has often been a source of trouble both to the card maker and to the cotton spinner.

"We now come to the different sections of wire in use at the present time, of which round is the most common. All the attempts that have been made to improve upon this wire have been with the object of producing finer carding points and to increase the space between the teeth without lessening the number of points. This was by what is known as 'flat to bend wire,' introduced in the year 1873. One reason why this wire has not been more successful is, I believe, because of the difficulty of producing it satisfactorily. If it had been produced with the desired uniformity it would have been a far greater success. Next comes angular and tolled double-convex wire. With these, as with flat to bend wire, the ideal has not been attained. Angular wire, when properly produced presents a sharp point to the cotton, but this is about the only merit it posseses. In regard to the rolled doubleconvex, there are many disadvantages in its production. Some time ago I was consulted by an established firm of card-clothing manufacturers in reference to the difficulties there are in producing it. Their workmen were unable to make it satisfactorily, much unpleasantness being caused. My own experience leads me to say that it is very difficult, and I may say almost impossible, to insert the teeth into the foundation and put an angle to the wire so as to present a parallel point to the working face of the card. I find, also, that the two thin, outer edges of this wire are often rough and serrated, this being caused, I believe, by the process of hardening and tempering, as these thin, outer edges receive more heat than the body of the wire, it being much thicker. Another probable cause is that the slightest variation in the thickness of the wire causes it to overlap in passing through the rollers, and is thus the means of roughening the surface of the wire. This roughness must certainly prevent it from carding and stripping properly.

"Next we come to what has been the subject of much controversy, namely, plow or side-ground wire. The reason why it is called plow ground wire is because small plows precede the emery disks, to keep the various rows of teeth apart. It was first introduced by Ashworth Brothers, of Manchester. As I have already stated, this has been the subject of much controversy, which is still going on. It is a well-known fact that the system of passing the emery disks through the various rows of teeth in the card clothing produces a rough surface upon the tooth, which is very injurious to the delicate cotton fibers. The experience of most cotton spinners confirms this; but, apart from the serrations upon the sides of the teeth caused by grinding through the surface of the wire, there are many other objections. Most of you will be aware that during the process of grinding, the card is traversed at a very slow speed, while the emery disks which follow the plows between each row of teeth revolve at a very high velocity; the result of this being that the wire becomes heated and loses a portion of the temper, and the resisting power is considerably weakened. Another objection is that in order to enlarge the space between the teeth the best portion of the wire has to be ground away.

Again, as a consequence of plow and side grinding, burnishing has to be resorted to, in order to modify the mischief done by the emery disks; and it is no uncommon thing to go into the card room and find that the burnishing process has been going on for a year or two in order to obtain decent stripping. So it may be concluded from these facts that plow or side-ground wire has not yet reached that state of perfection that many of its advocates claim to be possible. The investigations that were published in 1892 by Sir Benjamin Dobson go far to prove these points clearly. In his book upon the ' Principles of Carding,' page 48, he says that 'the inevitable conclusion that will be drawn from a very careful inspection of these plates is, that in all side-ground wire there is a very large amount of surface asperity capable of injuring the delicate wax walls of the fibers.' But, perhaps, some may say that he has changed his opinion since that time. That may be so, but it does not necessarily follow that this is not correct, for we must remember that the illustrations then used were taken from specimens of card wire obtained from all the principal makers of card clothing.

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" In concluding my remarks upon this class of wire, I may say that, apart from all the objections that have already been mentioned, rough or side grinding is at the best a very precarious operation, as during it the teeth are often damaged and completely cut off. Not long ago, along with another gentleman, I paid a visit to a firm to inspect a machine that had only been a few months in use, and which the inventor claimed to be a great improvement upon all previously introduced. Upon our arrival we were taken into the grinding room, where all had been specially prepared for our visit. After a full explanation as to how the machine worked, it was set in motion, but it had not been going long before it damaged the card by cutting the wires off in all directions, to the complete discomfiture of the inventor. This only confirmed what my experience had previously proved to me, that there was something superior to plow or side-ground wire needed. Perhaps some may ask at this stage what class of wire I myself recommend as the best. My answer to this question would be, that I consider round wire double convex to bend to be the best for all cotton and worsted fibers. My principal reasons for this are as follows: First, because it is free from striation, which must inevitably accompany side grinding, secondly, because the surface of the wire not being broken into by grinding, there is no necessity for burnishing. For the same reason it will strip all the more easily. Again, as it is admitted that all side-ground wire damages or weakens the yarn, I contend that wire double convex to the bend, being free from the objections of side ground wire, will produce a stronger and better yarn. And lastly, this wire, being compressed upon the working parts, gives it a greater amount of resisting power and durability. In conclusion, I may say it is of the utmost importance to have a suitable angle for the different cards upon the carding engines. It is a fact that a great amount of card wire is broken and good carding lost for the want of sufficient attention to this important matter."

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