

The Graphic Laboratory of Popular Science

Nickel Is Put to Many Uses

By JOHN A. MENAUGH

AT THE mention of the word nickel the average person is apt to think of objects plated with this metal or of the 5-cent coin in use in this country. Unless he is of an inquisitive turn of mind he does not know that only 6 per cent of the world's annual consumption of nickel actually is employed in nickel plating. And he may not know that the coin called the nickel is not made of pure nickel but of an alloy called cupronickel, which is three-fourths copper and only one-fourth nickel.

There are countries, however, that do mint pure nickel coins. In fact, since 1881, when the metal first was adopted for coinage, a total of 33 countries have issued pure nickel coins in 87 denominations and 102 designs to the number of about four and a half billion.

Cupronickel coins, such as the present Jefferson nickel and its predecessor, the buffalo nickel, have been coined since 1880 by 84 governments in 231 denominations and the number of 16 billion.

The making of coins uses up only a small fraction of the grand total of nickel consumed by the world, which for the first ten months of last year was approximately 168,000,000 pounds and for the whole year of 1937 was 201,000,000 pounds.

The most important use of nickel from the standpoint of volume is in the making of steel. Sixty per cent of all of the nickel consumed in 1938, it is estimated, went into the making of steel—structural steel, stainless steel, corrosion and heat resisting steel, and steel castings. Nickel cast iron consumed 3 per cent; nickel-iron alloys, 1 per cent; nickel-copper alloys and nickel silvers, 14 per cent; nickel brass, bronze, and alloy castings, 2 per cent; heat-resistant and electrical-resistant alloys, 3 per cent; metals such as Monel and



Aile of converters in Canadian smelter where more than 90 per cent of world's supply of nickel is produced. (Thomas photos, courtesy International Nickel Co., Inc.)

The principal source of nickel today is Canada, where by far the greater part of the output is obtained from the Sudbury district of the province of Ontario. Relatively small quantities are obtained from the deposits 150 miles north of Sudbury and from the cobalt-silver district in the same province. Still additional Canadian sources are in other regions in Ontario and in Vancouver Island, British Columbia. Canada's annual productions of nickel range from 69 to 90 per cent of the total for the whole world. The second most important source is New Caledonia, a French possession about 1,250 miles northeast of Australia. No longer ago than Jan. 8 of this year a newspaper dispatch from

nickel-lined tanks. On Aug. 12 of last year it put into Chicago after its maiden voyage from Oswego, N. Y., with a cargo of a million gallons of kerosene stowed away in five tanks lined with pure nickel sheets. The use of nickel in this connection is said to permit of easy and rapid cleaning of the tanks by the use of steam. Petroleum products, caustic soda, or molasses may be carried in the ship, as the nickel-lined tanks are non-corrosive.

Many are the chemical compounds in which nickel is found. It combines with oxygen to form nickel monoxide, nickel hydroxide, and nickel peroxide. It also combines with various salts to form nickel salts, and with a number of other elements. It is in the form of nickel salts that it is used advantageously for electroplating.

In the "Review of the Nickel Industry in 1938" Robert C. Stanley, chairman and president of the International Nickel Company of Canada, Ltd., points out that nickel consumption in the year in question fell off from that of the previous year, owing for the most part to an abrupt drop in business in the United States during the latter part of 1937 and the early part of 1938. The United States, Mr. Stanley

The structural parts of modern airplanes are more and more being made of chromium-nickel stainless steel.

Shipbuilding, mining, and the petroleum industry are large users of nickel alloys and nickel alloy steels, while the paper and pulp industry is using in increased volume chromium-nickel stainless steel and Monel metal. Monel metal is defined in the review as a high nickel-copper alloy with good mechanical properties and corrosion resistance. Monel is a trade name. Among other trade name metals bearing nickel are Constantan, Hipernik, Inconel, Invar, Hastelloy, Ni-hard, Ni-resist, and Permalloy.

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The review stresses the point that, although it has been widely practiced more than sixty years, commercial nickel plating continues in increasing volume.

"During the year," says the review, "many new advances were made both in the art of application and in the uses of nickel plating. The technique of producing bright deposits without grinding or buffing became widely established. Deposits of extreme hardness and strength were effected. A new interest appeared in nickel plating for general utility purposes, which is additional to the continued world-wide interest in nickel plating for decorative purposes."

"Nickel plating to protect steel and iron against corrosion has become more fully recognized, and during the year successful trials were made of important applications in fields where there is opportunity to increase the use not only of nickel but also of steel."

The review goes on to tell how the use of coatings of nickel several thousandths of an inch thick protect strong alloy and mild steel structures against abrasion and corrosion. In this case there is no thought of beautifying the metals. On the other hand, for decorative purposes, the review continues, bright nickel plating has greatly increased.

"While the hardest nickel," says the review, "is softer than chromium, laboratory tests have shown that its physical properties can be controlled, and the toughness and ductility of the softer deposits are being used." In other words, under certain circumstances nickel plating, the review indicates, has advantages over chromium plating.

Nickel has important uses in armaments—especially in artillery, in armor plate, and in armor-piercing projectiles. Five thousand tons of this metal went to uses of this kind in the United States and Great Britain in 1938.

Mostly About Dogs

By BOB BECKER



The alert eagerness shown by this champion collie, Avril of Kerris, is typical of the breed. (Tribune photo.)

Boy Scouts Do Another Good Turn

IF THE Boy Scouts of America have anything to say about it this country soon will have thousands of dog owners who really know the fundamentals of correct feeding and general care and training. The Scout organization has adopted a merit badge to be awarded for genuine interest in the health, care, and conduct of dogs.



This pure white Samoyed, Champion Prince Koski, represents a breed which has served mankind for centuries as companion and sled dog.

guishing breed characteristics of fifteen breeds of dogs.

Here is what a Scout must do before he may win the merit badge:

Own and give proper care to a dog for a period of not less than six months, or have responsibility for the care of his family's dog for that period.

Present a record showing the care he has given to his dog during a period of six months, including such items as feeding hours and kinds of food, housing, training, exercise, grooming and bathing, care of the dog's habits and health, including precautions to keep dog in good condition.

Report the approximate cost of feeding and caring for his dog for a six months period.

Point out on his dog at least

ten parts, giving the technical name for each part.

Describe from personal observation or point out from pictures three distinguishing breed characteristics of fifteen breeds of dog; or give a brief history of some one breed of dog, including the origin (if possible), any cross breeding that has taken place, characteristics that have been gained by cross breeding, great champions of the breed, persons who have been instrumental in furthering the breed.

Explain the symptoms and first aid treatment for at least one illness and one accident common to dogs.

Explain proper methods of training dogs to do the following: Obey simple instructions, such as "come here," "stop barking," "lie down," etc.; walk to heel; carry and retrieve objects; herd cattle or sheep; or more tricks, such as "speak-



The merit badge worn by Boy Scouts who pass requirements on dog care.

them obedience and good manners, we believe that the requirement might well be that a Scout teach his pet at least two fundamental commands, such as "come here" and "sit down," rather than ask him to "explain proper methods of training dogs." As the Scout manual points out, "Like Scouts, dogs learn by doing." No better application of this truth could be made than in this question of dog training. If the Boy Scout were required to train his dog the fundamentals of obedience, thus demonstrating how simple training eliminates bad habits in dogs and develops them into more lovable and valuable pets, he would be making a valuable contribution to the world of dogs.

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DOG NOTES

Although many dog owners are not aware of the fact, dogs may have jaundice. And it's usually fatal. We know because we lost a valuable dog which developed jaundice.

Very few pure-bred huskies are found outside the most remote Arctic regions, mainly because the white man has carelessly crossed the husky with the Newfoundland, Great Dane, German shepherd, borzoi, collie, and mongrels. The Royal Canadian mounties at their headquarters in Ottawa have been experimenting by crossing the husky with the borzoi.



• For attractive offers of dogs, turn to the Dogs, Cats, Birds, and Pets columns in the want ad section of today's Tribune.



Dolomite-4, equipped for ocean service. It is unique in that its hold tanks are lined with pure nickel, hence noncorrosive.

Inconel, 9 per cent; nickel plating, 6 per cent; nonmetallic materials for the chemical industry, nickel salts, etc., 1 per cent; and miscellaneous and unclassified uses, 1 per cent.

Nickel is one of the basic elements. Its atomic weight (its weight in relation to that of hydrogen, which is 1.0078) is 58.69, and its chemical symbol is Ni. Its melting point is 1,455 degrees centigrade, which is slightly below that of iron and considerably higher than that of gold or silver.

A. F. Cronstedt is credited with having discovered nickel in 1751, when he first isolated it in an impure state, but it actually had been known from earliest times. The Chinese many centuries ago employed it in an alloy known as paktong.

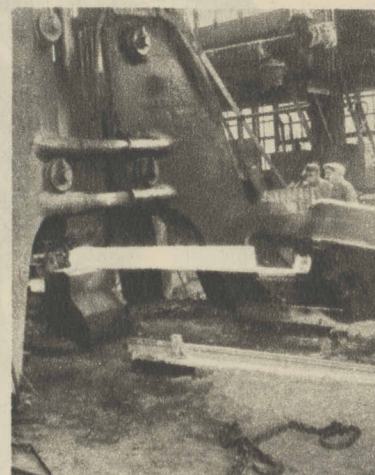
Nickel occurs in combination with a number of minerals (chiefly in combination with arsenic), including kupfernickel, white nickel, nickel glance, nickel blende, and melonite, and also in association with cobalt in speiss. Kupfernickel deposits are found in North and South America, Norway, Germany, France, and Hungary, and other ore deposits occur in Ontario, New Caledonia, and South Africa.

Amsterdam carried the information that a new source of nickel soon would be exploited on Celebes Island, Dutch East Indies. Nineteen concessions covering a large area near the coast of Bingkoka Bay, according to the dispatch, have been claimed by the Netherlands East Borneo company, and the mines therein are expected to produce from 2 to 3 per cent of the present world production of nickel. The ore is to be smelted on the spot by a new process developed by the Krupp works of Germany.

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Nickel is known to the chemist as a black powder. But to the average person it is the bright, lustrous metal commonly employed for plating other metals. Used in the manufacture of steel, it tends to toughen that metal. It is especially valuable for plating other metals, such as iron and steel, as it does not readily tarnish in the air.

Nickel has been put to a specialized practical use in recent years as a lining for tanks of liquid-carrying ships. The Dolomite-4, a vessel built for service on the Great Lakes or the ocean, is said to be the largest of this type of craft equipped with



Mechanical pincers manipulate ingots of nickel under forging hammer.

discloses, normally consumes half of the total output of the metal.

The review, which was published in January, covers the use of nickel in virtually all branches of industry. While it points out that consumption of the metal in 1938 showed a marked falling off, it calls attention to the fact that new uses are constantly being found for nickel. In the automobile industry, for example, it tells of an increasing use of nickel in steel and of a tendency to increase the thickness of nickel plating as much as 50 per cent. The metal, it is emphasized, is highly important in railway transportation and aviation.