

followed out the plan herein set forth, he would soon acquaint himself with the successful and unsuccessful steps made by his predecessors, and act accordingly; this is an indisputable fact.

Because an inventor finds that all through an art certain elements therein have been retained, it does not follow that he need combine these elements in the same manner; the requirements of the case will, of course, determine this, coupled, of course, with the inventor's mental capacity.

I do not say that, between my statement of the law to be observed in developing inventions, and Darwin's Law above cited, there is a complete parallel. The inventor, of course, has more immediate freedom in his choice of combination of elements than if he were working through a process so slow as that of Natural Selection. But it would seem that he is bound to recognize and adopt those elements in prior inventions that have contributed to, or that have been the sole cause of, the success of same.

It is well known that inventors oftentimes find great difficulty in making improvements or fully developing their inventions in order to make them commercial. When these periods or states of non-development are taken into account, it appears to me that there is quite a parallel between the development of an invention (particularly a complicated one), and the Law of Natural Selection. When the inventor cannot at once make the step or improvement he wishes, it naturally follows that he cannot draw upon his past experience, and his knowledge of the prior state of the art, in order to supply that defect; consequently a mental process (which I might term Mental Natural Selection—Inventing) must be gone through before the inventor can arrive at the result he is aiming at. The more fertile the brain in which the idea has lodgment, the quicker will the mental powers absorb, so to speak, that idea, and give birth to it in concrete form. So likewise in the development of the organic being; the more suitable the conditions, the quicker will a genus or species be developed that can best exist under the then existing conditions of that period of life.

Darwin states it is notorious that specific characters are more variable than generic. In machines, the main or essential elements we will consider as being the basis for the generic claim. Although they may be modified, these main elements are not subject to the same amount of modification or variation as are the minor elements that are made use of in combination therewith. As is well known, these minor elements are often claimed as means or mechanism for the very reason that they are subject to great variation; that they may be constructed in many different ways and yet be capable of use in combination with the essential elements.

As Natural Selection will never produce in an organic being any structure more injurious than beneficial to that being, it follows that when an inventor proceeds along the right lines of development, he will naturally use elements that will always contribute to the success of the invention. Natural Selection tends only to make each organic being as perfect as, or slightly more perfect than, the other inhabitants of the same country with which it comes into competition. Consequently the properly-directed efforts of an inventor must essentially produce as good or better an invention than those prior thereto, and with which it must inevitably come into competition. The chances are greatly in favor of a better invention being produced, as all inventive effort is exercised for, that very end.

I do not pretend to any great knowledge of Darwin's above-mentioned law, and any errors I may have committed must not be too strongly dealt with. If I have touched upon a method of development well known of organic beings so as to try and prove to inventors that there is an easier or more natural method of reaching their goals than is now generally practised, and succeed ever so little, I shall be content. When we look around us and consider what humanity at large owes to the inventor of all nations, we must acknowledge our great indebtedness to him. His success is many times purchased by the

practice of great personal privations, and often without reaping the rewards his heroic and unselfish efforts have merited.

Many inventors will ask how they are to get knowledge of what inventions have been already made in a particular art. The best way to procure this information is to get copies of all the patents granted in that art.

As certain as day follows night, if an inventor proceeds in his investigations after the manner I have endeavored to prove to be the correct one, he will obtain the maximum success with the minimum expenditure of time and money.

What I have stated relative to the development of the Industrial Arts, applies with equal force to the development of the Fine Arts.

## CORRESPONDENCE

Editor Canadian Engineer:

Sir,—Enclosed please find one year's subscription to "The Canadian Engineer." I would appreciate it if you would let me know what the standard rate paid for locomotive machinists is; also, how long do apprentices serve?

Yours respectfully,

(Sgd.), A. G. CUTHBERT,

Sacramento, Cal., U.S.A.

- [(1) Locomotive machinists are paid 24 cents per hour.  
(2) Apprentices serve four years in contract shops, and five years in railway shops.—Editor.]

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## NATIONAL OWNERSHIP OF TOWN SITES ON GRAND TRUNK PACIFIC RAILWAY LANDS.

Editor Canadian Engineer:

As the Canadian Government is incurring great expenditures and liabilities in promoting the G. T. P., it seems only fair that the termini on the Pacific, Hudson Bay, and Atlantic, at least, should be, and remain, Dominion property, to be sold in "Zones of Value," only to parties ready to occupy and improve the same. Sites should not be less than ten miles square, and lots one-fifth to one-tenth acre each; with wide streets, parks, and public squares. The advantages of being freed from provincial and municipal interference must be reciprocated by a clean active style of management, and the power to "do things" must be in competent hands, and all ring influences carefully eschewed. The sites must be judiciously selected, and put into shape for immediate sale and use, with no boom methods. The rails, pavements, water and electric works, and sewage could be kept abreast of the building enterprises, so that the streets need not be broken up again.

By such a system progress would be uniform, and all the advantages of a city would be at the door of a house when it was ready for occupation; slums avoided, and more uniformity of building ensured.

With such a system, fully carried out, a very large proportion of the values created by building the railway would be recouped at once; and the same principle might be made applicable to a proportion of the lands intervening between the terminal cities. A portion might be given to the municipalities traversed, but the chief values should be retained to defray cost of survey and construction by the country. The more the government can retain, the greater benefit will arise to the nation, and the less influence to the boomer of real estate. If public ownership means anything more than a war-cry, let us give it a fair trial. Civilization is the logical outcome of intelligent public co-operation for the common weal.

Yours very truly,

(Signed)

THOMAS FROOD,

Little Current,

North shore Lake Huron, Ont.