CHAPTER V.

AFTER seeing my aunt to her room, I went again to my window, and, sitting there, strove to pierce the blackness of the night, and to follow with my eyes the man whose influence had so changed my life.

A watery moon floated above amidst grey clouds. For some time I could distinguish nothing but mist and drifting rain, but ere long I caught sight of a figure passing along the gravelled walk. He chose the lower way, which brought him to the very verge of the river. The shadows and the trees covered him almost immediately, so I began to take off my few trinkets and to unpin my hair.

Suddenly a rushing, seething sound, infinitely louder than the cry of the tempest, fell upon my ear. It terrified me. It was like the hissing of some gigantic snake; there was something vindictive and horrible in its approaching fury. Rushing again to the window I looked up the valley towards the place whence it came. A moment afterwards a mighty shock struck the house, and from the buffeting beneath my window I divined that the tarn had burst its banks.

One loud piteous shriek burst from my lips, then flinging my door open I sprang into the gallery. The servants were gathering in alarm, and behind them I saw my aunt tremblingly grasping a chair.

"Sir Geoffrey!" I cried. "He will be lost!"

The servants clung to each other speechless. My aunt beckoned me to her side.

"He is in God's hand," she whispered huskily. "Nothing can be done."

Impelled by some strange force, I entered the drawing-room and, thrusting the window open, stepped to the balcony. Three feet below was a rapidly quietening sea. The waters had come downwards in one wild leap, and, although confined within the hollow park, were no longer turbulent.

"O God," I murmured, "grant my prayer. Let me save him."

As if by a miracle a light boat that was used on the mere floated in front. It had been torn loose from its moorings, and was half filled with water. It passed at a considerable distance from the balcony, but without the least hesitation I sprang forward and fell face downwards in the stern. The shock stunned me, and when I recovered, I was drifting far from the house, and the shouts of the servants sounded faint in my ears.

The oars were inside. From my earliest childhood I had loved rowing, and now in this hour of need, I felt the strength of a giant in my arms. The boat scarcely seemed to touch the surface. On and on and on. The trees thrust their full-leaved heads above the water, the rain ceased, and the moon, white and round, established her supremacy.

Soon I reached the place where I had seen Sir Geoffrey last. Passage here was difficult, for the great elms wove a labyrinth that was hard to thread. With my heart beating so violently that I could hear every sound, I peered from side to side. There was nothing to be seen.

A passionate hope came that he had escaped, and I began to think of returning. At some distance lay a heap of *débris*, entangled amongst the ruins of the boat-house, which had been torn bodily from its foundations. To this I rowed, and resting my oar, gazed into the network of branches and woodwork.

Then came a deathly sickness, for in the very midst I saw a white upturned face, and two convulsed hands grasping the framework of the roof.

Somehow I understood that he was not dead. His eyes were closed—he was almost unconscious.

"Sir Geoffrey," I cried, "I am come to save you."

He moved slowly, then looked at me.

"You?" he murmured. "Oh, why have you dared this?"

So assured was I of his rescue that I laughed aloud, a little excitedly perhaps, but still very happily.

"I have dared it for you," I said.

How I extricated him I cannot tell, but although I must have worked like a man, I scarcely felt the exertion. For days afterwards, however, my limbs were stiff and painful. Before five minutes had passed he was in the boat. His right arm hung limply by his side; it was broken above the elbow.

Now that he was safe I felt my self-possession fleeing, and dropping the oars I sat with my head bowed between my hands. His voice brought me to myself.

"Let me have the oar," he said, "I can manage with one arm."

I gazed at him somewhat defiantly. Since I had saved him I should at least take him home. Before I could speak again we were moving rapidly towards the Grange.

On the banks near the house rode men on horseback with lanterns. A loud halloo of gladness came from them as we reached the terrace. The flood had subsided here, leaving the gardens and lower apartments in a state of indescribable disorder.

At the threshold stood my aunt ankle deep in mud. She stretched out her arms and pressed me close to her bosom.

"My darling," she said in such a voice as she must have used to the boy she loved, who had found his death in the same waters. "My darling, if you had not come back I should have died."

Sir Geoffrey, as soon as she had time to notice him, stepped forward.

"Let one of the carriages be got ready, godmother," he said, "and come over to Rathglen with me. It is not fit for you to remain here."

She seemed about to demur, but he prevented her.

"My arm is broken, and I must have you to nurse me."

A beautiful light came into her tired face.

"Well, my dear," she said, "if I can be of any use to you I shall be glad."

So together we went, and from that hour she sacrificed the morbid part of her recollections. When we reached the higher lodge I saw her tremble as she left her estate for the first time since her husband's death, but on the morrow she was bright and cheerful as if no great sorrow had ever darkened her life.

Sir Geoffrey is wont to declare that she is the tenderest and cleverest nurse in the world. Of late all the pent-up love in her nature has gushed forth, a very fountain of blessing.

On the first day that our host left his room he came to my side. I was sitting in his library with an old book on my knee. With his sound arm he lifted it and dropped it on the table heavily.

"Listen to me," he said.

I looked up silently, half in amazement, half in delicious fear.

"I love you," he said; then bending forward our lips sealed our betrothal.

[THE END.]

BICYCLE WORRIES AND HOW TO COPE WITH THEM.

BY W. LAWRENCE LISTON, M.D.

PART I.

"AND so we had to walk the last five miles!" Simply because the girl-cyclists did not know how to remedy some simple fault in their companion's bicycle, this is the woe-begone cry on arriving home late and tired. How few girls take the trouble to understand the construction of their cycles sufficiently to deal with any little trouble that may arise at some distance from home! Bicycles have their ailments like human beings, and a little judicious treatment

promptly applied or a little kindly forethought exercised in either instance may be attended by the happiest and most gratifying results. The girl who rides a bicycle should try to learn something of the temperament and little failings of her steed and to know what to do when it falls ill; no rider can be really independent who trusts to the chance of having some companion who can set things right for her, or who has to wait until she can find some repairer's workshop.

The girl who has mastered the elements of cycle "first aid" will know how to minister to burst or punctured tyres, and so save perhaps many weary miles of unnecessary walking, and, when her fellow-rider says, "My bicycle is making such a curious noise," she will not allow her to ride on ignorant of the cause, but will dismount and try to discover what is making the noise, and, by putting some little thing right in good time, will probably avert an accident, or at least save the machine from injury.

The old saying that prevention is better than cure applies with the greatest force in the care and treatment of bicycles, for a little careful overhauling of the machine before starting to ride will often prevent the necessity for an annoying stoppage at some time or place which is least convenient. The first thing to which attention should be given is the condition of the tyres; each tyre should be tested in turn in order to determine whether it is sufficiently inflated, that is to say, the back tyre should be pumped so hard that it can only just be dimpled by pressing with both thumbs on the upper surface whilst the machine is standing on the ground, and the front tyre should be slightly softer, otherwise the arm will be jarred by the inequalities of the ground. Pneumatic tyres in proper order should not require pumping more than once a week, and if more frequent pumping be found necessary it is well to examine the tyre and valve to determine which is at fault, for there may be a leakage from a puncture or badly-made join in the tyre, or an easily-stopped escape from the valve. Indeed this last possibility should always be thought of and excluded in any dealings with troublesome tyres before proceeding to the further and greater trouble of pulling the tyre to pieces.

Before we can remedy any little bicycle disorders it is necessary that we shall possess a properly-fitted armamentarium in the shape of a well-equipped tool-bag; the makers of the machine will supply the bag, in most instances containing an oil-can and spanners to fit all nuts, but it is advisable to have in addition a small duster, a small screwdriver, a repair outfit for the tyres, and a Dale's tyre lever and Mossberg wrench, all of which can be purchased at any cycle-shop. We shall see the use of all of these things as we encounter our various bicycle difficulties. Now to return to our tyres. Should the tyre on pressure be found to be more or less empty of air, the wheel should be rotated until the valve comes to the top with its cap pointing towards the ground, the cap should be removed and the tyre pumped hard; a small glass test-tube or an egg-cup two-thirds full of water should be so held that the whole of the valve is completely immersed; should the valve be leaking bubbles of air will soon appear in the water; the collar-screw should be tightened as much as possible with the fingers, taking great care not to use any tools in the manipulation of the valve at any time. Test the valve again in water, and should it still leak unscrew the collar-screw and see that the little rubber tube covers the hole in the stem; if not, take it off and put on a new one, which you will find in the little cardboard box of your tyre outfit (I am assuming that Dunlop, or tyres of a similar principle, are being dealt with), taking great care that the rubber does not project beyond the end of the stem, as its doing so prevents the free entry of air into the tyre; pump up and test again. Very frequently this is all that is necessary to save you the trouble of a daily pumping, but should this manœuvre fail to stop the leak, the fault must be sought in the tyre itself in the following way.

First, take your repair outfit out of your tool-bag, then remove the lamp, if it be on the machine, and turn the machine upside down, unscrew the collar screw of the valve, remove the stem with the rubber tube, and unscrew and remove the ring which holds the whole valve to the rim; in this way you empty the tyre of air and have the inner tube ready for removal. Taking a duster, carefully wipe the outer cover so as to get rid of any dust or dirt, at the same time examining the cover minutely in order to discover any signs of a nail or thorn in it; should you find one, make a mark on each side of it, but do not yet remove it. Next get your tyre-lever and insert its broad end under the edge of the cover just at the valve, being careful, if you are working on the back wheel, to choose the side farthest from the gear-case, as thereby more room is obtained for subsequent proceedings and the danger of touching the rubber parts with oil is lessened, the last being a thing to be avoided at all costs as the rubber rapidly deteriorates after the contact. Raise the edge of the tyre as much as possible with the lever so that a loop is formed at the valve, press the rest of the edge well into the bed of the rim, never relaxing the pressure on the lever; a considerable arching of the edge of the tyre at the valve will be the result, and the outer cover can now be slipped over the edge of the rim by easing it over with the tyre-lever; the inner tube is thus exposed to view.

Should you have marked the point of puncture, it will simplify matters very much at this stage, as that part of the inner tube which is wounded only need be drawn out, otherwise it will be necessary to push the valve tube out and gently withdraw the whole of the inner tube of the tyre, taking the very greatest care to peel the rubber tube gently and gradually from the canvas of the outer cover, should it be at all adherent to it. In many instances of marked punctures the point of injury becomes at once apparent, and the following description of the method of mending applies to these cases, except, of course, that part which deals with the discovery of the puncture. Remove the inner tube, taking the metal valve tube carefully from the hole in the rim; be careful also not to let the rubber touch any oily part of the machine, such as the side of a bearing. Put the valve together again and pump the tube up slowly, avoiding any sudden inflation, as the tube may bulge and burst if over-inflated. Have some water ready in a bowl sufficient to cover the whole circumference of the inner tube, and taking the tube with one hand on each side of the valve hold it under water; should no bubbles rise from any part of the tube, gently stretch it, when any small puncture will be apparent; test the whole length in this way, and should bubbles arise, make a small circular pencil mark round the puncture and resume the search for any further injury. It is most important not to be satisfied with the discovery of one puncture, as you may possibly replace the whole tyre and then find that it goes flat immediately, necessitating a repetition of the whole affair.

Having detected the whereabouts of the puncture or punctures, the tube should now be removed from the water and thoroughly dried by means of a duster free from all oil. One of the small india-rubber patches supplied in the outfit should now be prepared for the puncture by smearing a little of the solution (sent out in a small soft-metal tube) over one surface of the patch and laying it on the other side to dry; attention should now be turned again to the punctured inner tube, the punctures in which as above indicated have been marked by an aniline pencil.

You will no doubt have noticed that the inner tube of your tyre is of a yellowish white colour on its surface. This is due to the presence of sulphur used in the process of vulcanising the rubber, and before any patch can be made to adhere to it, it is necessary to remove this sulphur at the spot at which it is to be applied. Opening the valve we let all the air out of the tyre after drying it so as to be able to hold the tube flattened out over the left forefinger, while with the right hand the surface of the tube is thoroughly rubbed with the sandpaper provided in the repair outfit until there is a black patch exposed quite free from sulphur at least the size of a halfpenny, and having the puncture for its centre. This black area is treated in just the same way as the patch which you prepared with the rubber solution being smeared all over with it and left to dry; great care should be taken not to proceed to the next step until the patch and the prepared surface of the tube are almost dry, when the patch

is applied to the puncture in such a way that the sticky surfaces are in apposition; gentle pressure is now made, beginning at the centre of the patch and finishing at the edges, so as to expel all air and get the patch firmly adherent throughout: a little French chalk (supplied in your repair outfit) dusted over the patch so as to cover also any rubber solution at the edge completes the treatment of the inner tube.

The next manœuvre is that of replacing the component parts of the tyre, and until this is done our anxieties are not by any means ended, for a little carelessness even now may cause all the trouble over again. The inner tube should be thoroughly dried, and the valve-stem, devoid of all nuts, passed through the hole for it in the rim, the screw ring which holds it in should be lightly screwed on, and the tube laid in the bed of the rim all the way round; next the outer cover is to be replaced by pressing the edge well down into the bed of the rim commencing opposite and finishing at the valve, which should be pushed up slightly as the last loop of outer cover is replaced.

The valve must now be put together again as before, and the tube very slightly pumped up; search should now be made all round the edge of the outer cover in order to make sure that no portion of the inner tube has been pinched between it and the rim, and if any part should be found caught in this way it should be gently pressed and eased until it has disappeared. Now pump away as hard as you can, for there is no doubt that the harder the tyre is now pumped the firmer the patch is made to adhere.

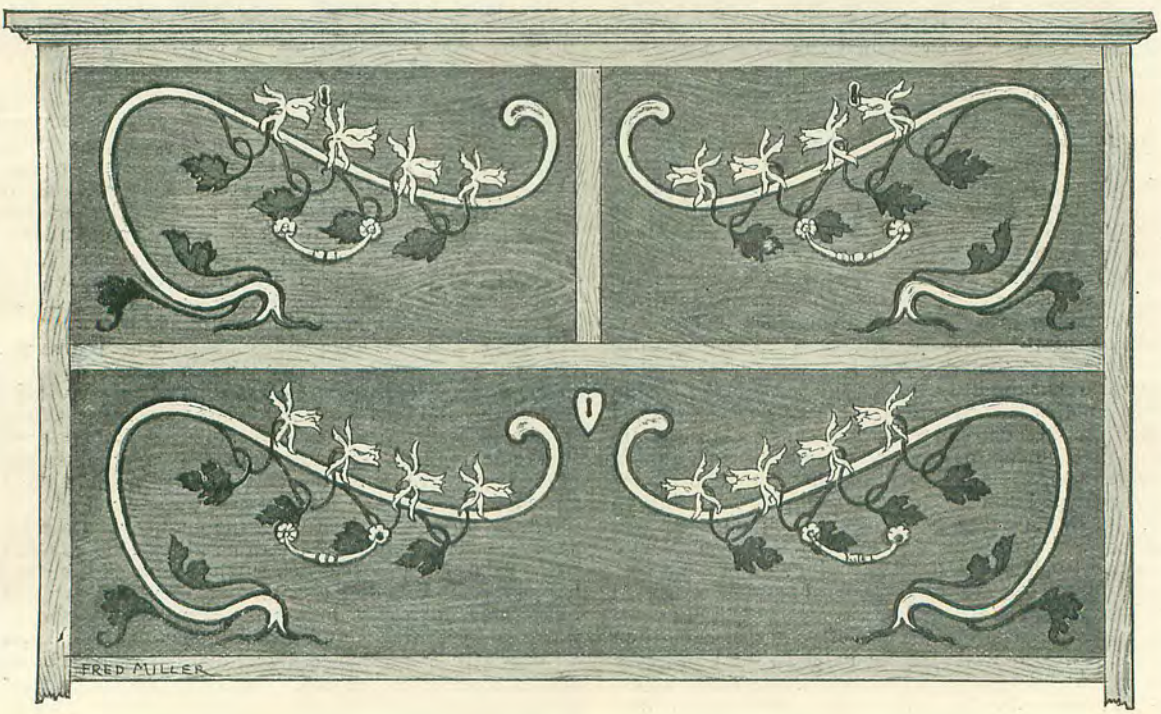
What a long time all this has taken to tell! Yet there is not one little fact that can safely be ignored and forgotten; one can do it all in very much less time than it takes to tell, but she will be an exceptional and fortunate girl who mends her first puncture without a mistake: so much is this the case that it is not a bad plan to make one's first attempt at home on some old tyre. Once having mastered the secrets of the pneumatic tyre, you have an inkling of the treatment of by far the larger proportion of bicycle ailments, for the modern bicycle's tyre is its weakest and most vulnerable part, and most of the hindrances to riding can be traced to it.

The inspection of the tyres having been made and completed, any slack tyre having been blown up, our girls will start for their ride possibly in happy unconsciousness that there is anything else of a preventive nature to be done. In my next article we shall see how they fare, how they might have avoided mishaps, and these having happened, how to correct the faults and mend the wounds of their stricken steeds.

STAINED POKER-WORK.

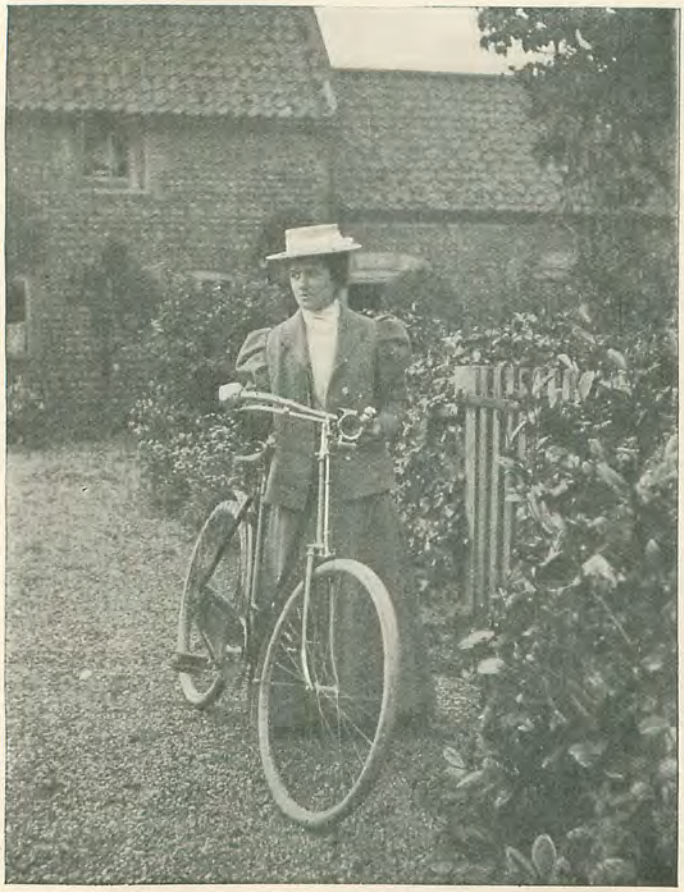
A HINT FROM THE PARIS SALON.

I SAW the cabinet from which I took the idea embodied in the sketch in the Salon of 1900, which is to Paris what our Academy is to London. The wood was stained in greens and yellows, blending one into the other, and producing a rich, varied, and harmonious effect. On any white wood, such as pine, it would not be difficult to blend two or more stains on the same panel, provided, of course, that they were colours that assimilated. It would not do to try to blend opposing colours, such as red and green. Yellows and greens, on the other hand, break into each other and yield charming half-tones. There are many excellent liquid stains sold which could be used. They should be simply stains, and not mixed with varnish, as the work should be French-polished if a nice surface is to be secured. This would have to be done for you, as polishing is a tricky operation. Those who wish to do everything for themselves might purchase some copal varnish and mix up such oil tube colours as Prussian blue, raw sienna, burnt sienna, and terre-verte with varnish, and apply them to the wood, using a separate brush for each colour. These colours would yield a number of tones as they blended one with another. Of course, this staining would have to be done after the poker-work was finished, or you would cause the varnish to burn, which would spoil the work. As regards



BICYCLE WORRIES AND HOW TO COPE WITH THEM.

By W. LAWRENCE LISTON, M.D.



A FAIR START.

PART II.

NOTHING is more essential to comfort in riding a bicycle than the absence of noise. The subdued hum of a well-made machine is not unpleasant, but anything beyond this is annoying and generally serves to put the rider on the alert as an indication of something wrong in her steed of steel.

To locate the noise and assign its proper cause is what every intelligent girl-rider should aim at. Some riders will ride on for hours, to the intolerable discomfort of their companions, with machine squeaking or rattling the whole time, when a dismount and a few minutes' well-directed search might have revealed the fault and suggested the remedy; for there are many evils that can be righted by a drop or so of oil, or a turn of the spanner. In time, such people become happily insensitive to the noises and perhaps imagine that their friends enjoy a like immunity, but even so, the presence of the noise generally means that the rider is working at a disadvantage and against unnecessary friction, for the ease and perfection in running attained on any bicycle are due more to reduction of friction than to any other attribute of the machine.

For practical purposes, all noises arising from some fault may be classed under two heads, the continuous and the intermittent, and after a little experience a girl who gives her attention to these matters will automatically classify any noise perceived and so exclude all improbable causes almost without thought. As examples of each class we may mention the rattling of a loose metal mud-guard, which is continuous, and the knocking of a crank against a metal gear-case, which only happens once perhaps in each revolution of the crank. The pitch and tone of the noise will often give a clue to the origin of the trouble, and the writer recalls an instance in which attention to this point solved the question of weeks in a few moments. A girl had noticed that when she rode her machine there was a knocking noise at every movement of the feet; on riding by her side it was noticeable that the sound was a clear ringing one, and on striking the front diagonal tube of the machine it gave out the same note; the probability immediately suggested itself that the noise was due to the impact of something on this tube which was causing the annoyance. The only thing which appeared to touch the tube at all was the rider's skirt, and on examining this it was found that all the trouble arose from some metal discs in the hem, inserted to make the skirt hang gracefully, which struck the machine on every revolution of the feet. So disagreeable had the noise become to the poor victim that she was just on the point of sending her bicycle miles away to the makers in order to have the "defect" put right.

Another important point to observe is the time of the noise, if not a continuous one, *e.g.*, whether the noise is coincident with each revolution of the cranks or, on the other hand, times itself to the revolutions of the wheels, which in all modern bicycles are much more frequent than those of the feet.

A girl who has one of the helpless ones with her in difficulties should, first of all, ride by her side and try to discover the cause of the worry; if there should be any unusual and persistent noise, a halt must be made and the machine examined carefully to see whether the opinion formed of the cause is the correct one; if no satisfactory result can be arrived at, the girl of resource must mount her companion's machine and ride it a short way herself, a proceeding which will often clear up the mystery at once. Let us now consider some of the conditions she may meet with, how she will recognise them, and in what way she is to remedy them sufficiently, at any rate, to enable the injured machine to proceed to its destination for the day.

Gear-cases have done almost as much in rendering bicycling a possibility for girls as pneumatic tyres, but they, like all other improvements, have brought, as their natural attendants, a train of ailments to be reckoned with and attended to. The space between the right crank and the outer surface of the gear-case is often so small that a little extra mud or even dust accumulated between them will give rise to friction, and a slight accidental bending or displacement of crank or gear-case will frequently cause a grinding or scraping noise always noticed when the feet are at one particular position in the circle which they describe in pedalling. A very small amount of this trouble will take the enamel off the gear-case, or, at any rate, will scratch it, so that it should be detected at once and remedied by gently pushing the gear-case away from the crank at the point of impact, a manœuvre which will often enable the unhappy possessor of a bent crank to get to the next repairer, where it can be straightened. The metal gear-case is also a great tell-tale and soon warns the rider of any undue slackness of the chain by a repeated knocking, particularly noticeable in going uphill; this knocking, which is quite distinctive, is due, of course, to the loose part of the chain striking the interior of the case; naturally the remedy lies in the tightening of the chain, a rather difficult matter in the older machines but fairly simple on those of the modern ones which have an eccentric adjustment at the bottom bracket. Always remember that the gear-case covered chain requires its fair share of attention and lubrication, and that a little oil will often stop annoying little clicks and noises within the gear-case.

The wheels themselves are a fertile source of noise; there may be a general rattle due to an ill-fitting mud-guard, easily detected by getting off and trying to produce the same noise by shaking the mud-guard with the hand and generally to be remedied by tightening a screw or two; again there may be a general rattle from a loose bearing, a state of things which can only be ascertained by dismounting and examining the machine in the following way. Hold the fork firmly in one hand as the machine stands upright on the ground, and with the other grasp the rim of the wheel just on one side of the fork and see if it can be pushed sideways, *i.e.*, whether there is any "play" or lateral shake; should there be any, it is necessary to tighten up the bearing. To do this on the ordinary pattern of machine the nut on the left hand side of the machine on the fork is loosened—that is, the nut which comes to your right hand as you stand facing the front wheel of your machine—when you will find what looks like a ring on the inner side of the fork but which is really the cone of the bearing; in your tool-bag you will find a spanner which fits on the flattened surfaces of this ring, and with it the cone must be gently tightened up by turning from left to right until there is resistance, when you "unscrew" the cone, as it were, for a quarter-turn; the outer nut is then tightened up and the wheel tested as before; if there still remains any side shake the cone is insufficiently tightened and the process must be repeated. Of very much greater importance is the ascertaining that the bearing has not been tightened up too much, for it is much more harmful to a bearing to ride it too tight than too loose; all that need be done is to lift the wheel from the ground and watch how it ceases revolving; the wheel should go to and fro several times after it has ceased to revolve and should finally come to rest with its valve at the lowest point; if the wheel stops suddenly without these to and fro movements, the bearing is unduly tight and must be freed.

An unpleasantly loud click is often heard which corresponds with each revolution of a wheel; this may be due to an ill-adjusted cyclometer, in which the little striker engages the toothed wheel too heavily; in this case the remedy is obvious. Again, a noise having the same relation as to time may be caused by a blister on the tyre or by some mud or a small branch of wood which the tyre may have picked up. This warning, in the case of thorny branches, if promptly attended to, may save a troublesome puncture, as the thorn very often does not penetrate the inner tube during the first revolution or so after it has become attached to the outer cover. A wheel noise which often causes great perplexity and unnecessary annoyance is one arising from the movement of the little chain which is attached to the cap of the valve: the most radical treatment is its removal. The noise above-mentioned as the result of a blister on the tyre is of evil omen, for it generally heralds a final burst of the tyre and almost as frequently the purchase of a new one. It is wise not to pump such a tyre very hard if you value its life!

Perhaps one of the most neglected parts of an unobservant girl's bicycle is the head; the continual strain conducted through the front forks in riding, especially over rough roads, tends to shake the bearings of the head loose, a disorder which manifests itself by a continued rattling in the part affected. To make doubly sure it is necessary to dismount and pull upwards at the handles, without actually lifting the machine from the ground, thus determining the presence or absence of play in the bearing; the remedy is generally a simple one on most machines, consisting, as it does, in the unscrewing of a locking-nut and the turning of a collar followed by the relocking of the outer nut. There are two points which demand care and attention in this adjustment, and they are, first, not to allow the front wheel to move so as not to be at right angles to the handle-bar, and, next, to see that the bearing is not over-tight and that the steering is quite free.

Noises which closely simulate that caused by a loose head are frequently found to have their origin in the lamp, or its attachment to the bicycle, or to the rattling of a front brake-rod against the lamp-bracket. If the noise is due to the former cause, it will, of course, cease the moment the lamp is removed, and the remedy will generally lie in attention to the particular fault in the lamp; often the front lens is rattling, and a little pressure on the spring which holds it closed will mend matters. Should the brake-rod give rise to noise, it should be carefully examined, and if found to impinge on the side of the lamp-bracket through which it generally passes, the bracket may be swung round a little so as to free it.

The whole matter of attention to brakes is a most important one, and there is no part of the girl's bicycle in which neglect may be attended by more awful consequences; in any part of your ride you may be confronted with a combination of circumstances in which the only possible chance of safety and escape lies in the prompt and speedy application and immediate action of a brake in perfect order. Free-wheels especially demand the presence of an efficient brake on each wheel, and if girl-riders had received no other benefit from the introduction of this invention, the attention to and improvement of bicycle brakes incident to it would in itself have been the greatest boon imaginable. Every girl should see that her brake or brakes act quickly and easily before starting for a ride; in many instances the joints of plunger brakes become clogged with mud and require cleaning and oiling before the brake can be made to act properly. It is most important to remember that attention to brakes is to be given before riding, when, if any serious defect is found, it can be repaired by a mechanic on the spot. It is of almost equal importance to see that the brake takes itself off after application, and as this freeing is generally attained by some spring-mechanism, a few drops of oil or the slight turning of a screw will soon make things satisfactory. An unreleased brake means useless toil and unnecessary wear of tyres.

Insufficient oiling leads to many annoyances in bicycle riding, and it is well to remember that a bicycle will not oil itself, and, quite apart from the question of noise, no machine can possibly be expected to run smoothly and easily unless it is adequately lubricated. The excruciating squeak given out by a wheel with dry bearings should not be tolerated for a moment; there should be an immediate hunt for the shrieking bearing with the oil-can. The bottom bracket, that is, the part through which the spindle connecting the cranks passes, is a frequent sinner in this respect, and this is especially the case if the machine happens to have been left for some time out of use and leaning to one side: the noise in this instance is, of course, coincident with each revolution of the cranks, and in dealing with the difficulty it is well to recollect that this particular bearing is generally greedy of oil, and that the machine should be slowly tilted from side to side in order to permit of the oil thoroughly permeating the whole of the bearing. The question of adjusting a loose bottom-bracket is best left to a local repairer, but it is well to know how to test this bearing for looseness. The cranks should be grasped one in each hand and pulled on alternately from within outwards; there should, of course, be no play between the spindle and the rest of the bearing. It is necessary in applying this test to be very careful not to catch hold of your pedals, as any looseness in them would be immediately felt and be confused with that in the larger bearing.

Properly adjusted pedals play an important part in the ease with which you ride your bicycle, and a little attention in the way of oiling and adjusting will amply repay you. If a girl is unfortunate enough not to have a free-wheel machine, and is unwise enough to attempt "coasting" on the fixed-wheel machine, a practice at once inelegant and dangerous, her unadjusted pedals will soon give evidence of their neglect by rattling during the whole of the procedure, but will cease to do so on her taking up her pedals again. The adjustment depends upon the particular pattern of pedal in use, but generally it is very simple, consisting in the removal of a dust-cap and the tightening of a cone, much after the manner already described when speaking of the wheel-bearings.

It is often a matter of great difficulty to obtain a saddle which suits the rider, and when one is obtained it is frequently a source of serious discomfort from the many

and mysterious noises to which it may give rise. Most of these noises can be assigned to their proper cause by noticing that they are increased by movements of the body rather than of the limbs, and upon dismounting and pressing or leaning heavily on the saddle they are easily repeated. A little, a very little, oil at any part in which the coils of the springs appear to touch one another will generally effect a rapid cure, but be very careful to avoid too much oil lest your clothes suffer. A saddle which has been allowed to become "sagged," that is to say, one which is no longer sufficiently stretched on its frame, may be the cause of much needless misery through the rider bumping on to the hard metal springs beneath; the remedy is generally beyond the powers of the ordinary rider, as on the best saddles the method of tightening is so absurdly difficult that it entails the removal of the saddle and considerable muscular effort afterwards. Some few saddles can be screwed up by means of a suitable wrench without removal, and it is a very great pity that some means of this sort cannot be more generally adopted.

Most of the present-day machines have their pumps fixed to the frame by means of two little metal points which engage the open ends of the pump, and are kept up to their work either by springs or a screw; it is no uncommon thing for these to work loose, and so cause a continuous jarring noise, which is, of course, easily remedied. Another small thing which is wont to give rise to trouble is the interior mechanism of the bell, which may get loose and rattle; the noise is easily located, for if the bell be covered by the hand, the tone of the noise immediately alters. The remedy for this noise will, of course, depend on the particular fault discovered on removing the dome of the bell.

Quite apart from the rattle caused by a loose spring or fitting or that caused by careless manufacture, lamps, even the very best lamps, may be a source of great discomfort and annoyance unless a certain amount of intelligent care is bestowed in the first instance on the choice of a lamp and afterwards on maintaining it in proper order. Nothing can be more disheartening than to be suddenly confronted by a lamp which will not burn on a dark night and miles from one's destination, and it affords no comfort to reflect that the defect is in all probability due to the rider's own lack of care, and any trouble with a lamp during a ride only too terribly emphasises the fact that "prevention is better than cure!"

There can be no doubt that, of all the lamps now in use, those which burn candles are the least prone to give the careless rider trouble; their illuminating power is low, but an extra candle can always be carried either in the wallet or pocket, and so long as this is kept dry there is not likely to be much the matter with the lamp. Most riders, however, prefer a stronger light, and in most instances use oil lamps, so it will be as well to see how one can get the most satisfactory work out of them.

In the first place no greater mistake can be made than the purchase of a so-called cheap lamp; they will neither hold their oil satisfactorily, light easily nor burn properly. "Oh, any lamp will do for my sister; you see, she rides so seldom at night." How often we hear something of this sort, but the argument which applied to the choice of a machine holds good in the selection of the lamp, and the less often a lamp is going to be used the more important it is to get a really good one. A lamp then should be chosen which takes a wick of fair size, and has a good reflecting surface, and a clear front lens. It is better that the side-lights should not open, and it is important that every part of the interior of the lamp shall be easily got at for cleaning. If not in use it is as well to keep the lamp empty of oil, as the wick becomes clogged by prolonged immersion in it; care should be taken to rub the wick after each time of using, and to see that there is a good length of it in the lamp; a proper supply of suitable oil is, of course, necessary. The girl who, after riding with the lamp alight, puts it away untouched for some months until the next ride must not be surprised if it refuses to do its work.

There are, of course, other lamps, such as the acetylene and electric lamps, which will in all probability supersede the oil lamps entirely in the future, but their use among girls is at present very small, so that their special and peculiar troubles need not be discussed here.

From what has been said about bicycles and their ailments it will be seen that they are many and varied, and the detection and treatment of them will teach any girl many an important lesson in observation and patience. Never go about the matter in a hurry, always be deliberate, and let everything you do have a reason for its being done. In dealing with sick machinery, as with ailing people, much more can often be done by gentle and patient persistence than by bustle and force.

A JUBILEE QUARTETTE.

By MAY CROMMELIN.

CHAPTER II.

As all of us know who remember that first grand Jubilee Day, it was glorious weather.

Very early in the morning the sisters breakfasted. Then Grace slipped out of doors from her modest lodging, adventuring herself in the Underground Railway. To her comfort, although there were many other passengers, these were mostly ladies and gentlemen, and there were seats enough for the former, while the men stood up in the carriages.

At St. James's Park station Grace alighted and hastened up the steps, lest the gates should be closed at nine o'clock, to keep expected crowds out of the park. Along the asphalted path under the shady trees, over the bridge, where the ducks swam unconcernedly on this great day just as on others, Grace went alone among hurrying groups all pressing forward to gain their seats in various windows or balconies before the throng in the streets should make passage an impossibility. When Marlborough House glowed warmly through the green of the trees she turned down the shady Mall, where Charles II. was wont to stray, and gained the back door of the War Office.

Here a tall janitor, an old soldier, directed her up several flights of stairs to a room near the top, where were other visitors already. All who came in went straight to the windows, as did Grace, and gazed out. Below them Pall Mall was freshly gravelled, the roadway empty, the side-paths crammed with sightseers, many of whom were sitting on the kerbstones or steps of the houses breakfasting, or nursing little children with a patient air, knowing that the procession was not timed to pass by till four o'clock. And now it was barely nine in the morning!

But there was much to see. Not only the long red rows of soldiers guarding the road, the gaily dressed people in the balconies, the decorations and flags. Now and again orderlies trotted by, and occasionally at the sight of an officer in full uniform wending his way to some distant point, the crowd cheered to pass the time.

Towards ten o'clock those in the room, grown weary of gazing out, began chatting together. Some young people of Grace's age, and especially two cadets from Sandhurst,