oped piston drills and the ordinate is the rate advanced in feet per week shown. As we developed slowly, about 1860 when drills and dynamite first came in, 1867, specifically, we could advance about 20 feet of mining a week on a three-shift basis. Then we developed the locomotive for carrying away the muck, and developed hammer drills, mechanical loaders, and multiple hole drilling. We developed the tungsten carbide bits and at the same time we could drill faster. We learned the fact that if you drill a particular pattern of drill holes, explosives were much more effective. Until today, 1967, by this technique, drilling and blasting, we can progress about 250 feet per week, a factor of more than 10 over this period of roughly 125 years.

Now, with this tunneling machine, with the appropriate kind of soft rock, can go about 375 feet a week, which is up in here. If we permit this technology to evolve in the way it has in the past, we could expect to attain something like 750 feet per week by 1982. For example, the boring machine was developed for a specific job in New Mexico. I saw the manufacturer's representative in Pittsburgh last week. I asked them what improvements had been made in the last 6 months. They said none. I said why. They said because we have not had any contracts for purchasing advanced equipment. You do have to have contracts for development. Their research and development is very small otherwise and the development will be only as fast as they have contracts to stimulate them.

For example, in the 25 miles of subway scheduled for the District, no consideration is being given to this type tunneling device. The