HOW THE SCIENTIFIC AMERICAN TROPHY WAS MADE.

In the art of the silversmith we have a striking example of the increased demand for skilled labor which follows the introduction of machinery. Innumerable tools have been invented or adapted for the working of precious metals, but at every stage of their work they call for trained hands and alert brains—the tools supplement but do not supplant.

A brief survey of the manufacture, in the workshops of Messrs. Reed & Barton, of the trophy offered by the SCIENTIFIC AMERICAN for flying machines heavier than air, shows that the work has passed through many skilled hands, and that in each case the worker and not the machine has been the dominant factor.

The first designs, embodying the suggestion of the donor, were sketched out by an artist. Sometimes the artist elaborates a design from crude suggestions; oftener he is the creator. The main lines of a design

Hammer Work.

having been decided on, the proportions are carefully studied and the details worked out, in a complete sketch the actual size of the proposed work. From this completed sketch, the artist makes a final drawing in water color, intended to convey as true an idea as possible of the finished work.

The preparatory work of reducing silver to sheet form, though requiring expert skill and care, is in most respects like that bestowed on any of the metals used in the arts, and the processes of melting, rolling, etc., need not be described here.

In the forming or "spinning" of the metal, the sheet is worked over a turned form, or "chuck," in a lathe. An illustration shows the spinning of the sphere of the trophy—a delicate piece of work which calls for the nicest and most accurate touch on the part of the worker. The spinner's chuck is usually turned from a block of carefully seasoned hardwood; but for undercut shapes—such as this sphere—which will not slide off a solid block, the chuck is built up in sections round a core. When the core is withdrawn the sections can be removed, one at a time, through the aperture in the spun metal.

Another illustration shows the silversmith at work on the lower part of the trophy. Hammer work is still the vital factor in shaping silver, for the delicate touch and control of the skilled worker has not been imitated by machinery. Many of the most beautiful examples of silverware are handwrought in this way; and the hammer, with which the art began ages ago, will doubtless continue to hold its place.

The ornamental features of the trophy were worked directly on it by hand, or reproduced from models specially made for it. These models were built up in wax upon the body or form prepared by the silversmith. This process of modeling is identical with the work of the sculptor who reproduces his models in marble or bronze, and it requires an equal amount of artistic knowledge and skill, in addition to a special knowledge of the technicalities of silver working. The modeler bestows much thought and care on his work, frequently finding it necessary to modify or even change the original design. What looks well in a water-color sketch may not be satisfactory when developed in mass, but may require the accentuating of some features and the subduing of others before a pleasing effect can be secured. When the wax model is completed, a plaster cast is taken, and carefully finished to serve as a pattern for the molder, who reproduces the model in metal by casting.

Casting is delicate work; some of the fine sands from which the molds are made are imported from Europe. These, after being accurately prepared, are tamped into iron frames around the plaster model. When a sharp mold is obtained, the frames are clamped together, dried, and the molten metal run in. With suitable sand and careful manipulation, exceedingly fine castings are secured.

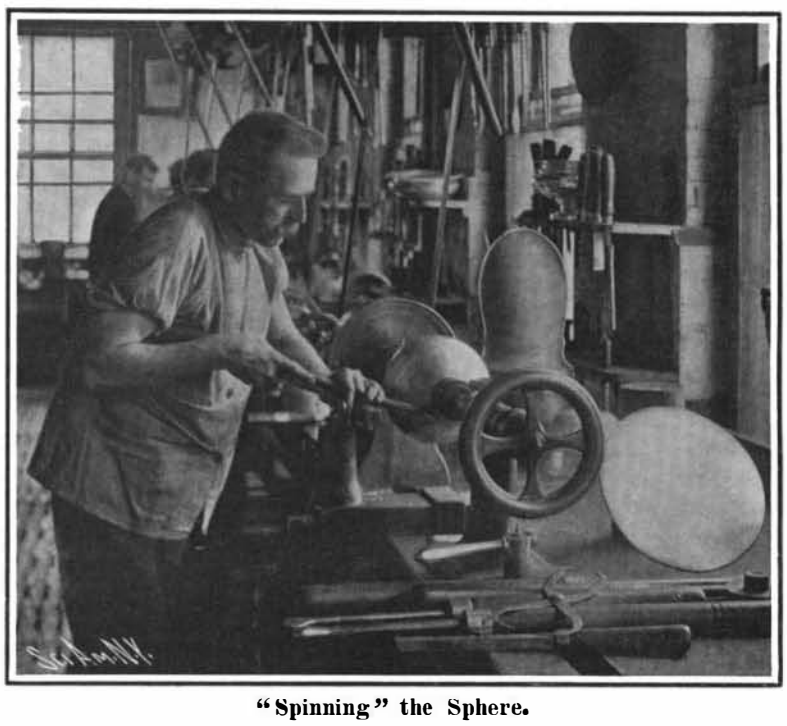
The trophy is a fine example of the work of the chaser, and an illustration shows three men at work on various portions of the piece.

In the chasing of cast or sheet-metal work, a multitude of small tools are required—tiny chisels, punches, and riffles for cutting, hammering, or scraping the surface according to the texture desired. In *repoussé* work, where the metal has first to be raised or "snarled," this is done with a snarling iron—a hammer, which may be inserted in a hollow body, and by a sucession of rapid taps force the metal to rise or bulge out. During the snarling, the metal body is held by the operator, who guides it to obtain the raised pattern just where needed. The raised body is filled with a composition stiffening, which prevents any general sinking while yielding at any special point. The detail of the design is then tapped out on these bulges, by means of tiny punches.

When the spun, hammered, and cast portions of the trophy were chased, the several parts were assembled for soldering together. In soldering, a clean gas flame is used with the ordinary air pressure blowpipe. The portions to be joined having been accurately fitted are scraped clean at the points of contact, fluxed with borax, heated to the requisite temperature, and touched with a thin rod of solder, which should instantly flush the seam. A perfect

Finishing the Original Sketch.

solder joint is practically invisible, and is as strong as the metal itself. The making of a trophy necessitates a perfect cooperation among the workers engaged on it. Each individual must be skilled in his own department, and his work must dovetail in with that preceding and succeeding him. A weak link at any stage will be revealed in the final result. To produce a perfectly satisfactory trophy, such as this one, betokens not only a staff of skilled workers, but a well-organized workshop and men whose hearts are in their work. The trophy is on exhibition for a short time in the showrooms of Messrs. Reed & Barton, 32d Street and Fifth Avenue, New York city, where it is attracting much attention.



"Spinning" the Sphere.

HOW THE SCIENTIFIC AMERICAN TROPHY WAS MADE.

Foreign Apples in Great Britain.

A report from Consul F. W. Mahin, at Nottingham, states that official figures show that Great Britain's annual import of apples is now nearly 9,000,000 bushels. One-half the import is from the United States. The total from all the British possessions is under 4,000,000 bushels; Canada's share is about 3,000,000, and Australasia's nearly 500,000. The import from all foreign countries other than the United States is therefore small. The favorite apples in the British market are certain kinds from the United States, but it is believed that the entire demand for imported apples could be met by Canada and Australasia.

FOOD VALUE OF DRIED FRUITS.

BY SIR FRANCIS HENRY LAKING, M.D., PHYSICIAN TO THE KING OF ENGLAND.

It is to be regretted that an economical and valuable article of food, in the shape of the dried currant, should be so much neglected. The dietetic value of the fruit is misunderstood and the prejudice against it entirely unjustified. Properly prepared, the currant might, with the greatest advantage, form an every-day item in the meals of the people, who seem to choose their food and arrange their dishes with an ignorance the extent of which is appalling. If people could be taught a few simple facts about the worth of various kinds of food commonly eaten, I am of opinion that much benefit would result. If some elementary knowledge of the chemical components of food could be imparted to the masses, I feel sure that our race would be healthier, more vigorous and better equipped to resist the attacks of disease.

Imagine what would be the benefit, if the toilers could be induced to master and act upon the fact that food, to be perfect, must contain in the proper proportions the three main elements—nitrogenous substances, carbohydrates, and fats. It should not be difficult, say, to popularize more extensively an inquiry into the meaning of "proteids"—that they are, in fact, the albuminous fundamental and principal constituents of the animal body; that food accurately abundant in proteid makes for the building of tissue and the making of muscle. The meaning of the word "carbohydrates" should not be incapable of demonstration in popular language; nor should the importance of the proper balance of the sugar in the food be difficult to explain in a manner intelligible to the people.

From recent analyses of samples of dried currants the fact has been verified that the fruit contains no less than 73 per cent of sugar in its most valuable form. This great saccharic proportion is already in the shape of grape sugar, and thus is potential to take up its work of producing and maintaining energy and vitality. It is what is known as "invert" sugar, a composite of dextrose and levulose. It assists digestion; it allays nervous excitement, and provides nourishment in case of nervous exhaustion. No fruit can show this large proportion except those of and kindred with the currant.

I wish it could be more generally realized that, in selecting articles of food to supply the constituents of normal diet, regard should be had to the amount of potential energy in the material. It should be an easy matter to convince the people that this or that food is good or bad—that certain things are abundant or deficient in essential food elements.

For instance, let us make an interesting comparison, and one that should be quite clear to the average intelligence: I mean the comparison between the components of currants and lean beef. The currants show 73 per cent of grape sugar, the whole of which contributes to manufacture energy; the beef contains no sugar at all. Currants contain 1.77 per cent of proteid; the beef 19.3 per cent. In currants there is but 20 per cent water; in beef 72 per cent, the bulk of which is waste. Lean beef con-

tains but 0.6 per cent more heat-producing material than currants, the figures of which as regards fat stand at 3 per cent. These figures referring to the currants are taken from a recent analysis by E. F. Harrison, B.Sc. (Lond.) F.I.C., Ph.C., F.C.S. The figures for the beef are extracted from a table of food values compiled upon the researches of such authorities as Church, Payer, Letheby, Blyth, Pavy, Holbrook, Oldfield, Kress, and others. The result is the disclosure of the important fact that there is no less than 54.87 per cent more total nutriment in the currants than in the beef. The point might be advanced that the currants show a low proportion of proteid, but the people should be warned against the dietetic error of using food containing an excess of proteid. They should also be taught how to supplement any deficiency in the various modes of preparing the fruit for table. They should be shown with what ingredients to mix it, so that it may contribute its powerful assistance in building and maintaining the body. Indeed, I am not wide of the mark when I say that, even eaten alone, the currant contains nutriment in all sufficiency.

In the dietary of the peasant classes of Greece, a people remarkable for their hardihood and health, the currant appears at almost every meal, while in Germany and Holland currant bread is a common article of food; indeed, among the many shapes in which the currant may be brought to table, a bread made of say thirty parts of currants to seventy parts of dough is one of the best.

Currants contain in the right proportion certain valuable acids such as tartaric, citric, and malic. These acids, while having wholesome individual properties, besides being refrigerant, antiseptic, and antifebrile, serve to modify or adjust the flavor of the sugar and help the other nutriment components of the fruit to readily deliver themselves up. It will thus be seen that the toiling and insufficiently fed masses have at their command a delicious article of food which costs the merest trifle and of which they would surely and readily avail themselves did they but know its value. The middle and upper classes, those who are in a sense indifferent to food regarded in its dietetic aspect, but who select it mainly for flavor, have an important adjunct to the table, which gratifies the palate and operates as a liberal auxiliary to health and well-being.

Now a word as to the prejudice against currants. It is a fact, generally overlooked, that the desire to quickly obtain the flavor of food which is particularly acceptable to the palate, has a tendency to induce hurried and incomplete mastication. To obviate this neglect and to obtain the best results, it is important that the skin of the fruit should be broken. The delicious flavor of currants develops in a most marked degree by the act of chewing, and carelessness in this respect is a great loss to the eater.

The splendid varieties of currants grown in the district of Vostizza, and intended to be eaten as dessert, either alone, with almonds, or with any other kind of nuts, are shade-dried, seedless, as indeed all currants are seedless, and of a velvety softness. For children and those who must of necessity adopt a "diet" currants properly treated and prepared will prove a digestive aid and act as a gentle and natural laxative. Therefore, any accusation against this delicious economical and valuable little fruit must fall to the ground as absurd.

Deutschmann's Yeast Serum.

Prof. Deutschmann of Hamburg has opened a new field of serum therapeutics by his researches, which were undertaken for the purpose of obtaining a single serum applicable to the treatment of all germ diseases, both local and constitutional. Deutschmann's serum has the additional peculiarity that it neither produces immunity from infection nor generates antitoxins but simply aids and strengthens the cells of the body in their conflict with disease germs. Microbes of many kinds find daily and hourly entrance into the bodies of men and animals and the issue of the conflict between pathogenic microbes and the cells of the body depends upon the health of the latter. If the body cells are victorious only slight and transitory impairment of health results, but if they succumb to the invaders we have a case of typhoid, cholera, pneumonia, blood poisoning, etc., according to the species of the disease germs. As a rule, healthy bodies successfully resist the attacks of most of these invaders, and Deutschmann's search was for a serum which would confer the resistance of normal, or rather of ideal health, upon a body attacked by zymotic disease.

He obtained such a serum from the blood of healthy animals to which gradually increasing doses of common yeast had been administered, in their food. Yeast has recently been employed with good results in the treatment of carbuncles and contagious local catarrhs. As yeast does not kill bacteria, Deutschmann evidently assumed that it acts by promoting the natural formation of remedial or protective substances in the organisms. These protective substances differ from antitoxins in that they neutralize or destroy all germs, not merely germs of one kind.

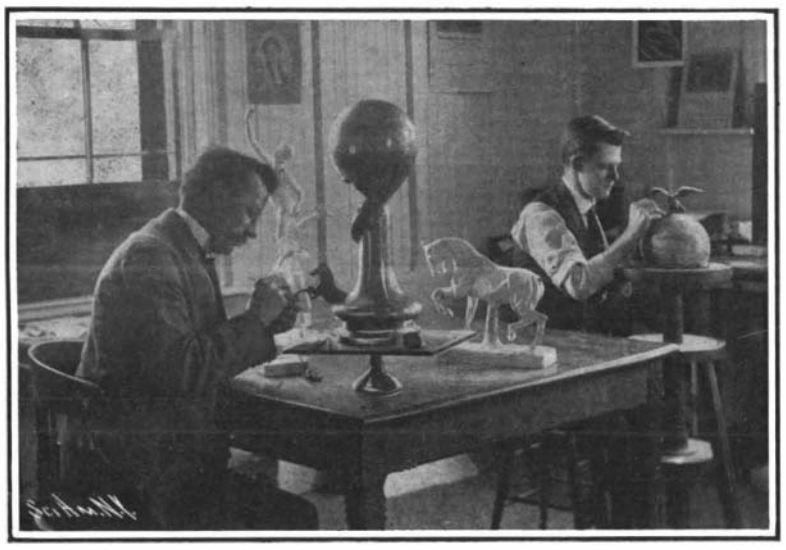
The serum of the animal, which contains these substances, can then be extracted and administered to human patients. The human organism can itself elaborate these substances under the stimulation of gradually increasing doses of yeast, as appears from the successful employment of this treatment in carbuncles, etc., but it cannot do so effectively when it is already seriously diseased. Hence the advantage of the indirect treatment, using the blood serum of a healthy animal that has been dosed with yeast.

The direct administration of large quantities of yeast has an injurious effect, particularly in febrile conditions. (The writer is contemplating a series of experiments on the administration of other remedies by this indirect method.) Deutschmann had in view chiefly the treatment of infectious diseases of the eye and in the Munich Medizinische Wochenschrift (No. 19, 1907) he reports a number of severe cases, from his practice as an oculist, which were completely cured by the serum, without any other treatment.

The serum, however, has been found equally effective in a variety of zymotic diseases. Prof. Deneshi has employed it with success in twenty-four cases of pneumonia. The writer has used it with astonishing results in five cases of contagious sore throat. In each case a single injection of one or two cubic centimeters of the serum brought down the temperature immediately and a cure was quickly effected.

Of cases reported by other physicians I shall mention only the most remarkable—a case of puerperal fever complicated with pneumonia which was cured by a few large doses of serum.

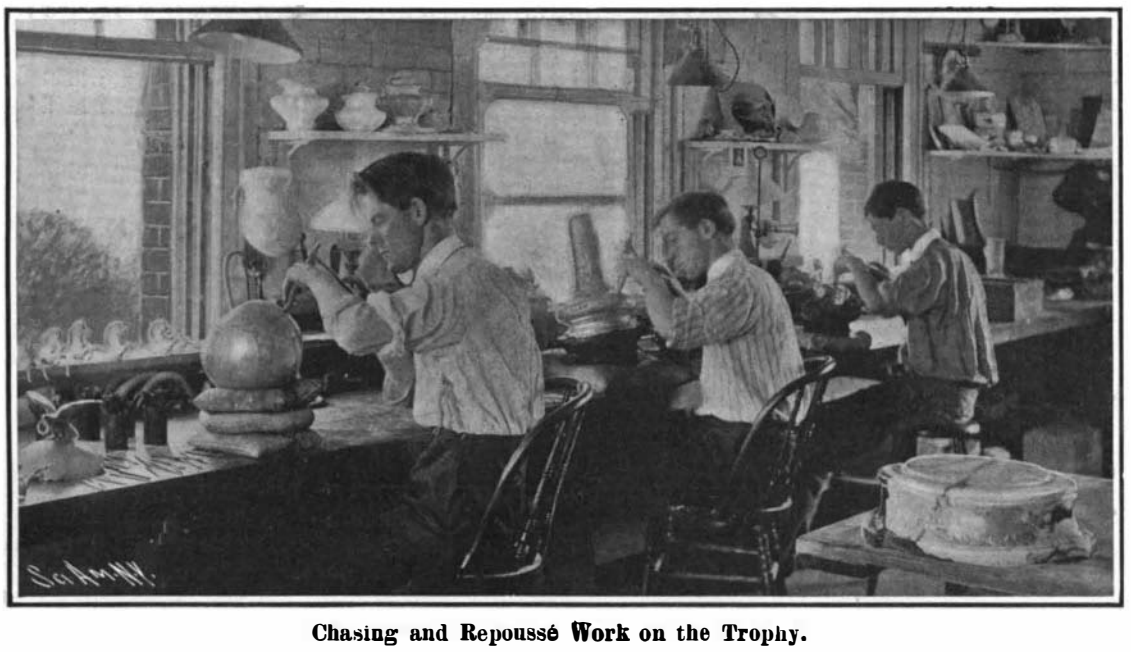
It is too early to pronounce a final verdict on the merits of Deutschmann's yeast serum, but it is evident from the results already obtained that it well deserves the attention of the medical world.—Dr. Friedlieb in Umschau.



Modeling the Decorations.

The Molder at Work.

A free trade-school has been opened at Grace Chapel, Fourteenth Street and First Avenue, New York, where instruction is given in architectural and mechanical drawing, free-hand, clay modeling, tailoring, bent iron work, electrical fitting, carpentry, millinery, dressmaking and cookery. The classes, which are under the supervision of Mr. Arthur H. Kiewitz, M. E., are held on Monday, Tuesday, and Wednesday nights and on Saturday forenoon.



Chasing and Repoussé Work on the Trophy.

The Final Soldering of the Trophy.

HOW THE SCIENTIFIC AMERICAN TROPHY WAS MADE.