

regards the welded pipes, it may be mentioned that the daily wages of the chief welder are stated to be \$4.80 and of two assistants \$2.40 each, making the welding costs of $\frac{1}{2}$ in. plate 8c. per linear foot.

In Germany, after the deduction of all capital charges, the net profit per ton has averaged \$13.20, and in view of the growing demand it seems probable that a works equipped at a cost of \$500,000 to turn out 15,000 tons annually, would prove a profitable venture. On the Continent there are several works of this capacity, and a score or so capable of a smaller output.

FIVE COAL FIELDS OF VANCOUVER ISLAND.

The five coal fields of Vancouver Island, Nanaimo, Comox, Suquash, Cowichan and Koskeemo, all bituminous fields, are the most valuable on the Pacific Coast of North America. Mr. D. W. Dowling, of the Geological Survey of Canada, considers the Nanaimo field the most important of these, and gives its area as 350 square miles, with an average thickness of six feet of coal, or a content of 1,344,000,000 tons. Comox is given an area of 300 square miles, and a similar thickness of coal to Nanaimo, giving its content as 1,152,000,000 tons.

Suquash has an area of 10 square miles, with an average thickness of 3 feet of coal, or 19,000,000 tons. Mr. Dowling made this estimate before any development work had been done outside that of the Hudson Bay Company in 1848. Recent development shows this field to have two seams of economic value, hitherto unknown, while diamond drilling shows the coal area to be much more extensive than formerly supposed.

The Cowichan field has an area of 9 square miles, averaging 4 feet of coal, or 23,000,000 tons.

The Koskeemo field is placed at five square miles, with an average thickness of 3 feet of coal, or 9,000,000 tons. Cowichan and Koskeemo fields are the only two lying dormant. Attention has been paid to Koskeemo, diamond drilling and geological investigation having been employed with a view to ascertaining the prospects of opening it economically, but so far with little success, owing to the disturbed nature of the country tributary to the Sound. The Koskeemo field is a continuation westerly of the Suquash field, and it is not improbable that the two may be yet found to be continuous. The area is older than either the Comox or Nanaimo fields, and is co-related to the still older formation of Graham Island.

A new field is likely to be added to the above, namely, Alberni. It has been recognized as probable that coal might be found at Alberni, outliers of the Comox formation having been recognized there, and as a result the Alberni Land Company Limited, in disposing of its lands there, reserved the coal rights.

When the extension of the railway was under construction last fall, the steam shovel uncovered a seam of coal, and the company recently started development on it, with the result that so far as the slope has been run, about 170 feet, a continuous seam of coal of high quality, and of a width of 4 feet has been proved up.

It seems probable that the coal areas of Vancouver Island are good for about three billion tons of coal, or enough to supply 10,000 tons a day for 800 years, so that the people of to-day have not much need to worry over the possibility of the exhaustion of these great coal fields. The Vancouver Island coal fields have produced to date coal to the value of \$70,000,000.

The Nanaimo field occurs in Upper Cretaceous formation, and has been proved by the developed mines and bore

holes to be coal bearing over a length of 55 miles, by an average width of six miles. About a fourth is land area and the remainder submarine. The basin lies north-west and south-east and dips easterly. The average dip is from five to twelve degrees, with variations due to several faults. Its continuity is proved from the old Wellington mine north-west of Nanaimo, to Tumbo Island, near the south-eastern boundary of the Gulf of Georgia area of British Columbia, Mr. W. Blakemore, M.E., representing Mr. A. E. Hepburn, M.E., having proved by diamond drilling the extension of the field to the latter point. Over a considerable portion of the area the coal deposits are probably at too great a depth to be economically workable at present, but toward the western portion of the field they gradually rise to the surface, and their outcrops are traceable from the old Wellington mine to Oyster Harbor.

So far as proved up the Nanaimo field carries three seams of coal of such volume as to be available for economic operation. The lowest seam, known as the Wellington, outcropped at the old Wellington mine, at Nanaimo River and Extension. At Wellington and Extension it was operated by the Dunsmuir interests, since acquired by the Canadian Collieries, Limited, and in the vicinity of Nanaimo it is worked by the New Vancouver-Nanaimo Coal Company, Limited.

The Wellington seam is irregular in thickness, having been laid on a floor with numerous depressions and eroded channels, the coal-forming matter accumulating in the basins, accounting for swells in the seam, causing it to vary in thickness from two feet to 28 feet. The average width of the seam is probably nine feet.

The middle seam is the Lower Douglas, and lies on a horizon about 800 feet above the Wellington seam. It is narrower than the other seams, but very uniform in width, running from two and a half to three and a half feet in thickness. It is particularly well adapted to longwall mining. It outcrops at Nanaimo and South Wellington.

The Upper Douglas seam occupies a horizon varying considerably in its relation to the Lower Douglas, the two being found at depths apart varying from 22 feet to 120 feet. This seam also outcrops at Nanaimo and South Wellington. In characteristics it is almost a perfect counterpart of the Wellington seam, being laid on an uneven, wavy floor, and varying in thickness from two feet to 26 feet. The roof of the Upper Douglas seam is mainly shale, while that of the Lower Douglas is sandstone. The tonnage mined in the Nanaimo field last year was 1,615,160 tons.

PERSONAL.

Mr. Peter Gillespie has been appointed Associate Professor of Applied Mechanics in the Faculty of Applied Science, University of Toronto.

Mr. H. W. Price has been appointed Associate Professor of Electrical Engineering in the same Faculty, and Mr. G. R. Anderson, Associate Professor of Physics.

Dr. Robertson, the chairman of the Canadian Technical Educational Commission, returns to Canada this week by the Tunisian, after a most interesting tour of investigation through Europe.

Mr. C. R. Young, Lecturer in Structural Engineering in the University of Toronto, and late of Barber and Young, Structural Engineers, has opened an office as Consulting Structural Engineer at 318 Continental Life Building, Toronto. Mr. Young will give special attention to reviews of designs and specifications, reports on old or overloaded structures, investigation of failures and defective work and the artistic design of bridges.