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AUTOMOBILE AND DOCTOR.

PHYSICIANS have naturally been very much interested in the evolution of self-propelled vehicles, for the ideal wagon should possess just those qualifications which are demanded in their work, viz., speed, endurance, ease of control and trustworthiness. The progress of invention and improvement, lately rearoused by the application of hydrocarbon motors to the propulsion of wagons, has been very rapid, and there are now on the market machines capable of doing more than 40 miles per hour on ordinary roads, and of maintaining that speed for hundreds of miles (barring accidents); but they are, at best, vehicles of pleasure, and not of work, because they lack the most important requisite of all, trustworthiness.

The development of automobiles has been along three main lines: hydrocarbon or naphtha, steam and electricity. The first class depend for their motive power upon explosions of confined vapor of naphtha mixed with air. There is little danger attending their operation. They are capable of attaining great speed (40 miles per hour and over); they will run 75 miles on one charge of fuel, which may be easily and quickly replaced at nearly any country store; they may be safely left for any length of time, and are ready to start at once. On the other hand, they are heavy and cumbersome (1,000 to 2,000 pounds), due to the necessary weight of the machinery, which

is at the same time very delicate in certain parts, requiring constant attention to keep it in working order. The motor must be started by hand, does not deliver its power regularly, is liable to stop for no discernible reason, and climbs steep hills with difficulty, or not at all. Complete combustion is not attained, and a very disagreeable odor results, while the machinery is noisy to such an extent that these carriages receive the popular name of "threshing machines." The minor objections might be endured, were it not that the action of the machine cannot be depended upon, and extreme cold seriously interferes with its use.

The steam machine is probably the most practical on the market for all round work. It has some advantages possessed by no other form of automobile. It is light (600 to 1,000 pounds), and yet has power to climb the steepest hills; it is easily controlled, starts instantly, has a strong, steady pulling power, and develops speed rapidly. It carries fuel sufficient for 50 or 60 miles on ordinary roads, and water enough for 20 miles, both of which are easily and conveniently replaced. But the running of a steam carriage is likely to prove unsatisfactory to one who is not a mechanic or skilled engineer. The machinery is that of a miniature locomotive, complicated and delicate, and demands constant attention of a technical character to get even fair results. The boiler needs constant watching to prevent its getting empty and causing burning out of the tubes, which means expensive repairs. The pump is liable to stop working at the most unexpected and inopportune times, meaning a delay to use the hand pump or the risk of a "burned" boiler. Unless care is used in the selection of water there is danger of "foaming," and consequent injury to the boiler. Cold or wind seriously interferes with steam making, and zero weather is apt to be accompanied by frozen pipes, even the safety valve and steam gauge not being exempt. If, when the carriage is left standing, the fire is turned out there is considerable trouble in starting should the steam get below a certain pressure, while if the fire is allowed to burn the steam escapes at short intervals with much noise. The running gear and engine, particularly the wearing parts, are altogether too light, in all the wagons now made, to stand the strain of the ordinary road.

Many of the drawbacks may be overcome, but it will always remain a locomotive, and the more automatic attachments that are added the more complicated and dangerous it becomes.

In many ways the electric vehicles approach nearer to the ideal. They are quiet, clean, easily controlled, may be left indefinitely, and are ready to start at a turn of the lever; nor is there any danger connected with running them. Nothing could be better for the use of the physician but for two defects, that so far have proved insurmountable: First, the great weight necessitated by the storage battery and motor, bringing the total up to 1,200 or 2,500 pounds, which diminishes to a large degree their effectiveness in hill climbing and on muddy roads. Second, the comparatively small radius of action. Forty-five miles is the greatest distance claimed at present, and that is only made on perfectly smooth and level roads. In going around New York, 35 miles on one charge is all that can be expected, and outside the city a much lower average. Considerable time (three to eight hours) and convenient and expensive mechanism are required for recharging.

Many of the defects noted would be sharply contested by the manufacturers of the various vehicles, but they are, nevertheless, facts, and have been proven by the users of automobiles. We are therefore forced to the conclusion that, at present, for use outside the city, for long drives, and to take the place of an extra team, the naphtha or steam machines may be useful, but for routine work they are too uncertain, and require too much care. The same objections must largely preclude their use in the city. With electric vehicles the great weight and contracted range of action are fatal to their use in the country, while in the city their defects are not of as much importance, and are largely overborne by their many advantages.