

turing has become a great industry, and the mechanical trades employ a considerable proportion of our population. With this change in the occupation of a large section of workers has come a demand for a change in educational ideals. It is recognized that in Provinces where manufacturing plants are increasing the education of those likely to be employed in these workshops should be of such a nature as to increase their interest in their occupation and add to their efficiency as skilled workmen; for it is being recognized the immense asset skilled labor is to a country.

The industrial school should not be made a trade school. The preparation of the student given in the industrial school should go far enough to enable him to understand what he is told in the shop. It should do more: it should interest him in the material with which he will work, should inspire him with a love for an occupation, but it should not attempt to make him a skilled workman—this must come later in the shop.

The industrial school should be State-aided and State-controlled. They are a fair charge on the State treasury. They should not be under the control of either manufacturing establishments or corporations carrying forward educational campaigns for private gain. Experience has shown that such methods discourage and confuse the student and mislead and disappoint his employer.

The levelling influence of the machine-like routine of many manufacturing establishments tend to discourage individual effort. Industrial education would develop individuality.

PROTECTION OF WOODEN TRESTLES.

The Board of Railway Commissioners have recently examined two new methods of protecting wooden trestles or bridges from fire, one known as the Montauk fire detecting wire, in the form of thermostat, and the other the Clapp fire-resisting paint. Both systems withstood successfully the tests, and would dispense with the employment of watchmen.

The chief engineer of the Board expresses the opinion that in open country and thickly-settled districts the ordinary section gangs would be able to protect all trestles, but in timbered districts and districts distant from settlement other protection should be provided.

The Board is inviting expression of opinion as to the most suitable method of protection of such structures.

THE DIFFERENCE BETWEEN CAST AND OTHER IRONS.

There is a great deal of confusion in the popular mind as to the difference between cast-iron, wrought-iron, and steel; in fact many people consider them distinct metals.

The fact is, that all iron products, such as cast-iron, malleable cast-iron, wrought-iron, and the innumerable grades of steel, are combinations of iron and other elements, the character of the finished article being determined by the number and quantity of the alloying elements and the process of manufacture.

There is no such thing as "bad iron," the metal, iron, itself, being an element fixed and unchangeable, and of no commercial value whatever in its pure state.

It becomes useful only when combined with other elements which change its nature—being brittle, ductile, tough, weak, hard, or soft, as these added elements vary in their proportions.

A chemical analysis of cast-iron, malleable cast-iron, wrought-iron, or soft steel bars, would show a result something like this:—

Elements.	Cast	Mal. Cast Iron.	Wrought Iron.	Soft Steel.
Iron	92.550	95.770	98.805	99.280
Silicon	2.500	0.600	0.145	0.020
Phosphorus	0.650	0.180	0.100	0.050
Sulphur	6.100	0.050	0.050	0.050
Combined carbon..	0.350	trace	0.040	0.200
Graphitic carbon ..	3.150	3.000
Manganese	0.700	0.400	0.020	0.400
Slag	0.840
	100	100	100	100

With the above elements, and sometimes the addition of two or three others, chemists produce every possible grade of iron or steel, from the light sharp castings used in the arts, to the hardest armor plate; from soft steel which can be dented by a moderate blow to drills which can almost cut the diamond itself.

ORDERS OF THE RAILWAY COMMISSIONERS OF CANADA.

Copies of these orders may be secured from the Canadian Engineer for a small fee.

4652—April 24—Amending Order No. 4580, dated April 14th, authorizing the Brantford and Hamilton Electric Railway Company to erect, place, and maintain its electric power, trolley, and feeder wires over the track of the Tillsonburg Branch of the C.P.R. in the City of Brantford, Ont.

4653—April 24—Authorizing the C.P.R. to construct and operate a branch line or spur in the Town of Lethbridge, Alta., to and into the premises of John Taylor.

4654—April 24—Authorizing the Dominion Natural Gas Company to lay two gas pipes or mains under the tracks of the Grand Trunk Railway, where the same crosses Tamarac Street and Cedar Streets (or Diltz Road) in the Town of Dunnville, County of Haldimand, Ont.

4655—April 9—Authorizing the C.P.R. to construct spur to the premises of the Standard Brick and Tile Company in the Parish of Kildonan, Manitoba.

4656—April 28—Number used, but order not issued yet.

4657—April 27—Authorizing the Bell Telephone Company to erect, place and maintain its aerial wires across the tracks of the G.T.R. Company at corner West Street and Barrie Road, Orillia, Ont.

4658—April 28—Authorizing the British Columbia Copper Company to construct pipe line under the track of the Motherlode Branch of the C.P.R. at Greenwood, B.C.

4659—March 12—Authorizing the Windsor, Essex & Lake Shore Rapid Railway Company to construct its railway along Pitt Street, Windsor Avenue, Strachan and Arthur Streets, Aylmer and Howard Avenues, in the City of Windsor; along and across the highways in the Township of Sandwich East and West; along the Talbot Road in the Town of Essex; and along Division Street and Main Street in the Town of Kingsville, Ontario.

4660—April 24—Authorizing the C.P.R. to construct, maintain and operate a branch line of railway or spur to and into the premises of J. Wilson, Como, P.Q.

4661—April 24—Authorizing the C.P.R. to construct a spur to and into the premises of the Lake of the Woods Milling Company, Keewatin, Ontario.

4662—April 30—Authorizing Messrs. Wiechman & McIvor to erect, place, and maintain an electric light line over the track of the C.P.R. at Treherne, Manitoba.

4663—April 24—Ordering that the time within which the Canadian Freight Association will be permitted to file an answer to the application of the Morang Educational Company, Limited, re fixing proper freight classification throughout Canada, be limited to four days from the date of the service upon it of the said application, and set down for hearing at the Board's sittings in Ottawa, Ontario, on May 5th, 1908.