

## ELECTRICAL FIXATION OF AERIAL NITROGEN.

By J. ORCHISTON, M.I.E.E., Wellington.

In a summary of a report by Dr. T. H. Norton on the proposed manufacture of nitrogen from the air in the United States, given by the *Electrical Review*, the authority named is quoted as stating, "All the fixation processes at present in industrial use are likely to remain so, and to extend in application according to local circumstances. Further progress will be made, but the general problem of fixing nitrogen from that inexhaustible reservoir the atmosphere is already solved, and the supremacy of synthetic manufacture over natural supplies of nitrate is already asserted. . . . The pre-war cost of producing 100-per-cent. nitric acid from Chile saltpetre was about £22 10s. The cost of production by the electric arc depends chiefly upon the cost of energy. The new Rankin arc process is reported to give 33 per cent. higher yield than the Norwegian furnaces for equal energy-expenditure. If this claim be justified the furnace has great possibilities, especially in the western parts of the United States of America, where energy costs as little as £1 11s. per horse-power year. The cost of the Ostwald process for oxidizing ammonia is given as £2 10s. per ton of 100-per-cent. nitric acid (including 17s. 6d. for liberating ammonia from cyanamide and concentrating 52-per-cent. nitric acid). The cost of production of 100-per-cent. nitric acid made by various methods may therefore be summarized as follows:—

	Electrical Energy per Horse-power Year.	100 per Cent. Nitric Acid per Ton (British).	
		£	s.
From Chile saltpetre (at 1914 rates) .. ..	.. ..	22	10
Birkeland-Eyde arc process .. ..	2 5	13	3
Rankin arc process .. ..	1 11	10	11
By oxidizing ammonia (from cyanamide)—	.. ..	..	..
(a.) Ammonia at £35 per ton .. ..	2 5	14	17
(b.) " " " " .. ..	1 11	13	8
(c.) Ammonia at £23 6s. per ton .. ..	1 11	10	14

The *Electrical Review* adds, "Overpopulation of the world—a contingency which has troubled many people, however unnecessary—is practically impossible now that unlimited quantities of atmospheric nitrogen can be fixed to meet the needs of intensive agriculture. An abundant supply of synthetic nitrogen compounds, made within our own frontiers, means an assured supply of explosives and security against starvation in war-time. Heavier crops may be obtained with less labour where nitrogenous fertilizers are used liberally. Finally, a national nitrate industry provides profitable investment for capital and labour, benefits industry and agriculture by its products, and