

thousands of mountain streams, should, when finished, rank with the great constructive public works of the world. The task is now half completed. The cost up to 1909 was \$20,650,000. The estimated cost for the remainder of the work in sight was then \$12,000,000, exclusive of upkeep and exclusive of the expenditure necessary by departments, communes, and private individuals. *Such works however, should not be measured by cost, but by results. The obliteration of the torrents of France, impossible as it may have appeared in the*

*beginning, will be practically accomplished with the completion of the programme now adopted. Torrential floods, which in one year wrought destruction equal to the total cost of stream improvement, will be no longer possible, and neither the vineyards and farms of the lower valleys, nor that important mountaineering element of the population which clings to upland slopes and valleys will hereafter be in danger by flood or snowslide. The price of one year's flood carefully expended will permanently add millions of acres to the productive area of France.*

## The Use of Pine Oils in Treating Ores

Much interest has been exhibited in the application of what is called the "pine oil flotation process" to the treatment of ores in the Cobalt mining district. At present the scope of the process in Canada is confined to experimental work, although flotation has been in use at many of the big United States silver and copper mines for years past.

The apparent economy and simplicity of the process, which may give high value to the enormous quantity of tailings of the Cobalt and other mines at present regarded as waste, depends upon an assured supply of pine oil. This is now imported from the United States and no guarantee of more than a few months' supply can be had. Whether or not the Canadian mines can be made independent of imported oils for the flotation process is at present engaging the attention of experts identified with the Ontario and Federal Governments and experiments will be made at the Forest Product Laboratories, Montreal, along such lines. If Red Pine or other Canadian woods could be made to produce the quality and

quantity of oils required, a new industry might be added to these now identified with the Canadian forest.

The system apparently is simplicity in itself yet there are things about it which cannot be explained even after exhaustive research work which is now being carried on. The principle is that air is forced under pressure through the canvas bottom of a tank-like cell, through which cell emulsified oil and water mixed with crushed ore held in suspension passes. The oil apparently forms a filament on the particles of mineral and brings them to the surface in the bubble. The froth is skimmed off and in it is contained the mineral.

The oils used may be broadly divided into "frothers" and "collectors." The pine oils are good frothers and coal tar and its various subdivisions are good collectors. It has been found that a mixture of coal tar, 50 to 60 per cent., coal tar creosote 30 to 40 per cent., and refined pine oil 5 to 10 per cent. give good results. Other pine oils work very well on Cobalt ores, however. The oil consumption per ton of ore approximates about one pound or from 2 to 3 cents per ton of ore.