

jections contain, no doubt, at least a germ of truth, and it is well that they should be raised in order that any possible contingencies may be combatted before they actually arise. The Institute's chief claim to recognition, its power for good, is on the score of nationalism. As a national organization it is in a position to accomplish what would be otherwise impossible. This should be, and of course is recognized by every member, whether he belongs or not to a branch organization. The principle is precisely the same as that which governs the world by maintaining the individuality of nations. The branch, as such, is a small organization within a larger one, and its main function is comparable to that of a colony in its relation to an empire of which it is an integral part. Branches were originally established to meet conditions peculiar to this country. The centres of mining activity in Canada are widely scattered, and

spread across a continent. It was realized that a great majority of members could not, by reason of these great distances, attend meetings; that it was difficult to keep in touch with them from headquarters, and that consequently they were apt to become indifferent to the Institute, or lose interest in it altogether. The only feasible way to overcome these difficulties was to create enthusiasm by local organizations, and by providing machinery whereby men residing in the same locality might meet as members of the Institute in common cause. It was in no wise intended that these local branches should become more than this. So far, the plan has proved most effective; but nowhere as at Cobalt, thanks in part to the naturally favourable conditions and environment, but more especially to the enthusiasm, notably that of the secretary, Mr. Cole, of the men who have taken a prominent part in the organization and administration of the branch.

THE DEVELOPMENT OF HEAVY GRAVITATION STAMPS.

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The history of ore crushing by means of gravitation stamps shows a progressive increase in their weight and in corresponding efficiency. This holds good in the development from the square wooden non-rotating stamps in use in Germany in the Middle Ages¹ to iron-shod wooden stamps in Cornwall, and then to rotary iron stamps in South Africa. The latter have greatly improved during the last few years, and probably represent the highest existing stage of development. About 1835, the first stamp mill in the United States was started at Tellurium, Virginia.² The stamps weighed 50 lb., and were made of square wooden stems with iron shoes and dies, the cams operating in slots in the stems.

Ten years later the Vaucluse Mine installed 380-lb. stamps, of which the head weighed 125 lb. When the first batteries were erected on the Rand over 20 years ago, Californian practice probably represented the highest state of the art, and was introduced upon these fields by J. S. Curtis, J. H. Hammond and other well-known Californian mining engineers.

To illustrate the type of battery in operation on the Rand in 1889, in which year the writer's experience of stamp-milling began, the following details may be given of the Du Prez Gold Mining Co.'s mill, premising that this was before the introduction of the cyanide process, and that concentrators, other than blanket-strakes and buddles, were not in common use.

The mill was erected in that year, and was of Sandycroft make, designed in accordance with the best Californian practice to date. It consisted of 20 stamps

weighing 900 lb. each when new, and was run at the rate of 90 7-in. drops per minute. The stamp duty was about 3 tons per 24 hours, using a screen of 900 meshes per sq. in.

By 1899 some progress had been made and 1,250-lb. stamps were in use at the Robinson Gold Mining Co. and elsewhere, though in Australia and the United States 900 lb. per stamp remained the almost universal maximum limit, and this remains true of the celebrated Homestake mills at the present time. At the Mount Morgan Gold Mining Co. (Westralia), in December, 1902, 30 stamps weighing 1,500 lb. each were erected. These were eclipsed, however, by the neighbouring Millionaire Gold Mining Co.'s battery of five stamps weighing 1,750 lb. each.³ The advance made on these small companies was not generally realized, and in 1907 few stamps dropping on the Witwatersrand weighed above 1,250 lb., with the exception of certain batteries of Consolidated Goldfields companies, as will be noted later.

In 1904, the author was authorized by Mr. R. M. Catlin, Acting Consulting Engineer of the Consolidated Goldfields, to carry out a series of milling tests at the Knights Deep battery, which was equipped with stamps weighing 1,350 lb. when new. The object of the trials was to discover some means whereby stamp-milling efficiency could be increased.

The initial experiments were made to test the effect of fine breaking before stamp-milling, and also whether the increased discharge area afforded by a double discharge mortar-box increased the stamp duty. A pair of rolls was installed to effect the preliminary fine breaking, and also a double discharge mortar-box. A

*Paper read before the Institution of Mining and Metallurgy.

¹ See Remarks by Bennett H. Brough, Proc. Inst. of Civil Eng., vol. cviii. (1892), during discussion upon paper by A. H. Curtis on "Gold Quartz Reduction."

² See Crane's "Gold and Silver," p. 473 et. seq.

³ See Special Edition of Australian Mining Standard, December 8th, 1904; also JI. of Chem. Met. & Min. Soc. of S. A., vol. vii, September, 1905, p. 92.