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The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are sharp, the articles short, and the facts authentic, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

## SANTOS-DUMONT AND THE EXPOSITION AUTHORITIES.

It is a pity that so soon after the opening of the St. Louis Exposition, so disagreeable an incident should have occurred as that attending the act of vandalism which has put M. Santos-Dumont's airship out of commission. The announcement about the airship was quickly followed by the offer of a reward of \$1,000 by the St. Louis officials, for the apprehension of the miscreant who committed the deed. This certainly was a step in the right direction, and indicated the purpose and intention of the authorities to protect exhibitors and competitors who have made entries at the Exposition. This was followed, however, by a disagreeable surprise in the extraordinary report rendered by the Chief of Police, accusing Santos-Dumont of himself having committed the outrage. This is certainly adding insult to injury. Santos-Dumont is no mere showman. He is a Brazilian gentleman, who from early youth has been the victim of a passion for aeronautics. He has spent a large private fortune in indulging this taste. He has built, launched, and successfully operated some dozen aerial vessels of various types. His success in the field of aeronautics has been pronounced, and has brought to him much recognition from French and other aeronautical societies. It will be remembered that he was the successful competitor for the Deutsch prize of 100,000 francs, having sailed successfully around the Eiffel Tower and back to the point of departure. Santos-Dumont has been before the public eye in France and this country for many years. To accuse him of committing a crime such as that imputed to him, on the flimsy evidence which up to date has been placed before the public by the Chief of Police at St. Louis, would seem unworthy of serious consideration, were it not that it were placing not only doubt, but stigma, on the name of one to whom those interested in aeronautics are greatly indebted. There is every reason to believe that Santos-Dumont is considered as the most formidable competitor for the great prize of \$100,000, offered by the St. Louis Exposition officials. Does it stand to reason that after he had spent many thousands of dollars in constructing the "Santos-Dumont No. 7" for the special purpose of competing for this prize, that he would deliberately commit hari-kiri? The two main accusations brought against Santos-Dumont by the Chief of Police are: First, that he brought the airship to St. Louis for exhibition purposes, and not for purposes of competition; secondly, that he has lost courage, owing to the many accidents during past years in experiments made about Paris, and he was endeavoring to escape the dangers attendant upon the competition. With regard to the first charge, it may be stated that Santos-Dumont is no charlatan, and that it is a well-known fact that he has sunk a large fortune in his aeronautical experiments. At the time that he won the Deutsch prize, it was said that he distributed the large sum of money he received among the poor of Paris.

The reflection upon his courage can not be taken very seriously. His many repeated feats of daring and his long record of successful experiments stand as sufficient refutation of an accusation which seems as unworthy as it is discourteous. The incident will no doubt produce as disagreeable an impression among those who are interested in fair play in France as in this country.

Should any serious delay follow the repairing of the injury to the airship, the authorities, it would seem, should surely afford this visitor at the Fair an opportunity of making good the harm done, and of entering the competition under as favorable conditions as before the disagreeable incident occurred.

## MACHINE GRINDING.

Any one who has ever stood by the side of an iron-planing machine or lathe and watched it slowly slugging off, or what is worse, perhaps, if the job is a hurried one, see it tediously skimming the surface for a finishing cut, must have wished that there was either

another way of doing the work, or that the machine could be speeded up to get along a little faster, no matter whether he was peculiarly interested or not. It seems a great waste of time to do so little; other people think so too, and reduce the amount of stock to be removed to its lowest terms, which does not expedite the work in the least. It takes just as long, so far as the speed of the tool is concerned, to remove a sixty-fourth of an inch as it does to remove a quarter of an inch; quicker feed can be used on the finishing cut, certainly, but the loss of time is in the type of tool employed on the work. Matters have been expedited somewhat by the introduction of new tool steels of late, but there are some drawbacks to the use of them upon the equipment of machine shops generally, the old tools not having power enough to take the cuts that the steel will stand; if it is necessary to get a new outfit of machine tools to use a better steel, old shops will be handicapped for some time to come. The milling machine is the alternative of the planing machine on regular work, but it can not compete with the latter for jobs of all sorts that come to machine shops usually, and the cutters lock up a good deal of money. It comes to this, then, that we must subdue our enthusiasm and stick to the standard machines, or take a chance with still another agent, and that is the grinding machine, which has undoubtedly a future before it. Recent improvements in the capacity and range of the grinder render it available for both large and small work in manufacturing and repair work as well, from chilled rolls 12 inches in diameter down to a quarter-inch rod. If proper precautions in the management of the grinder be taken there is no tool that can compare with it in truth of surfaces, and persons who are skeptical as to this fact may quickly satisfy them by turning a shaft in a lathe, smoking it in any way, and then putting the shaft in a grinding machine; the irregularities left by the lathe tool show in a most surprising manner. The first grinding machine was undoubtedly a grindstone, and even that is no mean adjunct now to finishing metals in the hands of skilled workmen. I have seen gun barrels "turned" on grindstones by merely screwing a dog on one end by which to handle them—which would caliper remarkably well as to rotundity and size. Cutlery never sees any other tool than grinding machines of one sort or another. As regards accuracy of surface and dimensions the machine grinder will do splendid work in the hands of those who know how to run it. Rolls for certain purposes have to be as nearly perfect as human hands can make them, and it is wholly within possibility to grind a pair of rolls, superpose them with slips of the thinnest tissue paper between and have the rolls "bite" them everywhere; not one can be withdrawn without breaking it. This comes pretty near absolute accuracy. But grinding machines have peculiarities of action which it is necessary to know before undertaking their use. Abrasion causes heat; if this is even sensible heat, perceptible to the touch, there will be a change of dimension in the work caused by expansion in different parts. On the start the shaft, or whatever the job may be, is cold, but as the emery wheel traverses the heat increases and the shaft gets larger, so that by the time the surface is finished there are various dimensions when the metal is cool again.

A great variety of work can be done on the grinding machines already in market, but for the average small machine shop all over the country the cost of these tools is prohibitive. They are finely fitted up with every appliance for adjustment at certain angles and for plane and parallel work besides; but certain specific classes of work can be done by very simple machines. Take the case of lathe handles, for instance. The whole of the surface on them can be skinned over, so to speak, from the drop-forging by an emery wheel, the machine to which it is attached having formers conveniently fastened to the carriage, so that ordinarily intelligent boys or handy men can run them. Aside from this detail, which is only mentioned as an example, there are quantities of other jobs, particularly in mechanics' and carpenters' tool shops, which can be executed on a simple tool which could be sold at a low price.

Joseph Horner, an English mechanical engineer and tool-maker, has paid much attention to the grinding machine, and gives some points in Engineering which are worth noting. An objection to the method itself has been made by some who urge that the natural wear of an emery wheel would militate against accuracy of dimension, but Mr. Horner says, on this head, that mistaken notions exist as to the amount of wear of wheels. Under certain conditions wheels will show wear during long roughing cuts; this will happen if the work is speeded too high and the wheel is forced too hard. It will also occur if the wheel is too soft, but with proper management these things should not be allowed. A wheel should not show wear even in a long roughing cut and none whatever in a finishing cut. The wear is controllable to such an extent that it should not be noticeable in doing a large number of pieces of the same kind. One surface speed

should not be used upon all kinds of work. Neither is one kind of wheel suitable for all classes of jobs at different speeds; this can be done, but it is not wise to undertake to cut iron, steel, and brass on the same wheel, for the time spent in changing wheels is more than made up by the better work done when the wheel is suited to the task in hand. Even on the same material the wheel may need to be hard or soft according to the character of the work to be done, either slow or fast cutting as exigencies may demand, and, in some cases, depending upon whether the machine itself is light or heavy; uniform speeds are not adhered to any more than on lathe work. Specifically the speed of the work should not exceed in revolutions from 10 to 40 feet per minute; 100 feet and over is too fast. The grinding machine is in its unappreciated stage, and has yet to obtain its proper place in machine shops.

It is asserted by a manufacturer of emery wheels that it is possible to remove one cubic inch of steel per minute from cylindrical work with proper wheels, and this is by no means the limit of capacity. The Brown & Sharpe Company illustrate the difference between turning in a lathe and grinding with an emery wheel by the fact that in the latter there are, approximately, 2,500,000 cutting points on a wheel 18 inches diameter by  $\frac{3}{4}$  inch face which pass over from 1 to 4 square feet of surface per minute, while a lathe has but one cutting tool at less speed superficially in a given time.

The practice at present is to rough-turn shafts before grinding them, the allowance for the latter operation being a full sixty-fourth of one inch; sometimes a finishing cut is taken in the lathe, but this is a waste of time and does not give so good results, because the temperature is less likely to rise on a rough surface than upon a smooth one. Rough-turning work for a grinding machine should be done with coarse feed, the coarser the better, within reason, for under these conditions the grinder does its best work. The important point is to rough-turn liberally, and grind lightly, never the reverse of these processes.

## THE PROGRESS OF MOSQUITO EXTERMINATION.

It having been demonstrated by many physicians and scientific men that certain species of mosquitoes facilitate the transmission of malaria and fevers from affected communities to those not affected, it follows that the only remedy is to prevent the production of the pest. The method most effective is the drainage of swamps or meadows to avoid standing pools of water; the results obtained in this way have been highly encouraging. Many desirable towns, presenting most attractive locations for residences, have acquired such reputation for having malaria and mosquitos that their development has been greatly retarded. It is to show how easily and with what small comparative expense these depressing conditions can be reversed and improved, that the National Mosquito Extermination Society was organized in this city last winter. The report of the society has recently been published, and contains many useful suggestions as to the best methods to be pursued to prevent the breeding of the mosquito. The society is desirous of enlisting in its membership all persons interested in promoting the general subject, and wishes to secure information from all parts of the country, later to be published in its annual report. As previously remarked, one of the most extensive plans for ridding a locality of mosquitoes is by a thorough drainage of meadows or swamps.

This is now recommended for the great meadows lying east of the city of Newark, N. J., covering a tract about eighteen miles long by four miles wide, or about 27,000 acres. The New Jersey State Geologist and two of his scientific associates have made a report urging the draining and filling of the Newark meadows as the only means of ridding the regions of the mosquito pest.

The report states that the agricultural value of the lands to be redeemed and cultivated would ultimately repay the cost. But the good effect on the surrounding cities and suburban towns in preventing the spread of malaria, thereby promoting the public health, is a greater reason why public aid should be demanded in co-operation with private enterprise or subscription for the prosecution of the work.

Work will have to be begun, no doubt, as that on Long Island was, at the expense of public-spirited citizens who are willing to risk money to prove in a practical way the extermination of the mosquito. It requires co-operation from so many sources that all that private citizens can do by organization and all that the cities can be induced to do in the way of appropriation will need to be combined in order to work on a territory large enough to make the demonstration convincing. It will be an excellent plan for village or town improvement associations in mosquito localities to discuss in public meetings the necessity of eliminating the mosquito pest, urging co-operation with adjoining localities, and show by maps and plans what can be done to secure permanent and lasting improvement. Ultimately, city and State aid can be secured to