us. The first edition was received so recently (JOURNAL, October 4th, 1913, p. 870) that there is little to add to the commendation then bestowed on the book. It makes no claim to originality, but, as the authors state, is founded on the standard works on the subject, keeping in view its special object, to adapt the principles of these works to the conditions which prevail in India. The new edition has been carefully revised, and in some places extended, to bring it up to date, and with the same view the number of illustrations has been somewhat increased. We may say that the book fulfils its object satisfactorily. But the fact that a second edition has been called for less than two years after the publication of the first is the best evidence that the book has met a want.

SURFACE TENSION.

ALTHOUGH many of the phenomena included under the term "capillarity," or "capillary action," such as the rise of a liquid in a narrow tube when one end of it is introduced below the surface, or the absorption of a liquid by a porous substance of which a small portion only is dipped into the liquid, are familiar to most persons, probably very few, except those who have made a special study of the subject, would be able to explain such phenomena or to give any account of the theoretical considerations deducible from them. In a little book entitled *Surface Tension and Surface Energy*,¹ Messrs. R. S. WILLOWS and E. HATSCHEK give a succinct account of the general subject of surface energy of which capillary action is one manifestation. The five chapters of the book represent a series of articles which appeared originally in the *Chemical World*, and are based on a course of lectures delivered at the Sir John Cass Technical Institute by one of the authors. Mr. Hatschek is the author of a work on colloids which has been previously noticed in our columns, and the present subject is very closely connected with what may be termed colloidal chemistry. In a so-called colloidal solution solid matter exists in a state of extreme subdivision, and, therefore, with a great development of surface for a given mass; the particular properties of surfaces due to their being the boundaries between dissimilar substances therefore play a very large part in determining the peculiar properties of such quasi-solutions. The phenomenon known as adsorption is also a particular case of the results of surface energy, and a general summary of the whole subject is, therefore, to be welcomed. The book under notice, being originally designed for the use of chemists, assumes a fair general knowledge of chemistry and physics, and to a reader possessing such knowledge it is an excellent presentation of the subject, but more general readers would probably find the treatment too condensed to be easily followed. The use of mathematical formulae and calculations is, of course, inevitable, but the mathematical treatment is confined to what is essential, and very few details are given of the experimental work which is described. The book will be found a useful summary, suitable for those who desire to obtain correct general ideas on the subject, either for the sake of its bearing on other subjects or as a preliminary to a more detailed study of it.

¹ *Surface Tension and Surface Energy and their Influence on Chemical Phenomena*. By R. S. Willows, M.A., D.Sc., and E. Hatschek. London: J. and A. Churchill. 1915. (Cr. 8vo, pp. 88; 17 figures. 2s. 6d. net.)

MEDICAL AND SURGICAL APPLIANCES.

A Tourniquet.

MR. J. M. CARVELL, M.R.C.S. (West Kensington, W.), writes: For some time past in connexion with ambulance work the need has been felt for a more efficient form of tourniquet than those in general use, that is, the india-rubber or the pad and strap varieties; the drawbacks being, in the case of the former, that when applied the circulation of the limb is completely restricted, and that the rubber soon perishes. In the case of the latter there are three distinct weaknesses: (1) When the strap is tightened the pad is pulled out of place, owing to pressure being exerted on one side of the pad or block only; (2) owing to the means to secure the appliance being a spiked buckle, some relaxation of the band takes place, and it is difficult to remove or adjust; and (3) the strap being pierced by the buckle spikes, is weakened, and soon wears

out. Messrs. Hatrick and Co., of 70, St. John Street, Clerkenwell, have made for me a tourniquet which overcomes these drawbacks, and possesses other advantages which are absent in other tourniquets. It consists of a pad or block of vulcanite (or other suitable material) which is affixed to a metal plate, one end of which forms an eye and the other an open hook. To the eye is permanently attached a special form of spikeless buckle, and a similar detachable buckle engages over the hook of the metal plate when the instrument is in use. Through the two runs the strap of the tourniquet, which consists of two lengths of webbing placed one over the other, and stitched across at frequent intervals, the ends of the webbing being thickened so that it cannot be detached from the buckles. To apply the tourniquet the loose clip is removed from the hook, the block is placed in position, the strap is passed round the limb, the loose clip replaced over the hook. Pressure is then exerted on both ends of the strap and the block is forced directly downwards, the strap automatically holding at the point of greatest pressure. To remove the tourniquet the release tongues (marked) are pulled with an upward motion, when pressure is instantaneously relaxed. An additional lock is provided (for use only in cases in which a patient may have to be transported a considerable distance and possibly loaded and unloaded *en route*). This is secured by inserting pencils, or anything similar, through the loops formed by the two lengths of webbing composing the strap immediately outside the clips, when the tourniquet is in position. When this is done, the appliance is secured even if the release tongues should be inadvertently pulled.

MOTOR CARS FOR MEDICAL MEN.

LIGHT CAR DEVELOPMENTS.

By H. MASSAC BUIST.

THE situation in regard to the supplies of British-built motor cars that I outlined in the JOURNAL of May 29th is emphasized by the appointment of Mr. Lloyd George to the ministry of munitions and Dr. Addison as parliamentary secretary. Further investigations at first hand of the position in the Midlands reveals that in effect all our best makers of cars of all powers, sizes, and prices are now busy on Government work; therefore there is no time to be lost by the medical man who contemplates placing an order for a new car. These remarks must be taken as applying not only to medium size, but also to the smaller sorts of vehicles, including light cars, with certain developments in connexion with which I propose to deal in these notes.

I cannot, perhaps, make a better beginning than by drawing attention to a new craze, whereby a large section of light car users are not content with the extraordinarily rapid manner in which the manufacturers are developing these machines, but fancy that perchance they can also improve their qualities by experimenting on them. Take, for example, the practice not infrequently advocated for owners of light machines to drill holes in the connecting rods for lightness, or to lighten the pistons by drilling and turning on the inside of them, or cutting the cams to increase the valve lift, or taking metal off the bottoms of the cylinder castings to increase the compression pressure. Some amateurs with a turn for mechanics take a delight in this sort of thing, with the result that for a space their vehicles become very slow in the matter of speed, and envy is created in the bosoms of owners of non-mechanical mind of similar light cars, who are tempted to engage some local mechanic to tittivate their machines on similar lines for a few pounds.

PRACTICES TO BE AVOIDED.

The medical man, to whom reliability is essential and the total cost of whose motoring is a material item, will be well advised to have nothing to do with any such practices. Those who advise or suggest them are false

educators of the motoring public, because they would inculcate quite wrong principles. It should be had in mind that the average light car of to-day is, proportionately to its weight, a powerfully engined vehicle. The transmission and other mechanical details are worked out by the manufacturer in strict relation to the power the motor develops as furnished by him. Increase that power by ever so little and you upset all the careful calculations on which the machine as a whole was designed. Apart from this the product is a machine which has never been tested by the maker as a unit because his experiments, which usually extend over at least a season before he presents a model, are all conducted with that vehicle in the form in which it is ultimately evolved and standardized. In these days of keen competition, when the majority of buyers are too much influenced in their choice by the quality they call liveliness, the medical man may rest assured that no maker markets a car with more material in it and with a less powerful engine than his exhaustive tests have shown him to be necessary.

THE ALTERNATIVES.

It will be observed as a rule, moreover, that all these seductive receipts for faking light cars are concerned with paring away the material furnished by the maker in the standard products. Thus, the engine itself is made to produce more power with less material to stand the strains of the greater impulses.

As many a medical man lives in hilly districts the temptation to succumb to what is almost becoming a vogue may be considerable. If, however, in spite of the extra cost in tyres involved, he wants to negotiate the rises more speedily there are open to him two alternatives: He may either spend his money in acquiring in the original instance a larger and more powerful vehicle which he will run on strictly standardized conditions, or ferret about and discover which maker or agent can give him one or other of the light cars that have been produced for speed and other competitions, and the more vital parts of which are fashioned of special steels, tested to stand the additional stresses. The latter alternative, however, is not to be recommended unless the medical man chances to make a hobby of the mechanism of his car, in that the more these vehicles depart from the strictly standard product the more liable are the details of them to get out of adjustment; and the results sought can be attained only when every detail is perfectly in tune with the rest.

A POCKET-SAVING LESSON FROM ABROAD.

Nearly every private advocate of the practice of "putting more ginger" into his light car innocently believes himself to have discovered things of which the industry is in complete ignorance, whereas the very practices he exploits have been indulged in since motors were. Far better, because more profitable in every way, is it to take thought as to the manner in which you drive your light car. There is a great contrast between motor drivers of all classes of vehicles in this country and the French, Italians, and Americans, for example. In these islands we have made a fetish of the idea of doing as much of our journeying as possible on the top speed. If the average owner had the least realization of the manner in which he strains his vehicle by doing this and the slower speed he really makes by hanging on to the top gear to the last gasp of the engine, he would cease the practice. Every foreign driver, whether professional or amateur, is taught that engine revolutions represent horse-power; consequently he always changes down to a lower speed when his engine begins to slow and before it has lost any appreciable number of revolutions.

Moreover, any one who had time and opportunity to study the car testers round about Coventry and Birmingham would observe that, though the average of those concerned with light cars certainly seem bent on destroying the chassis before they have any chance of being placed on the market, nevertheless, they are never guilty of attempting to make an engine of 1,000 or 1,500 c.c.m. travel at 5 miles an hour on top gear, or pick up on top at practically no miles an hour after rounding a corner. On the contrary, whenever they want the car to accelerate after it has been

slowed, they drop into a lower speed and open the throttle fully for a few yards. That way the engine, transmission, and all the rest of the mechanism is saved, and also the speed at which it is desired to travel is attained much more quickly than by hanging on to the top gear.

THE EVERYTHING-AT-ONCE POLICY.

One of the troubles of the light car proposition to-day is the impatience not only of a large number of would-be owners, but also of a number of manufacturers. They want everything at once. Thus, before we have had reasonable time in which to complete to its full possibilities the development of the two-seater with an occasional third seat, four-seater light cars with tonneau bodies are already being standardized and coach-making departments blamed for not producing luxuriously-equipped limousine bodies for these chassis, with miniature engines. There would seem to be a mad race to put on the market a showy-looking vehicle for two hundred odd pounds, embodying all the features of a six-cylinder Rolls-Royce. Already the light car owner has electric lighting and generating sets standardized complete, and there have been introduced this year electric mechanical engine-starting sets for light cars.

Though all those developments admittedly add to the weight and absorb horse-power, one has to admit a case for the dependable mechanical starter for the light car, especially when employed for doctors' service. The reason is that the little magnetos fitted are designed so that at present they only give an efficient spark when the engine is turning very much faster than is possible by any hand cranking. This present difficulty is common to the majority of light cars. It could, of course, be obviated by employing dual ignition, taking the accumulator current from the batteries of the lighting set. Speaking of my own experience, however, I do not advise this under the heading of reliability.

MECHANICAL ENGINE STARTERS FOR LIGHT CARS.

The average medical man has occasion to stop his car very frequently, consequently if anybody should get value out of a mechanical starter, he is the one. I would therefore take as an illustration of the latest developments the electrical light car starter now standardized by the firm of C. A. Vandervell that made its mark in connexion with electric lighting sets for cars. Connected with the battery and the starter motor is a plunger switch. When the switch is in its normal position, the circuit is open and the starter is electrically disconnected from the battery. When the plunger switch is depressed or pushed down, the starting circuit is closed and current passes from the battery to the electric starter. The firm itself has facilities for fitting cars at short notice at its London, Birmingham, and Manchester premises, so that there need be no uncertainty of the thing being bungled by inexperienced installation.

In winter especially, and for night work, the mechanical engine starter is an accessory much to be recommended to the medical man, since few things are more fatiguing than the strains of winding an engine rapidly.

THE FOUR-SPEED LIGHT CAR.

But with motors thus taxed to carry extra loads and to generate the electrical energy necessary for starting and lighting purposes, and with increases of weight also in coach work, so that some light cars scale 14 cwt. ready for the road, either larger motors or more gears must be employed.

About the finest scheme of a light car that shall be well up to its work is the Coventry Premier 10.4-h.p. 4-cylinder model, wherein we see a recognition of these points, for, on the one hand, the engine is 65 mm. by 120, giving a volume of 1,592 c.c.m., and, on the other, the gear-box provides four forward speeds, so that there is nothing undue in the chassis weighing 12 cwt. War is unfortunately interfering with the output, and the car will not be ready for the market just yet, but the product must be noted as representing a notable line of development, because, in addition, the rear suspension is on the true cantilever principle, as distinct from quarter elliptic springs, which, by some mysterious process, are generally catalogued as cantilever ones when they are applied to

light cars. This design also reveals the possibility of making a light car wherein the seats are well between the axles, the wheelbase being proportionately as long and the centre of gravity as low as in a six-cylinder large car.

LONGER WHEELBASES THIS YEAR.

This brings us to another point in light car development this year. In the beginning the centre of gravity of most light cars was high and the track narrow—as instance the earlier Morris-Oxford models. By most makers this tendency has been remedied by widening the axles with a gain in lateral stability. But the average light car will probably have the seating line an inch or two lower in a season or so.

What is more important in the meantime is the observed tendency to lengthen the wheelbase in the 1915 models. In some this measures as much as 8 ft. 3 in. These longer wheelbases make for easier riding, and undoubtedly enable the machines to hold the road better. The standard wheelbase last year averaged 7 ft. 6 in., though many vehicles were made shorter, one well-known type being not more than 6 ft. 9 in. Thus the increase to an average wheelbase measurement of 8 ft. 3 in. represents an appreciable advance this year, though that extra 9 to 18 in. of course entails considerable addition of weight by reason of the frame, propeller-shaft, and kindred details having to be elongated. Undoubtedly the increased comfort and stability of the 1915 cars thoroughly justifies the departure.

A NEW MAKE OF LIGHT CAR.

A newcomer to the light car industry this year is one long familiar by name to road users in the Raleigh Cycle Company of Lenton, Nottingham, which made a tentative effort at motor manufacturing in the early days of the industry in this country, but whose present 11 h.p. four-cylinder vehicle really represents its start in the motor industry. This machine scales 13 cwt. complete, and has a block cast four-cylinder engine with a bore of 67 mm. and a piston travel of 95 mm., giving a volume of 1,340 c.cm., so that again we have an example of providing something not so highly stressed as an 1,100 c.cm. engine must be when used on vehicles so completely equipped as the best sorts of light cars. The Raleigh is standardized with Rotax dynamo and electric lighting set, the generating plant being protected from dust and wet by a shield. A Thomson-Bennett British-made magneto with fixed firing point is used, and the cooling is by the natural circulation of the water, but the engine oiling is by the big ends dipping into pump-fed troughs, the pistons and cylinders being supplied by splash. The gate-controlled gearbox gives three speeds forward, and the drive is by an overhead worm above the back axle, which is equipped with three-quarter elliptic springs.

THE BABY PEUGEOT LIMOUSINE.

A somewhat quaint light-car novelty is the Baby Peugeot miniature limousine-coupé, which has been designed and built by one of the agents of the famous firm of Peugeot (England) Limited, 10, Brompton Road, London, S.W., and is sold complete with accumulator lighting set and lamps for £250. The problem presented to the coachbuilder, of course, has consisted in how to give plenty of room to the passengers on so small a chassis; it has certainly been tackled with considerable ingenuity. All the windows, including three oval ones, are of plate glass, and the door is hinged in two halves, the window portion opening independent of the lower part. The interior can be lit up at night, the main colour scheme of its decoration being light brown, while the exterior of this limousine-in-little is painted mustard colour, with black wings and details.

Other light car developments will form the subject of a future article.

ACCORDING to the *Medical Record*, a recently issued bulletin of the Census Bureau states that blindness is less common in America than in most other countries, and is apparently decreasing among the young. Indians suffer much more than other races from the affliction, and blindness is much more prevalent among negroes than among whites, and among men than women. The blind population of the United States in 1910 numbered 57,272, or 62.3 to each 100,000 of population. Trades taught in schools or workshops have prepared 1,500 blind persons for total or partial self-support.

BRITISH DENTAL ASSOCIATION.

ANNUAL MEETING.

THE thirty-fifth annual meeting was held on July 24th, in the hall of the Medical Society of London.

Retiring President's Address.

In delivering his valedictory address, the retiring President (Mr. W. GUY, F.R.C.S., L.D.S. Edin.) said the war had given the dental profession the chance of rendering splendid service to the country in the treatment of recruits and soldiers, and an enormous amount of work was done in that way. In the matter of army dental treatment, however, the war found them unprovided with a definite scheme, and emergency measures became necessary. Commissions as temporary lieutenants were conferred on about seventy dentists, who were now doing duty either with the Expeditionary Forces or at home stations. The War Office circular of January 22nd authorised a scale of payment for civilian dentists in providing treatment necessary to render a non-commissioned officer or man fit for service in the field. He believed the work of the army dentists was of the most arduous character, and the authorities were fully aware of its value. But what were seventy amongst so many? The present system might be improved by instituting effective control and supervision by dental staff officers, but the only logical and efficient method of coping with the great problem of dental treatment for the men of our armies would be found in the establishment of an army dental corps. In conclusion, Mr. Guy paid a tribute to the memory of five dentists and two dental students who had already fallen at the front. He also mentioned that he had personally operated on more than 1,000 patients at the 1st Scottish General Hospital, Craigleith, and considerably more than double that number had passed through his hands at the Edinburgh Dental Hospital.

A hearty vote of thanks was passed to the retiring president, on the motion of Mr. REES PRICE (formerly of Glasgow), seconded by Mr. W. G. CAMPBELL (of Dundee).

Installation of New President.

Mr. W. H. DOLAMORE, M.R.C.S., L.R.C.P., L.D.S. Eng., was then inducted as president, and delivered an address, in which he said that never, perhaps, had the disasters which may follow the neglect of teeth been more apparent than now. It needed but an inspection of the teeth of many soldiers invalided home to prove what an important factor neglected teeth were in producing or predisposing to the development of general disease. It was no secret that the army authorities first refused men with bad teeth. When the need of men and more men was felt, these were admitted irrespective of the condition of their teeth. But, having been admitted, it was found that either their teeth must be treated or these men would not be available for foreign service. It was the recognition of the lamentable condition of the teeth which led dentists in the early days of last August to offer voluntarily to do what they could for our gallant men, both in our hospitals and in their own consulting rooms. But the task was too great for efficiency unless properly co-ordinated, and with greater financial backing than they could give or procure. Tardily the War Office undertook the work. But the delay, some four or five months, caused, he was told, this serious position: Troops, passed as fit some months earlier, were paraded and inspected previous to foreign service. Then, and not till then, it was discovered that many men needed dental treatment. Now arose this difficulty: Either the work had to be done in a hurry, and frequently dentures inserted long before the mouth had healed sufficiently for them to be serviceable even for a year, or the men had to be kept back at home for some three or four months. Further, the War Office having recognized the obligation to provide dental treatment in the interest of efficiency, it was a matter of regret that it did not appoint a committee, on which dentists conversant with the matter had a seat, to advise, and to supervise the carrying out of the arrangements.

He believed that if there were such a committee, two points especially would have come early under discussion. First, the need of effective supervision over the dental