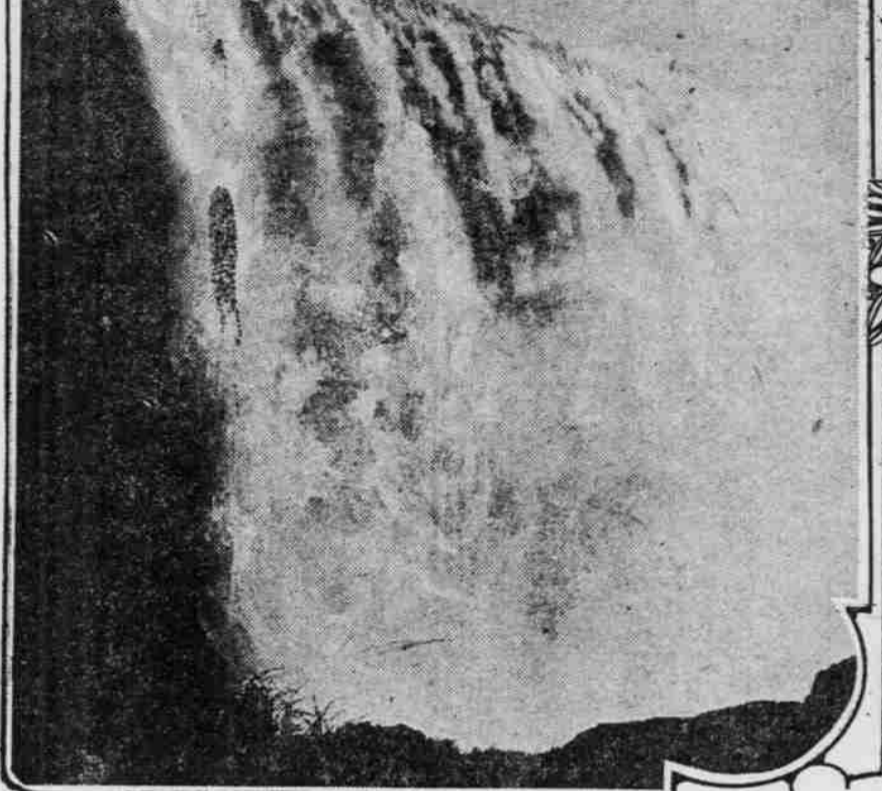


HOW NIAGARA FIGHTS FOR UNCLE SAM

Mighty Industries of the Falls Are Working for Our Army and Navy.

By Frank G. Carpenter



A Block of Water a Mile Square, and a Mile High Drops Down Every Week.

Copyright, 1917, by Frank G. Carpenter. NIAGARA FALLS, N. Y., Oct. 20.—I have come here to tell you how Niagara Falls is fighting for us in our great war in Europe. It is one of the most important of the industrial assets of the nation, and its products affect every soldier that goes to the field and every sailor that mans our vessels of war. It has to do with every gun that is fired and every projectile that scatters its deadly missiles over the trenches. It aids in making the armor plate for our battleships and in creating the fine machinery of the destroyers which chase the submarine sneaking along under the sea. It has to do with the fighting airplanes that fly the skies and with the gas which fills the dirigible balloons that patrol the waters along our coasts. It enters into every workshop which is producing material to be sent across the ocean and, I might say, into almost everything that has to do with making us equal to our part in this, the greatest struggle of history.

Before I describe the war industries of Niagara I want to tell you something of the mighty force that moves them. Niagara Falls is the greatest water power on the face of the globe. I have seen the Falls of the Zambesi in Africa and have traveled up the Parana below the Falls of Iguazu in South America. Neither compares with Niagara in the force which it exerts from one year's end to the other. The Falls of the Zambesi are twice as high as those of Niagara. They are twice as broad, and when at their flood they drop with a thunder equal to that of one of the great battles in France in a pit 400 feet deep, sending up pillars of mist which are visible for 40 miles around. It has been estimated that those falls at their flood have the horsepower of tens of millions, but the most of this disappears when the Zambesi is low. On the other hand, the Niagara River has an almost even flow the year around. Only 24 miles long and less than a mile wide for the greater part of its course, it has a drop of only 16 feet. The water from Lake Erie flows from there for a distance of about 100 miles to the foot of the falls, dropping the water from a height about two-fifths of that of the Washington Monument. A part of this flow is carried rapidly above the falls, but more than 160 feet of it is in the falls themselves. The force is so great that some engineers have estimated it as equal to that of 7,000,000 horses all pulling at once.

I despair of making you see what this mighty force is. Where the waters pour in from Lake Erie they rush on at the rate of 250,000 cubic feet each second and at the falls it is estimated that a block of water a mile square and a mile high drops down every week. The amount is 500,000 horse-power, of which some three-fifths are developed on the Canadian side of the falls. According to our treaty, we have the right to use only 20,000 tons of the water that goes over the falls every second and Canada has the right to 35,000 cubic feet. By the Burton law our Congress has reserved the American use to less than 16,000 feet. Just now all the factories are short of power and their work for the war is being cut down by the lack of cheap water power. Some of our industrial establishments have been getting their power from Canada, but this has been cut off since the war began, in order to make war supplies for the Canadian troops, and there is now a strong demand on the part of the manufacturers at Niagara Falls for more water.

During my stay here I have gone through some of the great power plants which have been constructed a short distance above the falls. The water is taken from the Niagara River in canals which have been built for the purpose of dropping down through penstocks or mighty steel tubes so large that if they were laid upon the ground a horse would just graze the top. Stood upright they are as tall as a 16-story house, and the

water drops down this great height in such a way that it pushes the turbines around, turning the mighty steel shafts which connect them with the dynamo. There are 10 or more of these penstocks in each plant, with an equal number of turbines below, and of dynamos high above them. The dynamos are enormous. They look like giant mushrooms of black steel, which are turning so fast that you cannot see them move. They fly around at a speed of a mile and three-quarters a minute, and each generates electricity equal to more than 5000 horsepower. Each dynamo is about 30 feet in circumference. As I looked, they made me think of thousands of horses galloping at a faster speed than has ever been made upon the race track. It is in this way that the 500,000 horsepower now in use is developed. There are two great power-houses on the American and several on the Canadian side of the river. All are connected with huge factories of one kind or another, which use the electric power necessary for the industries contributing to our Army and Navy supplies. The cost of the plants belong to the electro-chemical and electro-metalurgical industries. They are more or less scientific in their nature, and the men at the head of them are inventors who use the cheap electricity furnished

here in making products that could be created in no other way.

Take first the artificial abrasive or grinding materials which are used in all industries for making fine fittings, sharpening tools and cutting the hardest and softest of steel. There is a factory here which makes carborundum, turning out a million pounds or so every month. Carborundum was invented 23 years ago, and at first it sold for \$42 a pound. It is now produced so cheaply through Niagara Falls that it can be used in every factory and by the most common workman. This material takes the place of grindstones, emery and diamond dust. In fact, it might be called artificial diamonds, for it is composed of the hardest of crystals, with edges so sharp that they can be used for grinding any material without wearing. It is employed in every motor car plant, and it has to do with making ball-bearings, transmission gears, crank shafts and everything connected with the cheap and the high-priced cars. It is used in grinding the tools for the steel plants which are making projectiles, and it smooths the shells which fit the guns to the thousandth of an inch. It is used in making all sorts of agricultural implements

which have to do with our food supply, and with locomotives and electrical machinery of every kind. It will even grind manganese steel, which no steel tool can cut, and it will sharpen the finest of high-speed tools.

This wonderful product, like most of the others created here, comes from some of the cheapest and most common materials in nature. It is formed of crushed coke and common sand, melted into crystals by an electric heat of 7000 degrees Fahrenheit, or more than 24 times as hot as boiling water. During my stay here I have gone through the plant which makes it. It covers 20 acres and it is now making large quantities of abrasive materials to be used in connection with the war.

The plant is guarded by soldiers, and every employe has to have a photographic pass before he can get at his job. The official who took me in had to show his photograph upon entering, and we were watched as we went from building to building, where are the mighty electric furnaces, which are turning coke and sand into the millions of crystals or artificial diamonds, to be used as grindstones and grinding powders.

The furnaces are enormous. They are

The Dynamos Fly Round at the Rate of a Mile and Three Quarters a Minute.

cylinders or boxes made of fire brick, so high that the tallest man could walk through them without bending his head. They are about 20 feet long, seven feet wide and large enough to hold 70,000 pounds of material. This material consists of crushed coke and sand, mixed with a little sawdust and salt to aid in the reduction. It is put into the furnace in such a way that a cord or rope of graphite runs lengthwise through the center of the mass from one end to the other. This cord, which is made of lumps of graphite laid together in a little trench, is connected with two big carbon rods, one at each end of the furnace, and the carbon rods are joined to thick cables that bring in the electricity.

The graphite cord carries the current much like the filament in an incandescent lamp. As it comes in, the black cord turns white hot and the electric heat increases until it reaches the enormous temperature which I have mentioned. The heat is so great that it would turn steel, iron, granite or marble to a vapor and make the most refractory materials burn like so much tallow. The fire is so glaring that if a person should look directly into a furnace he would be blinded, and the power consumed would be sufficient to operate a 16-candle-power carbon incandescent lamp for more than 200 years.

It is this terrible heat that turns the coke and sand into crystals. It does that within 36 hours, at which time the steel frames outside the furnace are raised by machinery and the bricks are taken away, showing chunks and masses of jewels in the shape of crystals. These are then taken from the furnace and crushed by big iron wheels into the millions of tiny individual crystals used for grinding and the making of abrasives of various kinds.

But I cannot describe the many wonders of these Niagara industries. It would take more than the space of this article to tell you the story of carborundum alone. The most interesting thing concerning it is how electricity is used to produce it, for it is somewhat after the same methods that the enormous current furnished here changes other common things into materials of the greatest value.

This is the case with ferro-silicon, which is used to absorb the oxygen from molten steel, thus making possible sound castings and ingots by eliminating blow holes. We are now making like 23,000 tons of ferro-silicon a year, and 70 per cent of this

is treated with ferro-silicon. An enormous amount of it is now used in all the steel plants that are working for the war. Silicon is also employed for generating gas for our military balloons. All of the armies in Europe are equipped with the apparatus to generate it, and in connection with their observation balloons.

Speaking of high-speed steel, this is a product that depends almost entirely upon Niagara power. It is owing to this steel, made with alloys produced here, that we have the perfection of the modern cutting tool. In the old days of carbon steel it was necessary to have a cool cutting edge, and the best a man could get was a cut of 15 feet to the minute. With the high-speed tools we can now take off chips of steel an inch and a half wide and half an inch thick at the rate of 40 or 50 feet a minute, and that notwithstanding the tool is red hot. Without high-speed steel and artificial abrasives our machine shops would be cut to three-fourths or four-fifths of their present product. An automobile that would produce 500 cars per day could not turn out more than 100 cars with the same plant and the same force.

Among the alloys made here are ferro-chromium, ferro-vanadium and ferro-nickel. Ferro-chromium is the hardening agent used in making armor plate. Without it there would be no tough skin to protect our battleships and our great warships. The battleship Pennsylvania has 100,000 tons of armor, and to make this was required 3000 tons of ferro-chromium. This material enters into the manufacture of automobile steel and dies. More than half of all the ferro-chromium that is used in the United States comes from the electric furnaces at Niagara Falls.

Everyone knows about aluminum. It goes into automobiles and aeroplanes, and is used for cooking utensils, acid containers and electrical transmission. There are three great plants here that make this product, and it is turned out by the millions of pounds by means of this electric power. And then take acetylene. The calcium carbide made here by electricity is now saving millions of gallons of crude oil, and in the shape of acetylene gas, is giving light to thousands of homes and public buildings. More than 500,000 miners now use acetylene

lamps, and the same light is used for guarding the coast line in innumerable beacon lights and buoys. Acetylene, in connection with oxygen, produces a flame which is about the hottest known to chemistry. It is so powerful that it will cut the hardest armor plate. It is used in repairing the guns and other machinery of the battleships and also in doing similar work on our war vessels. Not long ago a 14-inch propeller in a French warship broke in two and was welded perfectly within 36 hours by acetylene flames. A few years ago it would have been six weeks before it was fixed.

Our military boards have stated that we shall need 100,000 tons of nitrates per year to satisfy the demands of the war. Nitrates are a necessity in the making of all high explosives, and they are the most common materials. The product supplied to the military is not nitrate, but nitric acid. By means of electricity they are making nitrates from the air at Niagara. The plant has been located in Canada, and the nitrates are sent to power to operate its electric furnaces on this side of the falls. It is, I think, the only plant this side of Norway. I am not sure as to what the Germans are doing.

And then there is artificial graphite, which is made here in electric furnaces by the millions of pounds. This was invented by Dr. Edward G. Acheson, the same man who discovered carborundum. It is electrical, and it uses the most common materials. The product supplied to the military is not graphite, but the lubricants which are greasing the wheels of our motorcars in France and of the other great power machines used there. This graphite is also employed in electric smelting and refining. It aids in producing high-grade steels, alloy steels and other alloyed metals of various kinds.

I might also speak of the new chemicals which are turned out at Niagara. These come from the electric processes, and they have made this the center of the electro-chemical industry of the world. Among other things, they make chlorine, which is used for bleaching our newspapers and which keeps our shirts and handkerchiefs white after washing. This chemical is especially important just now from the wonderful success it has had in the treatment of typhoid and in the purification of our water supplies. It is said that a small capsule of chlorine emptied into a bucket of the vilest water found in the trenches will kill all the germs and make it so that it can be drunk without danger.

Modern Poultry Culture

The poultry show has come to stay. It is vital to the biggest business in the culture of pure-bred fowls. Twenty years ago a great state would have two or three shows each year. The same state would have 20 or 30 now. There are excellent reasons for this modern and Nation-wide emphasis. Every breeder should study the advantages of pure-bred fowls. Thousands are losing heavily every year by slacking along this line. Tenderfoots are too slow to learn. Professionals are reeling after reading liberal rewards. There are patriotic as well as personal reasons for the biggest boom in poultry for this year's poultry shows.

BY G. R. SMITH, Author and Practical Poultryman.

PUBLICITY in business is every thing today. You may have it in some form or you are crippled. The show is one of the cheapest and most efficient methods. The very name, "show," proves what I am saying. If you have good fowls you must let the public see them and pass judgment on them. This is the basis of all your publicity. The test is made. The high value of your goods is proved. The story of your high-class work has gone out far and wide. The rest is easy. One horse is rated at \$50, another at \$20,000. The latter has won his spurs in life-and-death races under the eyes of the best judges of horse flesh in the world. Hundreds of thousands have seen him urged to the farthest possible limit of speed and endurance year after year. The markings have been without mercy. The findings have been authoritative. There is no other pathway to the fabulous price and to National or state-wide publicity. The poultryman must take the same road. His stock must line up neck-to-neck with his neighbor's under the eye of the public. He must let the public see his birds and watch the contest. His winnings will give him standing. Without the ribbon he may carry forward a right profitable business along strictly commercial lines, but he can hope for no high rating as a breeder of pure-bred stock.

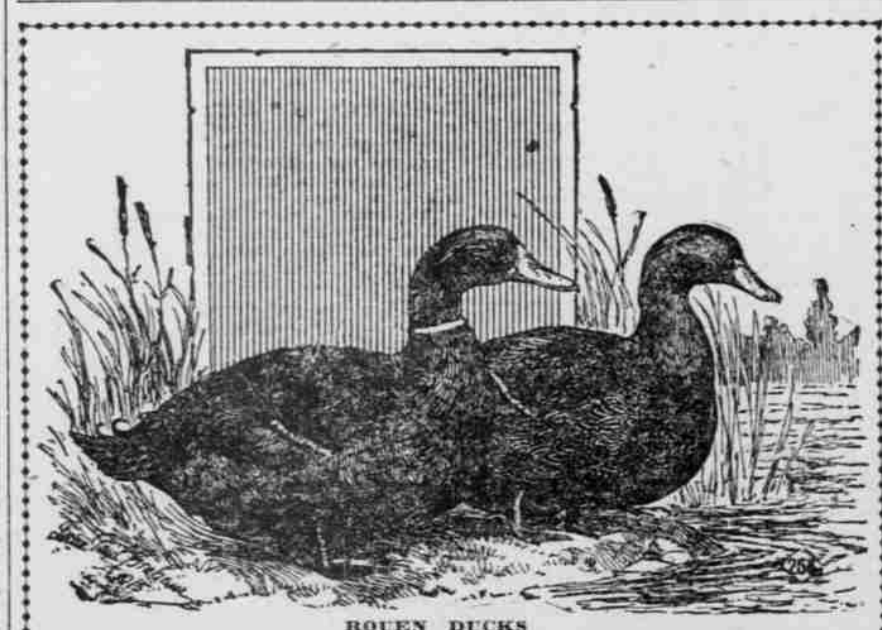
Quality of Stock is Test. Yes, the "test" is in the contest. Thousands of poultrymen do not know the difference between a good stock. Most of them care little for such "points." They therefore monopolize their fowls. There is no incentive to work toward a standard type. They therefore drift. Their ideals are left to drag along on low gear. There is no competition, and therefore there is no life in their business. The man who has decided to exhibit at the next show is different. He has higher goals. He has a race to run. He is to face an antagonist. There is

to be a competition for high stakes and he has entered. Put it as you will, there is a thrill in his business that he never felt before. His birds are to be tested side by side with those of others. Every atom of his genius for business and achievement is appealed to.

The unusual is bound to result. His rating in business is to be known to the public, and he is determined to make it as favorable as possible. "Standards of perfection" in poultry culture will be exhaustively studied, and every possible resource will be forced to yield its "bit" or its might in the breeding of the best fowls that every stooled in his yards. The back-lot amateur and the small farmer are all but wholly dependent on the score card of the poultry judge if they would reach the best there is for them. The highest authorities in the world exactly agree in this unqualified statement. Without the show the mongrel will forge more and more to the front, and

the scoring of the licensed fudge in the public exhibition his \$1000 flock may have a public rating 10 per cent short of its real value. The head of the 10,000-layer poultry plant does not need to be told that the same principle rules in his case as in the case of the small fowls.

Duty is Public and Patriotic. We are patriots first of all. This will remain true of every full-blooded American till this world war is won for humanity. Every man must have the hero spirit. Every day must be lived and every business must be planned to make sure the largest possible industrial output. No one will lose and all will be great gainers by keeping our eyes steadily toward this high ideal. Poultry exhibitions will promote an increased production of the best fowls to a larger degree than any other known agency. The highest authorities in the world exactly agree in this unqualified statement. Without the show the mongrel will forge more and more to the front, and



ROUEN DUCKS

ROUEN ducks originated in France, but English breeders developed their present size and perfection of plumage. They are probably the largest of all ducks, the drakes weighing 9 to 11 pounds and the females 8 to 10 pounds. As a table fowl the Rouen duck is highly esteemed. The meat is fine flavored, surpassing that of most other breeds, but because the Rouen does not grow so fast as the Pekin, the latter breed is preferred by those who grow ducks for market. Rouen ducks are hardy, thriving under ordinary conditions and doing

best where they have a range of woodland and water. In coloration the Rouen is like the wild Mallard, from which it undoubtedly descended. The male has a glossy green head and neck, with a white ring around the neck, and a claret-colored breast, shading into light steel gray lines. The back and top of the wings are brownish gray, penciled like the breast; the wing bar is glossy blue, edged with white, and this in turn is edged with velvety black. The female is brown, each feather pencilled with broad dark brown markings, excepting the back, where each feather is dark brown, edged with lighter brown. She also has the glossy blue wing bar.

present interest in the production on an immense scale of the best poultry that can be bred will soon cease. It is the public exhibition that enlists the largest talent and the deepest and most widespread interest. The history of poultrying proves this. Without the show we are all at sea, with neither compass nor chart. We will sink on, though many will not admit it, but we will never get to any particular and much-desired harbor. It is the score card that tells poultrymen where they are and what they should do. A local poultry exhibition is an amazing stimulus. Better fowls, a largely increased output and a deeper and more intelligent interest in poultry culture, in all its phases, will be certain to follow. The man who knows can do much for the public by promoting such local exhibitions. New information is given to hundreds. Ideals never before dreamed of are caught by the people. A new bunch of young and enthusiastic breeders are swept into line. Many a community has doubled its poultry interests in this way.

Every Egg Counts. This is eminently worth considering. Every pound of flesh, every dozen eggs will have something to do with the winning of the war, the feeding of the millions who are now literally dying of starvation, and the promotion of the prosperity and comfort of the great public. The alarming shortage is not so much of money as of meat. Creation and conservation of food is the supreme need of the time. The world has plenty of gold, but not enough "grub." As the poultry industry is known to one of the most important food industries of our nation, poultrymen should count it a patriotic and public pleasure to promote with great and possible efficiency the poultry show. Such a "cast upon the waters" of the world's troubled life will be certain to return before many days multiplied manifold.

Don't be suspicious. Cultivate confidence in your brother man. Poultry shows are as fair in their findings as any organization. Poultry judges are honest men, doing the best they can to give everyone a square deal. Frenks Not Recommended. "Pet stock" and freaks of nature are incidental and ornamental in most modern poultry exhibitions. The big freaks are the great utility and fancy breeds. It is well to remember, too, that all pure-bred stock of the really useful kind is included under the "fancy breeds." This term is another expression for "full-bloods," or "thorough-breeds." Formerly it had primary reference to the fowls that were bred for their beauty, or their picturesque or grotesque appearances, with little regard to real usefulness.

We have passed beyond the play period in poultry exhibits. It is serious business today. Not that the freaks and the pets are neglected. They are a period of vital consideration. It is the terminus of a year's work, and the beginning of another year's. Preparations for the "winner's" work is the subject of next week's article.

October may seem to be an unimportant month in the poultryman's calendar, but in reality it is a period of vital consideration. It is the terminus of a year's work, and the beginning of another year's. Preparations for the "winner's" work is the subject of next week's article.

comparison and competition hundreds of the finest specimens of thoroughbred utility stock. The rest is largely on the side. We have to thank the showroom for those powerful waves of interest in the best of pure-bred poultry that have swept over the land during the last decade and more. As a quickener of interest in the best of poultry, the show has done nothing that can be compared with the public exhibit. Like the horse show and the cattle show, the poultry show is an annual round-up of the best of the breed. The boys' Oxford have better next year. Do your bit to help it on. You'll get your money back "with usury."

Boys' Shoes Recommended for Tramps in Woods.

Ease and Economy Are Two Main Reasons Advanced for Suggestion.

No matter how much you have to spend for smart and dainty buttoned boots to make the new Fall tailor-made look just right, save out enough for one pair of sensible, low-heeled tan shoes for knockabout wear. Tramping in the Autumn through the burning leaves is so delightful, so invigorating, yet nobody feels like tramping in high-heeled, dainty boots. Comfortable, rubber-soled tennis sneakers are the most practical choice. If you have been done, but there is something very smart about mannish walking soles below a swinging sport skirt. Did you ever try wearing boy's shoes? One woman I know always goes to the boys' department for her golf and sport shoes, though she patronizes the women's department when she needs to be a pretty pair of dancing slippers or formal street boots of the buttoned type which fashion prescribes for formal occasions. The boy's Oxford is not so very different from the feminine sport Oxford of mannish type, but the boyish shoe is built with a wide swing under the ball of the foot, no matter how pointed the toe, and few feminine shoes have this comfortable swing in the sole.

Household Helps. If brass curtain rods are rubbed with hard soap before being put up the curtains will slip on them easily. To pick up bits of broken glass over a woolen cloth, lay it on the floor where the fragments are and pat the cloth to the carpet. The fine glass will stick to the cloth. To whiten ivory rub it well with unsalted butter and place it in the sun to shine. If it is discolored it may be whitened by rubbing it with a paste composed of burned pumice stone and water and putting it in the sun under glass.

To remove stains from a tiled hearth squeeze a little lemon juice over the stain, leave for 20 minutes, then with a cloth dampened with a little warm water wipe off the lemon juice. This will generally remove the stain; if not,

repeats the process. Polish afterward with a soft cloth.

POINTED PARAGRAPHS.

From Chicago News. Lots of people take offense when there is none in sight. The life work of some men seems to be to get into the trenches with a rural contributor says that cider is the spirit of the press. The less a woman has to complain about her husband, the better it is for her. A cynic is a man who must be unhappy in order to appear happy. A man is apt to be suspicious if his wife isn't jealous of him. It isn't what your grandfather was but what you are that counts. The man who marries an orphan can't blame his troubles on his wife's mother. Many a man who claims to be truthful spends a lot of time echoing the lies of other men. If coming across will not teach a young man etiquette, a book on the subject is of little use. What mankind needs is a collar button that will transform itself into a searchlight when it rolls under the dresser. Practice doesn't always make perfect, but it makes some lawyers and doctors wealthy. Even a spinster may have the matrimonial fever, but it doesn't always terminate to her liking. Some folks make a specialty of exchanging their brass for other people's gold.

To Stop a Persistent, Hacking Cough. The best remedy is one you can easily make at home, but very effective. Thousands of people normally healthy in every other respect, are annoyed with a persistent hacking or bronchial cough year after year, disturbing their sleep and making life disagreeable. It's so needless—there's an old home-made remedy that will end such a cough easily and quickly. Get from any druggist 2 1/2 ounces of Pinex (69 cents worth), pour it into a pint bottle, add 1/2 ounce of glycerine and 1/2 ounce of granulated sugar syrup. Begin taking it at once. Gradually but surely you will notice the phlegm thin out and then disappear altogether, thus ending a cough that you never thought would end. It also promptly loosens a dry or tight cough, stops the tickle in the throat, soothes the irritated membranes that line the throat and bronchial tubes, and relief comes almost immediately. A day's use will usually break up an ordinary throat or chest cold, and for bronchitis, croup, whooping cough and influenza, it is nothing better. It tastes pleasant and keeps perfectly. Pinex is a most valuable concentrated compound of genuine Norway pine extract, and is used by millions of people every year for throat and chest colds with splendid results. To avoid disappointment, ask your druggist for "2 1/2 ounces of Pinex" with full directions and don't accept anything else. A guarantee of absolute satisfaction or money promptly refunded goes with this preparation. The Pinex Co., Ft. Wayne, Ind.