and the blower reasonably near the battery of pots, the total requirement is 21 h.p. The cost of converting will be approximately as follows:—

Labor: 3 foremen at $3.20. ..	$9.60
9 men at $2.50..	22.50
Power: 21 h.p. at 30c.	6.30
Supplies, repairs and renewals..	5.00
Total..	$43.40=60c per ton of charge

The cost of converting is, of course, reduced directly as the time is reduced. The above estimate is based on unfavorable conditions as to time required for working a charge.

The total cost of treatment from the initial stage to the delivery of the desulphurized ore to the blast-furnaces, will be, per 2,000 lbs. of charge, approximately as follows:—

Crushing, 1.0 ton at 10c..	$0.10
Mixing, 1.0 ton at 10c..	0.10
Roasting, 1.0 ton at 63c..	0.63
Delivering, 1.1 ton to converters at 12c..	0.13
Converting, 1.1 ton at 60c..	0.66
Breaking, 0.9 ton at 60c..	0.54
Total	$2.15

The cost per ton of ore will be $216÷80=$2.70. Making allowance for the crushing of the ore, which is not ordinarily included in the cost of roasting, and possibly some overestimates, it appears that the cost of desulphurization by this method, under the conditions assumed in this paper, is rather higher than in good practice with ordinary hand-worked furnaces, but it is evident that the cost can be reduced to approximately the same figure by introduction of improvements, as, for example, in breaking the desulphurized ore, and by shortening the time of converting, which is possible in the case of favorable ores. The chief advantage, however, must be in the further stage of the smelting. As to this, there is the evidence that the Broken Hill Proprietary Co., after the introduction of the Huntington-Heberlein process, was able to smelt the same quantity of ore in seven furnaces that formerly required thirteen. A similar experience is reported at Friedrichshutte. Silesia.

This increase in the capacity of the blast-furnace is due to three things: (1) In delivering to the furnace a charge containing a reduced percentage of fine ore, the speed of the furnace is increased, *i.e.*, more tons of ore can be smelted per sq. ft. of hearth-area. (2) There is less roasted matte to go into the charge. (3) Under some conditions the percentage of lead in the charge can be increased, reducing the quantity of gangue that must be fluxed.

It is difficult to generalize the economy that is effected in the blast-furnace process, since this must necessarily vary within wide limits because of the difference in conditions. An increase of from 60 to 100 per cent. in blast-furnace capacity does not imply a corresponding reduction in the cost of smelting. The fuel-consumption per ton of ore remains the same. There is saving in the power requirements, because the smelting can be done with a lower blast-pressure; also, a saving in the cost of reworking matte. Moreover, there will be a saving in other labor, in so far as portions thereof are not already performed at the minimum cost per ton. The net result under American conditions of silver-lead smelting can be determined closely only by extensive operations. That there will be an important saving, however, there is no doubt.

The cost of smelting a ton of charge at Denver and Pueblo, exclusive of roasting and general expense, is about $2.50, of which about $0.84 is for coke and $1.66 for labor, power and supplies. General expense amounts to about $0.16 additional. If it should prove possible to smelt in a given plant 50 per cent. more ore than at present without increase in the total expense, except for coke, the saving per ton of charge would be 70c. That is not to be expected, but the half of it would be a satisfactory improvement. With respect to sulphur in the charge, the cost is commonly reckoned at 25c. per unit. As compared with a charge containing 2 per cent. of sulphur there would be a saving rising toward 50c. per ton as the maximum. It is reasonable, therefore, to reckon a possible saving of 75c per ton of charge in silver-lead smelting, no saving in the cost of roasting, and an increase of about 3 per cent. in the extraction of lead, and perhaps 1 per cent. in the extraction of silver, as the net results of the application of the Huntington-Heberlein process in American silver-lead smelting.

On a charge averaging 12 per cent. of lead and 33 oz. of silver per ton, an increase of 3 per cent. in the extraction of lead, and 1 per cent. in the extraction of silver would correspond to 25c and 35c respectively, reckoning lead at 3.5c per lb., and silver at 60c per oz. In this, however, it is assumed that all lead-bearing ores will be desulphurized by this process, which practically will hardly be the case. A good deal of pyrites, containing only a little lead, will doubtless continue to be roasted in Bruckner cylinders, and other mechanical furnaces, which are better adapted to the purpose than are the lime-roasting pots. Moreover, a certain proportion of high-grade lead-ore, which is now smelted raw, will be desulphurized outside of the furnace, at additional expense. It is comparatively simple to estimate the probable benefit of the Huntington-Heberlein process in the case of smelting-works which treat principally a single class of ore, but in such works as those in Colorado and Utah, which treat a wide variety of ores, we must anticipate a combination process, and await results of experience to determine just how it will work out. It should be remarked, moreover, that my estimates do not take into account the royalty on the process, which is an actual debit, whether it be paid on a tonnage-basis or be commuted in the form of a lump sum for the license to its use.