The plant engineer's office is in this building. He stated there is very little main-duct cable under 400 pairs run underground. This is subscribers' and not trunk cable. The gauge is No. 22 B. and S., weighing about 9½ lb. a single mile, and having a resistance of about 190 ohms per loop mile. The exchanges are not far apart and the subscribers' loops are short. Trunk cables are No. 19 B. and S. loop, resistance about 90 ohms, capacity about 0·08 mutual. The lead sheath is about 125 mils. thick; 3 per cent. tin is used in the sheath to harden it so that it will better endure drawing and bending. Draws vary from 300 ft. to 500 ft., according to road requirements. Aerial cable is the same thickness and quality of lead as the underground. It is suspended by marlin, or by metal rings, heavily galvanized, placed about 2 ft. apart. When using the rings there is no noticeable action between the lead and the rings, and the lead is not affected by chafe in any way. This method is in use a good deal throughout the States by the Bell Companies, and is generally stated to be an improvement on former methods of suspension. There is not found to be much trouble from aerial or other cable. Still, faults occur. There is no air-drying apparatus used, and this method was not seen anywhere in the United States. The exchange employees localize, find the spot where the fault is, repair, and dry out with a brazier and with hot paraffin.

Distributing in blocks is often done by running cable underground to the edge of the block, and even into it, and then passing *unprotected* along the fences with reducing lead cables to the various spots. Faults occur in these unprotected cables, but it was a matter for consideration whether it was not more economical to take a few faults and attend to them as they arose than to expend considerable money for protection which might be unnecessary in most of the places where such cable was run. It is considered better to attend to faults as they occur, and experience shows they are not burdensome. The Automatic Company, in San Francisco, does the same thing, and it was noticed also in other places. No attempt is made to keep ducts or manholes watertight. Cables are often quite immersed owing to wet spells and manholes taking in water. The manholes sometimes have holes made in their top to aid or serve as ventilation for gases. It was remarked that if cables were drawn into ducts during a dry spell, and wet weather then came on, faults showed in the cables. To avoid this special care was taken in drawing the cables. The duct was preferred wet, as any weakness in the cable would be observed before it got into service, and it has not been found that acids or alkalies from the streets are troublesome. They are too diluted to injure. Ducts are mostly earthenware multiple type. There is no fall for drainage necessarily arranged for; the ducts may be on a dead level. Small surface roughnesses do not injure the cable. They may score it a little, but it is found to be of no consequence in practice. Sometimes, if the alignment of the duct is bad, the edge of one duct may fit badly to another and there may be a little drag. Even this is not a serious matter. Creosoted wood is now being used, laid direct in the ground, and is said to serve well. There is no sign of attack of the lead by acetic acid. This is cheap and satisfactory. Ducts have usually 3½ in. clear opening. Iron pipes have been and still are used where their use is cheaper than considerable excavation for other purposes. A close record is kept of the position, the depth, and the general relations of the ducts to the service and to impediments in their line of run.

Manholes are mostly of moulded concrete. They are of different sizes, but large ones are about 6 ft. or 7 ft. by 3 ft. 6 in. and about 5 ft. headroom. They are kept as close to the surface as possible, as digging costs money. For extending to the subscribers from poles the company uses twin copper-clad steel wire, about No. 17, rubber-insulated and braided. This is mechanically strong and light. Formerly No. 14 copper wire, insulated, was used.

There are submarine cables across the harbour to Oaklands. These are lead-covered paper-insulated cables, armoured with steel wires. One has seventy-eight pairs, others have twenty-eight pairs and seven pairs, making in all 140 pairs. These cables are fitted with loading-coils about half-way across at Goat Island. The seventy-eight pairs have some No. 13 and some No. 19 B. and S. gauge. They are not suitable for duplexing over. The No. 19 pairs are used to Oaklands and the heavier No. 13 are for reaching the long-distance aerial wires coming from the north to that side of the bay. The loading-coils are about 1,000 ft. out of the correct place for theoretically best results, but practically it does not make much difference, if any, in working. The distance to Oaklands is eight miles, but the cable is only four.

Between exchanges in the city, trunk cables are run containing No. 19 B. and S. pairs or 90-ohm loops. This secures that subscribers with 22-gauge wire when joined through trunks to "long distance" will have a good speaking circuit. Some of these distances require 4,300, 10,000, and 11,000 odd feet of underground trunk wires. The plant engineer at the time of our interview was planning on paper a scheme for a forty-pair line, the phantoms of which were to be transposed. Only some of these were to be brought into early use, but the whole scheme was to be laid out, and if variation became necessary in time revision would take place.

There were sixty men in the drafting-office dealing with such studies, and planning and recording. Everything goes on to plans as far as possible. A study is made of every block: the kind of house, the vacant sections, all go down. The expected growth in a certain period is considered, and in estimating underground duct and cable, and in determining upon sites for new exchanges, all the circumstances become factors to be reckoned with. Plans are made of the city, or of portions of it. As the constructing party erects poles or removes them, or runs underground work, particulars are taken, handed in, and all are recorded. Boxes at street-corners have their special features noted on the plan by some mark which has a special meaning. Details are sometimes entered in books, and information is tabulated so that the rough notes can be destroyed. Pole sizes are indicated in various ways by marks. Everything is organized, which makes for ease of reference and reduction of work ultimately. Four men are dealing only with the question of way-leaves. All this is typical of what is being done by other telephone companies, and implies staff to take care of so much detail.