tried the change) to go back to the imprisonment of stays or to resume the burden of petticoats. And in this we are not like Mr. Proctor's "tail-less foxes,"* seeing that if we wished to make the change nothing could be easier.

* Referring to a remark of mine respecting certain unwise men who had given their experience of corset-wearing in KNOWLEDGE, asserting that corset-wearing must be good because they could not give up their stays without experiencing bad effects. This, I asserted, proved the reverse—showing they had been weakened by corset-wearing.

CHAPTER XI.

NOTES ON ROWING.

INTRODUCTORY.

IT is singular how unapt are most beginners in any form of exercise to consider the special aim and purpose of the exercise. They mostly try to acquire only the movements involved in the exercise. Thus the special object in tricycling is to work the outer rims of the driving-wheels against the ground in such a way that the body of the tricycle, and with it that of the tricyclist, may be urged rapidly forward. But nine out of ten who begin tricycling, work as though the great object were to work the feet round the axle. In their zealous efforts to do this, it seldom occurs to them till they have been some time at work (many weeks in some cases) that they are using one leg against the other. They wonder that they make little progress, and soon get tired out; but the real wonder rather is that so many persevere in the wearisome task. At last the idea dawns on them that the tricycle is a piece of mechanism designed for a certain purpose, and that it is as well to direct their efforts to accomplish that

purpose, and not a purpose for which the machine was not devised. *Then*, putting out their strength in such a way that first one foot drives, the other carefully refraining from resistance, then the other takes its turn, and so forth, each stroke being mentally directed to bring round the driving-rims as energetically as possible, the tricyclist finds his strength doubled and his labour halved,—or his effective work quadrupled. That which had been a weariness of the flesh becomes a pleasure.

With rowing the case is similar. Not only the beginner, but in nearly every case the teacher also, proceeds as though the great object in rowing were to put the blade of an oar into the water in a certain way to bring it through the water, to feather it with skill and dexterity, and then to carry it back for another movement through the water. If both the beginner and the teacher consider the real purpose of rowing, a much better start will be made in the task of learning to row, and much quicker progress will be effected. Let the beginner regard his oar as a lever for urging the boat along, and let him consciously direct his exertions to that end, and he will from the beginning work on correct principles. He will *feel* that to get work out of his lever he must put the blade in squarely. He will *feel* that jerking and scooping must be useless and worse, and that hauling in any other way but parallel to the course in which the boat has to go must be bad. He may be troubled a little by the curved course which his

hands have necessarily to take, but he will *feel* that the pull upon the oar must not vary correspondingly in direction, but should be made (and may pretty easily be made) always parallel to the boat's length. Presently he sees that to secure effective propulsion he may act as though his object were to propel the water backwards, and that the greater the amount of water driven along the surface backwards (no part of it being driven either upwards or downwards), and the more effectively it is so driven, the greater the propulsive effect on the boat,—action and re-action being always equal. This I have invariably found, when teaching the young idea how to row, marks the beginning of an effective style. The learner, from the time he notes this, begins to send sternwards the kind of swirl which the coxswain and the stroke like to see,—not a formless roughening of the water, but a well-shaped and swiftly-circling swirl, which means work done by the backward propulsion of a goodly mass of water. In aiming, on his own part, to send down such a swirl, the learner, if he really means work, soon finds his way to all the good points of style. Beginning (as is generally best) with strokes not too long, he lengthens his stroke by forward reaching as his mastery of the oar increases, and so increases the mass of water sent sternwards. He carefully keeps his blade square, that there may be nothing lost by the slip of the water over or under it. He keeps his blade well covered, that no part of it may waste its power on the idle air; but he refrains

from dipping it lower where no increase of power is to be found though the labour would be much increased. Then, too, he feels that at the end of his stroke the oar must be brought cleanly from the water, or the backward swirl (which really means and measures the forward urging of the boat) will be impaired, and the boat's way correspondingly checked. So he soon acquires the art of bringing the top of the blade above water just before the end of the stroke, then on the instant giving the blade a sharp half-turn, by which the swirl is neatly finished off and sent down as a pleasing little Maelstrom beside the boat's wake. In going forward, the oarsman, still rowing with his head as well as with his hands, feels that he cannot do better than to keep his blade flat, for so it will least oppose the air and do least harm should a passing wave unluckily touch it. He will recover sharply, especially in a heavyish boat, because all the time he is not pulling the effect of his last propulsive effort is being exhausted. And he will square his blade at the very instant that the forward motion of his arms and hands ceases and he is about to drop in the blade for a new propulsive effort.

Of course, a good Mentor, though he may save himself ever so much trouble by reminding his pupil of the real object in rowing (the propulsion of the boat), can still be very useful to the learner by telling him how best to apply his strength, by showing how the arms are most effectively used in conjunction with the swing of the body (not *alone*, as many strong-

armed learners try to use them), by calling his attention to the necessity of a straight swing from the hips, and by many hints as to the use of hands and and wrists, loins, legs, and feet. But the great point, I am persuaded, is to correct at the outset the idea that the object in rowing is to work the oar through air and water alternately, instilling instead the true ideas—viz., that the object is to propel the boat, that the oar is a most effective lever, the boat the weight levered, and the water the fulcrum, from which alone, —yielding or unyielding,—propulsive purchase is to be obtained.

On these principles I have taught a beginner more in two lessons than many learners acquire in a month's practice. My last pupil, for instance, was a lady, and a waterman who steered during the second lesson spoke with approval of her *style*, where in reality there was nothing but the conscious endeavour to secure propulsive effect.

THE MECHANICS OF ROWING.

A profound knowledge of the theory of propulsion through fluids is not essential to skilful oarsmanship, and is probably not possessed by one oarsman among ten thousand; I may go further, and note that even a perfect acquaintance with the principles of rowing may be found in company with singular inaptitude for the practical application of those principles. Shall I ever forget, for instance, how ably No. 4 in our

"tub" (when I was as yet a beginner in college rowing) would discourse about the proper way of rowing, taking, if occasion suggested, a fire-shovel wherewith to illustrate the beginning, middle, and end of the stroke? but alas! in practice he could never row a mile without catching a most monstrous crab.

It is not, then, with any idea that the general run of oarsmen should study the mechanics of propulsion or the true theory of rowing either, that I pen these lines. But the subject is an interesting one; and a good oarsman is likely to be none the worse for some consideration of the *rationale* of his art.

According to the system of boat propulsion adopted in most civilised countries (but the gondolas of Venice are propelled differently) the oar is a lever of the second class, in which the fulcrum is at one end, the force is applied at the other, and the weight is somewhere between the two. The fulcrum is not fixed as in ordinary applications of the lever, for the water yields to the oar in some degree; but, apart from this, the principle is precisely that of the second class of levers.

Many, however, who consider the problem of boat propulsion in this way, are perplexed by the circumstance that the oarsman himself is in the boat, and forms part of the propelled weight, while, again, the central line of the boat's breadth does not correspond with the place where the driving force is actually applied to the boat. Thus, if A B C is the oar, the rowlock at B, the place where the resistance of the

water against the blade may be supposed to act at C, and the power of the oarsman applied at A, we know that in reality the weight of the boat is under A, not under B; while again, the power P is applied within the boat itself, and whatever effect the pulling of the oarsman produces in one direction, must be exactly counterbalanced by an effect in the opposite direction. It is, in fact, the leverage alone which gives a balance of propulsive effect. The weight of the boat is really

felt at B, so far as the particular oar A C is concerned; the oarsman's strength is applied at A, and is met by an equal resistance there, but the propulsive effect at W is greater, in the same degree that the arm A C is greater than the arm B C. Thus, if an oarsman pulls at his oar with a force such as would suffice to lift one hundredweight, and if A C is 12 ft. long and A W 3 ft., then the propulsive effect at W corresponds to 112 lb. multiplied by 12 and divided by 9, or to 149⅓ lb. But the boat is not urged forward by this propulsive effect, only by the excess of this amount over the force actually exerted by the oarsman at A, so that the balance of propulsive action on the boat with its crew corresponds to a force which would raise a weight of $(149\frac{1}{3} - 112)$ lb. at the same rate as the oarsman moves his end of the oar.

It is evident that the actual leverage increases as A W is increased, supposing the oar's length to re-

main unchanged. But at the same rate that the leverage is increased, the velocity with which the oarsman's action tends to move the boat is diminished. Supposing C to remain at rest, and the end, A, to move with a given velocity V, the point W (at which the propulsive action is really exerted) only moves with velocity V diminished in the ratio of C W to C A. It might seem, then, that the use of outriggers diminished rather than increased the propulsive power of the oarsman—increasing his leverage, which one would have said did not need to be increased when the boat was at once made lighter and sharper—and diminishing the velocity with which his action tends to urge the boat onwards. But at the same time that the rowlock was thrown somewhat farther from the handle of the oar (not nearly so much farther as many imagine, for the old boats were wider in the beam, and their rowlocks were carried well out), the oar itself was lengthened. Owing to the diminished resistance, too, as the boat passed through the water, there is less slip of the oar through the water, which thus supplies a more perfect fulcrum. Yet the increase of velocity in light, outrigged boats is due more to the way in which they maintain their speed between the strokes than to any increased power of propulsion obtained by the oarsman. Being of smaller beam and lighter than the old racing boats, and also without keel and without laps, they maintain their velocity almost unchanged between the strokes.

And here arises a question which has been very

summarily, but in my opinion very incorrectly, disposed of by many writers on rowing. It is often said that the principles of rowing are just the same now as they were in the time of the old lap-streaked inrigged racing boats. The old rules for the action of arms and body—of legs also, except in so far as the sliding seats modify their action—are therefore repeated, as if no change whatever had been rendered necessary by the changed style of boats. In other words, though it is quite certain that the new racing boats behave quite differently, though it is manifest that as they move more quickly through the water they should receive a sharper propulsion, though it is clear that with the greater leverage obtained from the use of outriggers there arises a different amount as well as a different degree of propulsion at each stroke, oarsmen (we are told) should row in the same style now as before these changes were introduced.

It would be as reasonable, I venture to say, to assert that the style of stroke suitable for a coal barge must be the best also for a wager boat. It is manifest there must be some changes, and tolerably clear what those changes should be. And as a mere matter of fact, it is seen that those rowing clubs wherein the old style of rowing is clung to, get persistently beaten, or only win when they have a great superiority of physical strength, while those who adopt a style suited to the requirements of the light racing boats as systematically win—often against great superiority of sheer strength. Again it is found that those who on their own waters

are obliged to use the heavier boats, and, therefore, the old-fashioned style, are always, or almost always beaten, and that too by weaker men, when they row in the lighter boats, even when they have thoroughly mastered all such difficulties as arise merely from the relative crankiness of the canvas-covered outrigged craft.

I now shall show what are the differences of style which theory suggests for the lighter boats. I shall maintain the apparently paradoxical positions—(1) that the stroke must be longer, yet shorter in the water; (2) that it must be quicker, yet fewer strokes be taken per minute. I shall show how these requirements are to be secured, and I shall give evidence, which I take to be convincing, that when they are secured a style is acquired which utilises the oarsman's strength in the best way for contests in these cranky craft.

ROWING IN HEAVY BOATS.

Let us now consider the conditions under which an ordinary lap-streaked, inrigged (or half outrigged) boat should be rowed in order to get the best racing speed for a boat of that sort. I, of course, assume the rower to have mastered all the initial difficulties of his art, so as to be able to give his attention to the question of style. Well, in the first place, we find that for racing purposes the great object is to adopt a style by which we may *maintain*, as far as possible,

the velocity which can be readily enough communicated by a great short-lasting effort, and to do this with as little overwork as possible. Racing necessarily involves overwork, for no one who meant to row for two or three hours, or even for a single hour, would adopt a racing stroke, even for five minutes of the time. But the overwork in a race has to last over a good many minutes, and must be so distributed as to be most effective. The rower has, therefore, in racing, to avoid, above all things, whatever would involve waste of power; and he very quickly finds that the most mischievous waste of power results if he suffer the extra speed communicated by his efforts to be lost more than of necessity it *must* be lost between the strokes. In other words, a given average of velocity is obtained with greater or less expenditure of force, according as the necessarily varying velocity of the boat ranges more or less above and below that average. Or we may put the matter this way (it is not without a purpose that we put it in both ways): The more uniform the velocity, the less the total expenditure of power to attain a given average rate of speed.

When we say that a rower soon finds this out, we mean that he does so if he is attentive and apt. As a matter of fact, the most successful oarsmen (in races) are those who, whether they know it or not, have practically found this out; and the rules for a good rowing style are based, as will presently appear, on this important principle. But we know that, apart

from training and example, numbers of stout oarsmen would never attain a good rowing style or at any rate a good racing style. So that we might probably have said more truly that nine-tenths of our rowing men would not of themselves discover this law, which comes out very gradually in rowing practice, even to the acuter rower, and is theoretically only to be established by somewhat difficult reasoning, based on recondite principles, partly dynamical, partly physical, and partly physiological.

But now notice how, in the instructions for rowing in the old-fashioned racing boats, this principle shows itself.

Oarsmen were told in those days, and very soundly, to row in the following way:—A good reach forward was to be taken, and the water caught squarely by the oar, not by a pulling action of the arms, but by the action of the body and legs; the arms were to remain perfectly straight, acting only as "stretchers" until the body was a little past the perpendicular; then the stroke was to be finished by the combined action of the arms, body, and legs—the body slanting back, the hands drawn well in to the chest. The "recovery" followed, the body being thrown rapidly forward from the hips, the arms being at the same time extended, so that, the handle of the oar being thrust forward by both motions simultaneously, the blade passed with exceeding rapidity to the proper position for beginning the next stroke.

If we consider the dynamical effects of this action,

we shall see how admirably suited they were to produce a motion as uniform as possible in the racing boats of those days. (Such directions are given in "Principles of Rowing by Oarsmen," somewhere about 1840, by Bob Coombes, who became champion in 1846, and by other excellent authorities of that time.) First, the strength was applied with gradually increasing effect from the beginning to the end of the stroke, so that there was no undue strain in increasing the motion of the boat from the velocity to which it had fallen during the "recovery" to its maximum just before the "feather." Then the work was carefully distributed between arms, legs, and body, the body and legs doing the work first, then the arms joining them to give that extra lift at the finish which was meant to counteract as much as possible the tendency to lag between the strokes — so marked a characteristic of the old-fashioned racing boat. Lastly, that this tendency might have as little chance as possible to give the oarsmen extra or waste work, there was a very rapid recovery, so that the next stroke might begin under as favourable conditions as possible.

All these rules are admirable for the heavier class of boats, or for those which in old times were called racing boats. They served to obviate what, from our present point of view, may be called the great defects of those boats, their breadth of beam, and the (relative) clumsiness of their structure.

These rules were carefully enjoined at both the

Universities; but they were more perfectly carried out at Cambridge than at Oxford. The sway back of the Cambridge crews, and their rapid "recovery," were things to be marvelled at in some of the great races which preceded the introduction of light, outrigged racing boats. And those who adopted this system had their reward. Of six races rowed on the Thames in the old-fashioned craft, Cambridge won five. Not only did they win as a rule, but they often won in that hollow fashion which means that superior style has won the race, and not mere superiority of strength, or even of pluck (in both which University crews are likely to be pretty evenly matched). Cambridge won by a full minute in 1836, by a minute and three-quarters in 1839, by more than a minute in 1841, by half a minute in 1845, the last race rowed in the old-fashioned inrigged boats.

From 1846 to 1856 the University race was rowed in boats which had a sort of intermediate position between the heavy, lap-streaked, inrigged boat and the present light, keelless, outrigged craft. We should consider the boats used during those ten years quite unsuitable for racing purposes in our time. The old style of rowing suited them well enough—perhaps as well as the modern style; a style between the two would probably have suited them better than either. In the seven races between Oxford and Cambridge rowed in these earlier specimens of the outrigged racing boat, success was pretty equally divided between Oxford and Cambridge—counting

one race won by Oxford on a foul as a real win (which it certainly would have been, Oxford showing the better speed), each University won three. But the Oxford wins were better, especially in the latter years. Cambridge won by two lengths in 1846, by four in 1849, by half a length in 1856 (when Cambridge had an exceptionally powerful crew). Oxford won by eight lengths * in 1852, by about five in 1854, and would probably have won the race of 1849 by many lengths, apart from the foul. However, six years are not enough to judge by.

THE MODERN RACING BOAT.

So soon, however, as we turn to the races rowed since the introduction of the modern racing boat in its present form (except as to sliding-seats), we find the University which had been almost always successful in long races with the heavy craft, and which had seemed able, very fairly, to hold its own in the keeled outriggers, beaten, not only in the great majority of races, but also by much the greater distances. Let us consider the twenty-five races which have been rowed between Oxford and Cambridge since 1857 :—

Of these twenty-five races, fifteen have been won by Oxford, nine by Cambridge, and one was a dead heat. If we count the race of 1859 as one which Cambridge

* The number of lengths corresponding to any given number of seconds by which the race was won, may be obtained by regarding $6\frac{1}{2}$ *lengths* as equivalent to as many *seconds* as the race itself lasted *minutes*.

would have won had not the Cambridge boat been half full of water at starting, we may put fourteen races to Oxford and ten to Cambridge; but then, in fairness, the dead heat of 1877 should be counted as an Oxford win.* The mishap to Thorley's outrigger in the Oxford boat in 1858 may be regarded as fairly matched by the accident to Dick's stretcher in the Cambridge boat in 1875. This disproportion is too great to be probably due to mere chance. But when we examine the circumstances under which the various races were lost and won, we find the existence of a determining cause still more clearly indicated. Take for this purpose the following table, in which, to eliminate as much as possible the effect of mere chance, all the races since the introduction of outrigged craft are considered :—

Oxford won			Cambridge won		
In 1852 by	8	lengths	In 1846 by	2	lengths
1854	5	„	1849	5	„
1857	11	„	1856	½	„
1861	14	„	1858	7	„
1862	8	„	1860	1	„
1863	13	„	1870	1½	„
1864	6	„	1871	1	„
Carried forward	65	„		18	„

* The reader will understand that we are only regarding either race as affecting our opinion of Oxford and Cambridge style. The race of 1859 was unquestionably an Oxford win, though every one who knows the circumstances is aware that Cambridge never had a chance from the beginning; and in like manner, the dead heat of 1877 must be regarded as a dead heat, though it is certain Oxford would have won but for an accident.

Oxford won			Cambridge won		
Brought forward	65	lengths		18	lengths
1865 by	4	„	1872 by	2	„
1866	4	„	1873	3	„
1867	½	„	1874	2½	„
1868	4	„	1876	8	„
1869	3	„	1879	2½	„
1875	10	„	1884	2¼	„
1878	10	„	...	...	
1880	3½	„	...	...	
1881	3	„	...	...	
1882	10	„	...	...	
1883	4	„	...	...	
1885	4	„	...	...	
Total	125	„	Total	38¼	„
Average per race...	6 11/19	„	Average per race	2 4/5	„

Add to this the consideration that after Oxford had won nine successive races, from 1861 to 1869 inclusive, one of the best oarsmen Oxford has ever produced, Mr. George Morrison, gave much time and care to coaching the Cambridge crew into a better style than they had before followed, so that there is good reason for believing that in some of the races which followed (from 1870 to 1873, perhaps) the influence of Oxford training was at work in the Cambridge crews.

These points considered, suggest a strong probability that there has been a radical difference for many years between the Cambridge and the Oxford style, the latter being the better. As it is well known that for many years since the old-fashioned racing boats went out of use, the old-fashioned principles of rowing have been in vogue at Cambridge, we might fairly assume,

apart from all dynamical evidence, that the old-fashioned stroke does not suit racing boats of the present fashion.

Let us see what theory suggests as likely to be the best kind of stroke (for racing purposes) in these light boats, and then let us inquire what evidence we have to show that such a stroke really is rowed by the most successful crews.

Consider first in what respects the racing boat of our time differs from the racing boat of 1840. It is much lighter, it is much narrower and sharper, and has a perfectly smooth keel, so that it encounters a much smaller resistance, the leverage of the oar is greater, and the oar is longer. Taking the last point first, we see that the oarsman must pull the oar more sharply to give even the same velocity of propulsion as in the old boats, for the simple reason that he works at the end of a longer arm, while the increased length of the other part of the lever (the oar from blade to rowlock) only makes up for this increase in the length of the part which lies between the rowlock and the handle. It can readily be shown that, apart from the acquired motion of the boat, the driving distance for one full stroke of the oar would differ very little with the longer oars but increased leverage of our time from that obtained with the old style of oars, if the angle through which the oar is swept were the same as of yore. But to obtain this angular sweep the handle of the oar of our time must be carried through a distance greater in just the same degree

that the distance from handle to rowlock has been increased. The hands must, therefore, move more quickly to give the same rate of propulsion as to the older boats. But these boats will take and retain between the strokes a greater rate. Consequently the oar must be urged more sharply still, if it is to be effective in giving to them the greatest speed they can attain. The long, steady pull proper in the old racing boats would give, no doubt, to these much lighter boats the same rate of speed that it gave to the heavier boats, and with much less effort to the oarsman. But the racing boat would not then travel at the best pace that can be given to it.

I would call special attention here to the circumstance that it is not a mere matter of opinion, but of absolute certainty, that the same stroke which was good for the old-fashioned racing boat must be ineffective for the modern, outrigged, smooth-bottomed, light racing craft. It can even be shown that the actual stroke rowed by Selwyn and his contemporaries would not do more than simply follow the motion of a racing craft at full speed, instead of adding to its velocity.

Let us run through a little calculation, the elements of which, be it noticed, are not open to doubt or question :—

The University boats go over the $4\frac{3}{8}$ miles course on a good tide in about 21 minutes. We shall not be far wrong in saying that a very good racing boat would cover 4 miles *on still water* in about 20 minutes,

or would move at the rate of 1 mile in 5 minutes (note that whether a boat is travelling with or against the stream the rower works as if in still water, for the boat shares the motion of the stream). Certainly this speed is attained in spurts, and a still higher speed in sharp bursts over a short course. A mile in 5 minutes means 352 yards per minute, or 5·87 yards (or 17·6 feet) per second. This speed is not absolutely constant even in the lightest and best of our racing boats; but as every one knows who has watched the progress of a bumping race when the pursuing boat has its nose very near to or overlapping the stern of the pursued, falls off perceptibly between the strokes. Still the falling-off is very much less than in the best boats of half-a-century ago. We may fairly take 19 feet per second as the maximum velocity attained just at the end of stroke, and 16 feet per second as the minimum velocity just before the beginning of the next stroke.

Now, 40 strokes to the minute is pretty nearly the maximum attained even in spurts, the tendency being (as I shall presently explain) to diminish rather than to increase the number of strokes per minute. At any rate, 40 strokes per minute is very quick rowing indeed. If, then, the boat travels 17·6 feet per second, she covers about half as much again per stroke, or 26·5 feet. In other words, a boat travels very nearly nine yards at each stroke, in the case of an absolutely first-class and perfectly trained "eight" in a good craft, rowing at top speed.

Now, it requires, with an oar suited for an outrigged

craft, a very good reach forward and a good pull home, to give the blade a sweep of six yards in the water; and taking account of slip through the water, and of the arc nature of the blade's motion, we may consider five yards an unusually good *effective* sweep. Now, with the old-fashioned stroke, the oar was in the water at least twice as long as in the air, during each complete stroke (from feather to feather). If, then, this stroke were rowed now, the oar would be two-thirds of the fortieth part of a minute in the water, during which time the boat, with the motion already considered (whether supposed to be communicated by previous effective strokes or by the rest of the crew rowing properly), would travel six yards; so that rowing the old-fashioned stroke in the old-fashioned way, an oarsman would not be driving the boat at all, but simply following with the blade of his oar the (relative) motion of the past-rushing water.

It is obvious, then, that the stroke which was so effective in 1840 will not do now. It is equally certain that the requisite rapidity of propulsion cannot be attained by rowing the same sort of stroke, but more to the minute; for experience shows that no crew can keep up so quick a stroke as would be required—rowing full length, be it noticed, for else the quickening would do no good. Nor can men take a much longer stroke (in the same time), even with the modern sliding seats. Leverage is lost with increase of length; and though up to a certain point this consideration must be overlooked, it tells very much

when the question is of adding a foot or so of forward reach to the reach which had already brought the oar to an inclination of some 40 degrees to the mid position where the leverage is greatest. The sliding seats add something to the old length of stroke, and doubtless with advantage, but we were considering their use in the above calculation. More could certainly not be added, without bringing the oar to a position in which a large part of the oarsman's strength would be wasted in pushing the water from the boat instead of parallel to the boat's length.

It is, then, a simple matter of demonstration that the stroke must be changed, in the modern racing craft, in respect of the time during which the oar is in the water. If a greater rapidity of propulsion is required, as we have proved, and neither the number of strokes per minute, nor the length of the stroke, can be increased beyond a certain point, which does not suffice to give the necessary rapidity of propulsion, it follows of necessity that the oar must be a shorter time in the water and a longer time out of the water.

This is commonly misunderstood, especially by persons who have never rowed in light racing craft. They say the stroke must be kept "long in the water," and in one sense they are perfectly right: the stroke of the oar in the water must be as long as possible in distance, yet *not in time*. But then "comes answer like an Absey book," You advocate a quick stroke, and more than so many—say, from forty to

forty-four strokes per minute—should not be taken. This again is true, the oar must be dashed through the water quickly (or rather, for in good rowing there is very little slip, must be dashed down sharply against the water, and the boat lifted along by sharp, strong pressure against the water), but not too often to the minute. But then, again, comes still the objection, That means a slow feather, for if each stroke from feather to feather occupies a certain time, shortening the stroke means lengthening the feather; and every moment that the oar is out of the water the boat is losing speed. Again we reply, the objection is valid; but it is a necessity of the case that to give the swift, sharp impulse to the long, but quickly drawn, stroke, the oarsman must take a longer time in the feather. Of course, the best thing of all would be to have as many strokes as possible per minute, the longest possible stroke, taken in the shortest possible time, with the longest possible oars, and in the lightest possible boats. But the rowers being limited in their powers, the choice must be made between long dragging strokes with lightning feather, and long but swift strokes with less rapid recovery; and as the long dragging strokes would simply not propel a boat at all at the swift pace of a modern racing craft, the long, swift stroke must be taken. Here (as the point is constantly misapprehended) we note, that we do not in the slightest degree approve of short, swift strokes, which every great race of the last ten years has shown to be ineffective.

To sum up,—a modern racing eight, whatever may have been the tub practice of the crew, must be driven by sledge-hammer strokes, long and sweeping, but sharply taken, and resulting from the concentrated exertion of all the energies of the body, followed by a moderately quick recovery, during which the oarsman gathers himself together as it were for the next great effort, a momentary pause (which in old times would have been called a hang on the feather, and deservedly criticised as a defect) preceding the simultaneous plunge of the eight oars to grip the beginning of the stroke. In other words, a stroke must be taken which, with the old-fashioned boats, even when they had attained their best speed, would have meant breaking the oars—if the men were only strong enough to give it.

I watched the rowing of the two crews in the University boat race of 1882, under singularly favourable conditions, as they rowed past the White Hart at Mortlake. With an excellent field-glass by Browning, I had each crew in succession about half a minute in view, as distinctly as if they were at an oar's length from me. For a minute or two before and after this, I was able to see both crews together, foreshortened, so that the nature of the swing, and the time of stroke and recovery could not only be well seen, but readily compared. I had before only seen the crews in practice, and always at the beginning of their spins. Oxford, in particular, I had seen under very favourable conditions.

At Mortlake there was a difference naturally arising from the circumstance that Oxford were rowing out to the finish a race already won, while Cambridge—though they could not be so sure of the hopelessness of their position as the Oxford men were sure of victory—were nevertheless very obviously rowing a losing race. There was not seen that liveliness on the feather, after rather sluggish disengagement of the oar, which had been characteristic of the Cambridge style. On the other hand, the Oxford men showed the good features of their style very markedly. The swoop down of the oars upon the water was splendid at this stage of the race (I am told that earlier there was occasionally some little trace of flurry).

As for the way in which the work was done, I am as certain, after my observations that Saturday, as I am of my own existence, that nearly all the arm work was done in conjunction with body and leg work, and not, as some persistently assert, afterwards. I am equally certain that in the Cambridge boat the arm work followed the sway back of the body. The sluggish look of the Cambridge style was in singular contrast to the sharp slash of the Oxford oars through the water; and this sluggish look was entirely due to the inert condition of the arms during the first part of the stroke. The slow disengagement of the oar by the Cambridge, again, was in decided contrast with the clean, quick disengagement by Oxford.

On the other hand, I cannot say that the swing forward by Cambridge was anything like so sharp as

I had expected to find it, or as it appeared in practice. But this was only natural in a crew which had been rowing so hard a stern race. Moreover, the Cambridge style is, as every one knows who has ever tried it, exceedingly wearing in a hard race; and the lightning feather, which is its one theoretical advantage (more than counterbalanced by disadvantages), is very apt to be exchanged towards the end of a long race for a much less lively movement.

This circumstance, which I have noticed myself in rowing races, is well described by Mat Bradwood, in a passage which deserves to be quoted at full length, so apt and instructive is it: "Every day of practice on the Cam," he says, "you hear the coaches of the different racing-boats giving their crews certain directions, some absurd, and nearly all from some accidental reason useless. The chief of these is to 'keep it long,' and if you object to the results of this teaching, you are told that 'length' is the great requisite of good rowing, and that 'Oxford, sir, always beats us, because they are longer than we are.' Now this is true and yet untrue. At Cambridge, 'length' is acquired by making the men 'finish the stroke,' that is, by making them swing well back beyond the perpendicular. Of course, the oar remains longer in the water, but we maintain that the extra time it is kept there by the backward motion of the body is time lost. The 'swinging back' throws a tremendous strain on the abdominal muscles, the weakest rowing muscles in the body; very soon the men feel this

strain, become exhausted and unable to 'get forward,' and, finally, lose time and swing and 'go all to pieces.' Length obtained by going backwards is of no possible use. A crew ought to be coached to go as far *forward* as they can, to finish the stroke by bringing their elbows past their sides, and their hands well in to their bodies, and then complaints about 'wind' and 'last' will be fewer."

It may be asked why, if the repeated victories and the nature of the victories of Oxford result from an inherent superiority of the Oxford over the Cambridge style, Cambridge does not adopt the Oxford style? It is well known that Cambridge club captains try to introduce what they believe to be the style of Oxford. The passage above quoted indicates very accurately the feeling of Cambridge men on this point. But a radically wrong idea is entertained at Cambridge as to what the Oxford style really is.

Oxford men are apt, as I have already mentioned, to assert (and doubtless they believe, though erroneously, as close observation and theory alike show) that they do not use the arms till the body is nearly upright. Thus, Mr. Skey, F.R.C.S., in writing on the movement of the muscles and the body in rowing, gives, as the result of inquiry which he had made, the following entirely incorrect account of Oxford rowing:—"The prominent and distinctive feature of the Oxford system consists, I believe, in this, that the action of the glutei (the great muscles of the buttock), in drawing the trunk backwards to

something beyond the vertical, is nearly exhausted before the agents of flexion of the forearm commence their work. The Oxford authorities consider that they row with their trunk, while others more prominently row with their arms. In truth" (here his anatomical knowledge sets Mr. Skey right), "the muscular system of both trunk and arms is indispensable in all cases, the only distinction being that in the case of Oxford oarsmen the greater part of the retraction of the trunk, by the action of the glutei, is accomplished with rigid, unbent arms, while in other cases the retractors of the shoulders and the flexors of the forearm are somewhat more in unison, or rather, they share the time occupied by the former action." Mr. Skey is "unwilling to express a positive opinion as to the relative excellence of the two styles of rowing," but is inclined to think that some advantage is obtainable from the two actions being rendered consecutive, inasmuch as the superior power of the retractors of the trunk, on which the great effort in rowing depends, should be exerted singly, without the physical action of the system being hampered by two actions at the same moment of time.

As this was written in October, 1869, when Oxford had won for nine successive years against Cambridge, and an Oxford four had beaten in hollow fashion the American four from Harvard, it was only natural that Mr. Skey should be inclined to think the Oxford style must be the better; and so it unquestionably is; but the style he describes is that which was, and is, enjoined

rigidly by Cambridge captains, and observation shows that Oxford does not follow that style, but brings the arms to work from the beginning. How any doubt could ever be entertained on this point by those who know how much farther back than Oxford the Cambridge crews have always swung, is difficult to understand. For, if the arms are straight when the body reaches the vertical position, the body must, of course, swing farther back while the arms do their work, as yet scarce begun ; but, if the arms have been at work while the body is swinging to uprightness, the arms have little left to do, and therefore the body need swing back but a very little. As Oxford men unquestionably do *not* swing far back, while Cambridge men do—even men who know nothing practically of rowing can see *that*—it should need no demonstration that Oxford men do more of their arm-work than Cambridge men during the beginning of their stroke. "And I myself, with my very own eyes have seen," as the old chronicler wrote, that Oxford men and London men, too, and watermen always, row with body and arms, and legs, too, from the very beginning of the stroke. I assert confidently, as a result of theory and practice, of observation and of experiment, that for the arms not to be at work in connexion with the body and legs in the earlier part of the stroke is as great a fault in rowing as for them to be at work alone in any part of the stroke.

Meanwhile, at Cambridge they quietly accept the faith that Oxford men swing back with unworking

arms (and they see this in tub practice and paddling, where it is the correct thing to do); therefore they keep to the rule, unconscious or forgetful that it is the old rule, good only for the old style of boats; and so they get beaten, unless they have overwhelming superiority of strength, when they win by half a length or a length, where Oxford, with the same superiority of strength, would have won by half-a-dozen or a dozen lengths.

I write confidently, but I write about a matter which may be tested in a way there can be no mistaking (I would stake a good deal on the result if I were a betting man). The method of instantaneous photography, which has shown how a horse gallops and how an athlete turns a somersault, can very readily show how an Oxford or a Cambridge oarsman rows, and is very likely soon to be applied to the work. But there is a practical test which Cambridge captains might very easily try, and perhaps apply the result in a way very pleasing to themselves and their crews. Let a crew, each member of which rows well the Cambridge dragging swing-back, go over a measured distance, say half a mile, at their best speed in that style, and then let them—though, perhaps, a little tired—go back to the starting-place, and go over the course again with a changed style. Let stroke and each man of the crew agree for awhile to give up their cherished drag and lightning feather; let the arms be sturdily called into action, in due subordination, of course, to body, and in due alliance with the

legs, from the very beginning of the stroke, so that when the body comes upright, the arms have nearly done their work. Let not the stroke be hurried, but a steady (not sluggish) recovery, precede the simultaneous grip at the beginning. I will undertake to say that, even at the first trial (absolutely important though practice is in this style, where everything depends on the work being done in perfect time), even at the first trial, I say, the result will be such as to show unmistakably how much more effective, and also how much easier, this style is than the style inculcated forty years ago—for boats as different from those of our time as a barge from a pleasure-boat, or a pleasure-boat (with a party of ten under her awning) from the old clinker-built racing craft.

The following letter, sent to me when my series of papers on rowing were completed, gave me much pleasure, as showing that my reasoning and observation had not been unsound :—

CAMBRIDGE AND OXFORD STYLES.

"Dear Sir,—As the stroke oar of the winning boat in the Oxford and Cambridge race, 1845–46, and, I believe, the introducer of the slow recovery by which both races were won (though I can really, however, say that only of the first, for, in the latter race, Milman pulled very nearly my stroke), I wish to

say how much I approve of all you have written in *Knowledge*, and to remark that Cambridge loses now because they both hurry forward and go too far back —at least, this latter is often a fault with them. The rapid recovery is always a fault, and, I think, the most exhausting fault that can be made, either in the old boat or the new boat, but very particularly so in the new boat.—Yours faithfully,

"C. G. Hill."

CHAPTER XII.

LEARNING TO SWIM

EVERY ONE admits that we ought all to be able to swim; yet, if you ask the first ten men you meet whether they can swim, you will find that at least five cannot, and of women (who can learn the art much more easily than men) not one in ten can swim. Yet, out of a hundred men in all classes above the very poorest, ninety-nine have the chance of teaching themselves to swim with perfect safety, and quite easily, for one part at least of every year; and nearly the same proportion among women have similar opportunities.

It seems to me the reason why, despite the talk which goes on every year in the summer and autumn months about learning to swim, so few, who might, do really achieve the easy task, is that erroneous ideas are formed respecting the thing to be learned. A skilful swimmer, professional or otherwise, describes the art of swimming as eventually it should be acquired by the learner. He tells a man or boy who cannot support himself for a moment in the water—except, perhaps, by floating on his back—that he

must go through such and such movements. Here for instance, is a first lesson, extracted *verbatim* from an old magazine:—"Suppose a person standing up to his breast in water, and about to strike off in swimming; the hands are placed close to each other, with the palms undermost near the breast, the body is thrown forward in the water, the hands are thrust out, and when the arms are fully extended, they diverge horizontally (the backs of the hands being turned towards each other), describing curves" [excellent description!], "until they are brought round under the armpits and again extended. Whilst the arms are describing their curves, the legs are drawn forwards under the body, the knees being separated as much as possible, and the toes turned outwards, and whilst the arms are regaining their extended position, the legs are extended backwards and outwards, the soles of the feet being turned outwards." Now this is very pleasant to read. So the learner, standing up to his breast, puts his hands close together, the palms undermost near the breast, throws his body forward in the water, and presently comes up spluttering, having accomplished no part of the suggested operations except "describing curves" very vaguely and very uncomfortably.

The fact really is, that the first efforts of the learner should be of a much less ambitious kind. No one ever yet learned to swim all at once; and many are prevented from learning to swim at all by the circumstance that *every one fails* who tries to do what most

books on swimming tell him to do, and what professors of swimming pretend to expect him to do.

In the first place, the learner should not stand breast-high in the water, at least on a sloping shore, or where there is any stream. Not many years ago, some simple lessons on swimming, beginning with some such advice as we have quoted above, led a beginner to his grave; for, tumbling forwards in trying to carry out the instructions, he began to flounder, and floundering into deeper water, was drowned. In a bathing-place with level floor, a learner may safely take his first lessons with the water up to his armpits when he stands upright. But on a sloping shore (and even then he must be well assured that the slope is uniform and gradual, and the bottom such as he can stand on firmly) he should be content to stand in water some three or four inches below the armpits. If there is a stream, he will do well to fasten round his waist a stout cord, attached to some thoroughly trustworthy post on the bank. The same also at sea, if there is any tide or current, or any but the slightest undulations. It is better also to be with persons who can swim. In fact, avoid all danger. You will not learn the worse for being safe.

So much premised, note that the first thing to be learned—the first, but after it is learned everything else comes easily—is the art of retaining the balance in the water. It is *better,* if you want eventually to be a really good swimmer — that is, to have good

style and pace—to avoid at first all attempts at actual swimming; it is *essential* if your opportunities do not allow you to be so ambitious, and you want chiefly to learn confidence in the water.

Lean gently forward, with the face towards the shore, extending the arms forward and outwards, with the palms down, fingers and thumb close, and the hand, thumb, and fingers hollowed so as to form a sort of shallow cup. In this shape the hands have great power to help you in balancing yourself. Lean farther and farther forward—moving your hands about a little, so as to feel the water and also their power on the water, until your feet begin to be no longer able to support you. By this time your shoulders are immersed, and you feel the lifting power of the water, but you are not properly balanced right and left. One shoulder or the other dips as you tumble forward, and as your feet leave the ground your head goes under, which is not what you want. After a flounder or so (which itself has a good effect in teaching you, unconsciously, how water acts on a floating body) you are ready for another trial. This time, resolve that, on whichever side you find your body dipping, you will use your cup-shaped paddle (the hand held as described) on that side, with strong downward and rather outward action. You will find this very effective in tipping you up the other way, and you will flounder quite as badly as before. After doing this a few times, now one now the other side dipping first, and being too effectively

stopped, resolve to use both your hand-paddles, first the one first needed to save its side from going down, then, as the other side begins to dip, the other, and then, if you have time (most probably you won't, but that is a detail), the one first used. You will now rather wobble than flounder. You finally come to grief, of course, because your method of using your hand-paddles is too energetic. You put out too much strength to save you from your first dip on one side, and so you dip over to the other side; you correct that dip too strongly, and so dip the other way. Your next care, then, is to moderate your balancing movements. You resolve that as you dip over you will make only a slight effort for recovery. To your surprise, you find even this reduced effort tips you over; but now, if you still keep your attention directed to the alternation of the paddling action, you make more wobbles than before, before finally floundering over. You continue these experiments, reducing the action at each new trial, and learning more and more how very slight is the proper action for correcting the tendency to dip for want of true balancing. At last it dawns upon you that balancing in the water is very different from balancing outside of it. The slightest movement of the hand serves to restore the balance when disturbed; anything beyond destroys the balance. So soon as this lesson has been learned—most likely this will not be till after several days — the beginner can balance himself readily, without at first advancing or turning,

or using his legs, which, as they leave the ground in these experiments, may be left in any position they may naturally assume, while the learner gives all his attention to acquire ease and readiness in balancing the body by gentle movements of the arms and hands. After that will come the time for learning other things —amongst them the art of swimming, which is something more than balancing the body afloat in the water.

Having acquired the art of balancing easily in the water, body aslant, back uppermost, you are practically master of the situation; for, while the balancing comes easier at every trial, many ways of making progress come naturally to you. For instance, if you put the palms of the hands together, and so thrust them forward, then separating them and forming each hand into a cup-shaped paddle, in the way already described, carry them with a wide sweep backward, so that the hand-paddles drive back as much water as possible, you are, of course, carried forward, and you can repeat this action as often as you like, without using the legs at all. Or again, if you let your arms and hands simply wave about in front of you, keeping your balance, you can use your legs and feet in a rough-and-ready way to propel you, drawing the feet up under you aslant to the water, and kicking them back square to the water. Or you can progress more systematically by the process called "swimming like a dog," in which each hand is alternately slid forward, points of the fingers first, as far as it will

go, and then drawn strongly back, held downward from the wrist in cup-paddle form, while the legs also move alternately to give a kind of slow, backward kick, like that already described. In these and many other ways you can now get about in the water, not very quickly, but probably as fast as you want to go, and quite safely—though, of course, it is well not to go out of your depth.

Still, this is not to be called swimming. If you want to swim well, you must learn from the beginning a good style—which really means the sound, scientific application of the methods of progression possible in the water. That you may the better do this, do not be in a hurry; but first practise several things which will increase your confidence in the water, and enable you, when you do begin to learn the true swimming strokes—the breast-stroke and the side-stroke—to give your whole attention to style.

Learn, next, then, how to float on the back.

This is easier by far than learning to balance with the back uppermost (and the mouth out of water—a desirable state of things for those who prefer to breathe). But it is not right to learn *first* to float on the back, just because it is so easy that the learner is apt to stop there, and make no further progress. Besides, in turning from back floating to front floating, it is just as well to be able comfortably to balance in the latter position, and not be obliged ignominiously to splutter and struggle into a standing position.

Standing up to the breast in the water, *your back*

towards the shore, hold the arms out on either side, or inclined rather upwards and backwards, lean gently backwards—further and further, until the arms and the back of the head enter the water: you leave the ground, and at the first few trials you feel as if your head and shoulders *must* dip under. But they *cannot* do it, even if you try. The odd thing is that when you lean forward from a standing position in the water, you feel as if you could readily balance yourself, yet as soon as the feet leave the ground the beginner invariably goes head under; but when you lean backwards with the arms outstretched, you feel as if you were surely going under, yet as soon as the feet leave the ground you find yourself lying as comfortably on the water as if you were on a feather bed. There is scarcely any tendency to roll sideways, and what there is is very easily controlled by the hands in the water. But so little is there that after the first few trials you can put your arms or hands under the back of the head and float on your back as if you were going to sleep in that position on the green-sward.

To progress in any required direction, when floating on the back, is exceedingly easy. You can hold the arms easily alongside and work the hands from the wrist, "cupping" them for greater driving action, if necessary, or you can use the arms more freely, taking advantage of their full sweep. The legs can be used by gentle kicking, slanting the feet as you draw them up for the kick, and squaring them against the water as you give it. But you can now try a method of

propulsion with the legs, which will prove much better, and give you an insight into the true principle of leg propulsion in swimming. Floating on the back, gently draw up both legs, and kick them out simultaneously as far apart as you conveniently can; there then lies between them a triangular space of water. Bring them now, still extended, close together, forcing out, of course, towards the feet, the water which had lain between them (the action is like closing the blades of a pair of scissors). This action, you will find, produces a strong propulsive effect—the forcing of the water backwards urges, in fact, the body forwards.

While learning these preliminary exercises in order to acquire a good swimming style, both for breast-stroke and side-stroke, learn to roll over easily from the back to either side, and from the side to the front, until you feel as little care about any of these movements as you would about the corresponding movements in bed. To make them more difficult, change your floating position from back to front either way *after* expelling the air from the lungs, being careful, however, to do this at first only in shallow water; for though, after a little time, no difficulty whatever is found in bringing the mouth above water when the lungs are exhausted, it is at first rather discomfiting to find how very little floating power remains after the air has been expelled. I have seen a learner very much confused by the depressing effect of a hearty laugh in which he had indulged when floating. But

of course, after a little experience, the learner finds out the advantage of keeping his floating apparatus, the lungs, well filled with air. It also does not take him long to learn that it is not quite the right time to replenish them when the mouth is under water.

As I have said, my object here is to consider chiefly the beginner, showing how one who knew absolutely nothing about swimming might make his first attempts with safety, and learn readily the all-important art of keeping his balance, whether on his back, which is very easy, or with his back uppermost in the more usual position, which is more difficult. To swim properly requires somewhat more study and practice, and after the art of balancing in the water has been mastered, can best be taught perhaps, by reading one of the handbooks of swimming—ill-written though most of them are—which have been published in great numbers. Still a few words may be added on this point also.

The great general principle in swimming is that the arms and legs, in all methods of swimming, are to be brought forward with the least, and to be carried, or rather driven, back, with the greatest possible effect. This not only distinguishes good swimming from bad, in any given style, but also distinguishes the different styles from each other.

Thus the "breast-stroke" is better than the style called "swimming like a dog," because in the former the whole arm is used in propulsion, while in the latter little more than the hand is used; and again, because

in the "breast-stroke" the legs are driven back in a much more effective manner, as will be presently explained. So also, the "side-stroke" is more effective than the "breast-stroke," at least for short distances, because the arm, or rather one arm, is carried forward clear out of the water, and so encounters no water-resistance at all.

But, before our learner begins to learn any stroke, let him carefully note the following point, the neglect of which has ruined the style of many promising swimmers:—*The body should remain, as far as possible, at the same level during the whole of each stroke.* Many swimmers act as though at each stroke they were striving to save themselves from a watery grave. They drive the hands downwards as forcibly as they drive them backwards, the result being that the shoulders rise out of the water at each stroke, instead of keeping as much under as possible. A good swimmer will scarcely be seen to rise perceptibly in the water, even as he draws in his breath, for he always inflates his lungs when the body would otherwise be slightly sinking.

There are, indeed, some who adopt a somewhat different plan: they swim with the mouth under water, except when they want to breathe, when they turn the head round as if to lie with the cheek on the water as on a pillow—a movement which brings the mouth just enough above the water to enable the swimmer to breathe. This is theoretically the proper way to breathe so as to minimise work, for in this way

a maximum amount of the body's volume remains all the time under water; but it is better to learn this method of breathing later. It is sufficient at first to bear in mind the general principle that, in swimming not a particle of strength is to be wasted in up-and-down movements. The strokes should be taken so that they shall drive the body steadily forward without either lifting the body or causing it to sink so as to require raising.

Although I do not propose to describe here the various styles of swimming which may now be learned, I may in conclusion show how the "breast-stroke" should be taken:—

The swimmer is supposed to be simply balancing himself in the water when he prepares to try the movements now to be described. Placing the hands together close to the breast, with the wrists touching the collar-bones, or nearly so, the palms downwards, and in horizontal plane with the closed fingers, the swimmer launches his arms forward to their full reach in front of him, still keeping his hands together. While he is doing this, he kicks his legs out backwards to their full extent, and so as to throw the feet as far apart as possible. Of these movements only the leg work is propulsive. The arm work merely brings the arms, with as little resistance as possible, to the right position for their backward propulsive stroke. But though the legs and feet in being kicked out backwards produce a propulsive effect, especially if the feet are well planted, as it were, against the

water during their backward sweep, yet it is not in this motion that the legs do the most effective part of their propelling work. The arms are now to be carried backwards with a powerful sweep, the hands being held in the slightly cup-shaped form already described, and the stroke being taken with just so much downward movement, and no more, as is necessary to counteract the tendency of the head to sink when the support of the hands is removed. While the hands are thus brought towards the hips, the legs are to be brought forcibly together, like the legs of a pair of shears when we close it. It is in this movement that the legs produce their greatest propulsive effect, an effect which many who think they know how to swim, entirely lose, simply kicking their legs straight out backwards, and then drawing them up under them for the next stroke. This drawing up of the legs under the abdomen must only be begun when the legs have been forcibly brought together, both perfectly rigid till they are in contact. The closing movement of the legs is completed while the arms are doing their backward stroke. The legs are then drawn up under the stomach, the feet being bent back as when we stand on tiptoe, while the hands are brought to their first position by passing from the hips to the chest, the palm and fingers as it were gliding over the body. Then the movements described are repeated. The arms are thrust forward as before ; the legs are kicked out ; then, while the legs are brought forcibly together, and afterwards carried forward, the arms take their

propulsive stroke backwards to the hips. Then the movements are repeated, and so on, till the swimmer is tired, or thinks well to change his stroke.

The learner is now in a position to profit by the instructions given in the books, to which, therefore, we leave him, in the full assurance that had he gone to them as a mere beginner he would have obtained no particle of benefit from them.

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