Oxidized ores containing silver-chloride and lead minerals may be lixiviated after crushing, and the tailings may be concentrated for lead. In this case wet concentration would be the most suitable. This has been done at the Old Telegraph Mine, Utah, but the preference to dry concentration is given in all cases which require that concentration should precede lixiviation.

"The Russell process is also adopted to the treatment of tailings resulting from ores which have been worked either by the old lixiviation process or by amalgamation. Whether it is most profitable to lixiviate an ore raw, or after chloridizing-roasting must be determined in each case by actual experiment. Should an ore be deficient in sulphurets, it may become necessary to mix it with pyritic-ores, in order to obtain high chlorination in roasting. Oxidized ores containing manganese may be entirely free from sulphurets, and give high chlorinations in roasting without the admixture of pyritic-ores.

"The operations preceding the lixiviation process—namely, crushing, or crushing and roasting the ore—do not concern us here, since they are almost identically the same as those preceding the well-known treatment by amalgamation. It is necessary to say, however, that in every instance the crushing should be done dry, even in case the ore is lixiviated raw. The size and number of the screen through which the crushed ore should be made to pass, in order to lixiviate with most economical results, can only be determined by a practical test in each individual case, since it depends on the character of the ore. A No. 10 wire-screen may generally be considered the limit of coarseness. In most cases a No. 16 or 20 screen will be used to best advantage, especially if the ore has to be roasted, and a screen of No. 30 mesh will rarely be needed. These numbers represent the number of meshes per linear inch.

"In roasting ores, those furnaces should be used in which the dust collected in the chamber is well chloridized. The Stetefeldt furnace is known to give the most perfect results in that respect. In case the dust remains raw, the proportion of silver extracted is not only diminished for chemical reasons, but the mechanical difficulties in lixiviating fine material are also increased in proportion to the imperfection of its roasting. In the following it is proposed to treat in detail the plant, the chemicals and solutions, and the manipulations peculiar to the Russell process:—

"*The Plant.*—Although the Russell process does not differ materially from that used in the old lixiviation process, it is essential to describe what has been approved by the latest practical experience. The plant consists of lixiviation-vats; tanks for storage and manufacture of solutions, and for the precipitation of metals, pipes, injectors, and pumps for conveying solutions; a filter-press, for collecting precipitates and a refinery for the treatment of the sulphides.

"*Lixiviation-vats, Storage-tanks, &c.*—Dimensions to be recommended for lixiviation-vats, and suitable in most cases, are: Inside diameter, 14ft.; inside height, 6ft. 6in. if the tailings are removed by sluicing, and 5ft. if they are shovelled; thickness of staves and battens, 3in. The sides are made straight, and the best material for their construction found in America is Californian white cedar. The staves should be ordered cut to sweep of vat and 9in. longer than the inside height, but not gained for the bottom. The latter should be without dowle-pins, and cut to a diameter 2in. greater than that of the finished vat. The gaining of the staves 1in. deep is done by hand, leaving a chime of 6in. below the bottom. The bottom pieces are grooved and joined by a tongue $\frac{5}{8}$in. by 1$\frac{1}{2}$in. All joints of staves and bottom must be filled with precision, and are finally put together with a thick coat of white-lead. These precautions are imperative to obtain air-tight vats, so that the Korting ejectors may be used with effect. There are five hoops to each vat, made of 1in. round iron with screwed ends, which pass through cast-iron lugs and are tightened by hexagonal nuts.

"In constructing the storage-tanks for solution, the precipitating-tanks, and the sumps for the filter-press and pump, the directions given above should also be followed. The exact dimensions of these tanks are not of much importance, but the following recommendations are made: Storage- and precipitating-tanks, 10ft. in diameter and 8ft. 6in. high inside; tank for extra solution should be about 500 cubic feet capacity, and sumps for filter-press and pump about 250 cubic feet of capacity each; but the filter-press sump should not be deeper than 4ft.

"*Tank for Sodium-sulphide and Soda-ash.*—The tanks for the manufacture and the storage of the sodium-sulphide solution are made of $\frac{3}{16}$in. boiler-plate. The manufacturing-tank may be 6ft. high by 3ft. 6in. in diameter. The dimensions of the storage-tanks are not essential, but they should have a capacity of about 90 to 100 cubic feet in each. The same also applies to the soda-ash tanks.

"*Filter-press and Pumps.*—For filter-press, Johnson's, of 15in. diameter, is recommended, with twenty-four chambers, six 2in. distance-rings, and one dummy-plate. The chambers are of cast iron, and covered with asphaltum varnish. The force-pump attached to the filter-press should be of iron, lined with hard lead. The brass pump ordinarily sold with a 15in. press is too light and small, and the brass wears out in contact with the solution. The pump for raising the solution into the storage-tank is a plunger pump made of iron and lined with hard lead. Its capacity should be larger than the maximum quantity of solution circulated, so that the pump may not need to run continuously, and time may be left for repairs.

"*Pipes, Valves, and Troughs.*—Hard rubber is the best and, in the end, the cheapest material for all pipes, valves, and cocks that convey or come in contact with the lixiviation solution, and lead is the next best material. Iron or brass valves become useless very soon; but iron pipes may be protected by dipping them into hot asphaltum varnish. For sodium-sulphide and ash-solutions iron pipes are generally used. Troughs for conveying and distributing solutions are made of wood, and painted inside and outside with asphaltum varnish.

"*Korting Injector.*—The modification of the Korting injector, which acts in this case as an ejector, and is attached to the vats to hasten the filtering in lixiviation, is known as the acid siphon-pump. It is lead-lined, and provided with a platinum steam-nozzle. Size 1 is to be used.

"*Fitting up the Lixiviating Plant.*—Each of the storage-tanks and the extra-solution tank are provided, for heating the lixiviation solutions, with a coil of 1in. lead-pipe about 70ft. long, placed 3in. or 4in. above the bottom and connected with a steam-pipe. The storage-tanks are connected