cussions of great intensity, prove the greatest source of destruction to all kinds of metal. The more uniform and dense the iron is, in its grain or fibre, the greater will be its durability. Good wire is a very safe and reliable material, where great strains and vibrations are to be supported. Wire rope on inclined planes, where it is exposed to severe usage, and to an almost incalculable amount of vibration, lasts but a limited time. Its durability, however, will be found in direct proportion to the speed of its working, and to the consequent degree of vibration. Wire ropes of one and a quarter inch diameter, on such inclined planes as those of the Alleghany Portage, in Pennsylvania, where there is a speed maintained, of 7 to 12 miles an hour, and where the machinery is very imperfect, and always out of repair, will not last longer than 1½ to 2 years, and will pass about 300,000 tons, gross weight, over planes of half a mile in length, and rising one in ten. Ropes of less size, will perform five times the business, on the planes of the Pennsylvania Coal Company, and on the inclines of the Carbondale road, because treatment and machinery are so much better. Those in use on the inclined planes of the Morris Canal, are two inches diameter; draw loads of 100 tons, over inclinations of one in twelve, at a speed of 5 miles an hour, and last, in consequence of perfect machinery and good usage, seven to eight years. I mention these facts, to show conclusively, that the durability of wire rope and cables, is in proportion to usage. The same rope will last much longer under a heavy strain, moving slowly, than it will under a light strain, moving faster. Of this fact, I have the most ample evidence. I have cited the expe-