The question of nickel coinage

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cost and ease of working—two admirable features—presented such an opportune field for counterfeiters as to render the alloy undesirable in Italy and Korea.

Silver.

Everyone is familiar with silver coins. Their appearance is good, they are easily rolled and minted, and take the impression of the die well. The amount of wear is probably greater than generally suspected. Over a period of forty-five years (1872 to 1916, inclusive), the worn silver coin withdrawn from circulation in the United Kingdom was 30 per cent of the issue for that period. The amount of wear indicated by this figure is low, because the withdrawals during two years of war, were less than 25 per cent of normal, and the annual issue increased to five or six times normal.

Silver coins do not oxidize readily, and, from a chemical standpoint, are very suitable, with one exception—their affinity for sulphur, which rapidly turns them black. This is well illustrated by the coins you carried in a pocket with matches, and the frequent silver cleaning required in your home. But this is a minor consideration. The excessive wear is more serious, and the more serious draw back is the price, which will be discussed later.

Nickel.

Nickel meets all of the requirements for coinage more nearly than any other metal.

Consider:—

The Appearance—Bright, white, metallic, retaining its high polish permanently against ordinary exposure to moisture, oxidation or ordinary gases and solutions.

Contrast the frequent silver cleaning, mentioned above, with the maintained polish and appearance of the nickel-plated parts of your telephone, auto fittings and bathroom fittings. The plating may wear off, but while the nickel is there the appearance remains—so with nickel coins, they remain clean and bright.

Hardness—after annealing—99-100 Brinnell—6.15 Shore—sufficiently hard and tough to resist wear and deformation, yet it flows readily under the die, and takes with clearness the fine reliefs and impressions common to coin designs.

The only available figures on wear on nickel coins are embodied in a report of experiments made in Switzerland, as follows:—

Equal weights of coin of many varieties were placed in a drum which was revolved for forty continuous hours. The abrasion noted was:

	Per cent
10-rappen piece of brass (containing 60 per cent copper, 40 per cent zinc)	3.69
1-franc piece of .835 silver, .165 copper	7.79
2-franc piece of .835 silver, .165 copper	6.62
½-franc piece of .835 silver, .165 copper	5.77
5-rappen piece of brass (100 rappen — 1 franc)	4.01
10-rappen piece of aluminum alloy	11.27
5-rappen piece of copper-nickel	3.29
10-rappen piece of copper-nickel	2.45
1-rappen piece of bronze	1.23
2-rappen piece of bronze	1.09
20-rappen piece of pure nickel	0.59

These results bear out what we would expect—that nickel is the most superior from the wearing standpoint.

Other Physical Properties.—The melting-point of nickel is 1,450 degrees C., higher than that of the other alloys or metals considered.

It is a poor conductor of heat.

The relative heat conductivities of the metals:

Silver	1.096
Copper	0.72
Aluminum	0.35
Iron	0.17
Nickel	0.14

Nickel is magnetic below 340 degrees C. Exponents of pure nickel coinage hold this to be an advantage as an aid to detecting counterfeit coins of a cheaper alloy. On the other hand, the magnetic property might not appeal to proprietors of slot machines.

Sound and Weight.—Nickel coins have a very slight ring which is distinctly different from that of both bronze and silver coins, and their weight lies between bronze and silver coins of the same size. These two properties would aid to distinguish nickel from other coins in use.

Chemical Properties.—Nickel is one of the most passive of metals from a chemical viewpoint. It resists oxidation indefinitely at ordinary temperatures, and is with difficulty soluble in ordinary acids and solutions. It does not form poisonous salts.

We must conclude, then, that nickel meets all the physical and chemical requirements of a metal for subsidiary coinage.

Manufacture.—The process of manufacture of nickel coin blanks is long and difficult. Powerful machines are necessary both in the hot and cold rolling process, and the scrap returns are heavy. These factors tend to increase the cost for coins, but not to a prohibitive point, and at the same time make very remote the possibility of counterfeiting.

Price of Nickel and Silver.

Before the entry of Ontario's product into the market, nickel sold for $1.58 per pound. But the active development of our Northern properties rapidly forced it down, and in 1902 the metal was selling for 30c to 35c per pound. During the war, when metal prices were soaring to undreamed-of heights, nickel was quoted at 35c to 40c per pound, and today is quoted over the same range. These figures show the stability of the price of this metal.

Let us revert to silver and consider the price of that commodity. Previous to the war silver was very consistently quoted at 48c. to 50c. per ounce; but early in 1915 it commenced its upward flight, which amost stealdily continued, until it reached a price of 1.37 per ounce, and it seems to have anchored at something about $1.30. But the silver market is in New York, and to the above prices we must add New York exchange, bringing the price of silver between $1.43 and $1.50 per ounce in Canada at present.

Silver in Canadian Coins.

The present Canadian five-cent piece weighs 18 grains, and is 925 fine, 75 alloy. Under a recent act it will, in future, be made 800 fine, 200 alloy.

This lowering of the silver content was forced by the increased price of silver. The adjustment was sufficient to prevent the immediate rapid disappearance of our coinage into the melting pot, but insufficient to entirely remove the danger or to permit much of a saving to the Government at the present prices. The table below shows the difference between the **face value** and the **cost of silver content** per million five-cent pieces for varying prices of silver and exchange:

Old Standard Fine — Silver Content, 34,687.5 Ozs.

Silver N.Y. Quot'n	Ex-change	Price in Canada	—Per Million Pieces— Silver Value	Face Value	Difference
$ .50	Par	$ .50	$17,344	$50,000	$32,656
1.30	10p.c.	1.430	49,603	"	397
....	15p.c.	1.495	51.857	"	1,857

New Standard Fine—Silver Content, 30,000 Ozs.

Silver N.Y. Quot'n	Ex-change	Price in Canada	—Per Million Pieces— Silver Value	Face Value	Difference
$1.30	Par	$1.30	$39,000	$50,000	$11,000
1.30	10p.c.	1.430	42 900	"	7,100
....	15p.c.	1.495	44,850	"	5,170
1.36	10p.c.	1.496	44,880	"	5,120
....	15p.c.	1.564	46,920	"	3,080
1.42	15p.c.	1.633	48,990	"	1,010
1.63	Par	1.63	48,900	"	1,100
1.666	Par	1.666	50,000	"	.....

If we deduct the cost of manufacture—rolling, blanking, minting and other charges—from the difference shown above, it will be seen that the seigniorage on our silver coins has almost disappeared.

Cost of Nickel Coinage.

The cost of manufacturing coins of nickel is roughly twice that of silver, due to the added difficulty of working the metal to the fine specifications required for coins. But the difference in the base price of the metals, and the increased durability of the coins, would not only offset this additional cost, but would show an annual profit to the Government that would run into hundreds of thousands of dollars.

It has been suggested that a five-cent coin of pure nickel, similar in size to the United States "nickel," should be adopted, but contended that this savours of aping our American "cousins." As regards the contention, it is the opinion of the writer that by adopting a pure nickel coin we would be going them one better, and that, by adopting also a ten-cent coin of nickel, we woul be making an additional improvement.

As regards the suggestion, it should be pointed out that there is no good reason why we should not also use nickel for our ten-cent pieces, in which case it would be desirable to make the five-cent coin of a size nearly corresponding to our present ten-cent piece. and a new ten-cent coin corresponding in size to the United States "nickel," Otherwise, it would be difficult later to meet a size for a nickel ten-cent piece. This arrangement is based on the assumption that our present five-cent pieces are undesirable by reason of the difficulty with which they are handled and the ease with which they are lost and misplaced.

The seigniorage resulting from the suggestion above, figured very roughly, would be considerably in excess of $500,000 per annum.

Withdrawal of Present Coins.

It might be observed that during the past ten years (1910 to 1919, inclusive) approximately forty-four and one-half million five-cent pieces have been issued in Canada, of which the silver content is 1,543,571 ounces. If all of the silver five-cent pieces were recalled, and fifty per cent. of the above amount recovered, the Mint would obtain 771,796 ounces of silver, for which it paid something less than 70c. per ounce. This would be reissued in silver coins of the higher denominations, in place of new silver at $1.30 an ounce, making a net saving of approximately $463,000.

As there were about the same number of ten-cent pieces issued of twice the amount of silver content, the recall on the latter (based on the same percentage recovered, and silver prices) would net about $900,000, or a total profit on the turnover of over one and one-third million dollars.

Conclusion.

In conclusion, it is evident that, by changing to nickel coinage for our coins of low denomination we would secure a coin of highly attractive appearance, more suitable, from a physical and chemical standpoint, than of any other metal; we would get a great reduction in cost for subsequent issues, or a greatly increased seigniorage, and actually make over one million dollars profit on the change; and we would be using a metal which is typically Canadian, in that country is favored with a bountiful supply of this metal, and produces approximately eighty-five per cent. of the world's supply.

To substitute nickel for silver, in our five and ten-cent pieces, would seem the most reasonable thing to do.

—From the Canadian Chemical Journal.

Further work has been done in connection with the proposals to irrigate a portion of southwestern Saskatchewan embracing 125,000 acres. The irrigated district will now probably reach the Weyburn-Lethbridge line of the C.P.R. and take in country north of Consul, Vidora and Robsart.