Correspondence.

Salvage by Amputation.

To the Editor of the SCIENTIFIC AMERICAN:

I was very much interested in your article in April 27 number of SCIENTIFIC AMERICAN on the manner in which the White Star liner "Suevic" was saved. But the writer is in error in saying this is the first time that a steamer has ever been saved by this process of amputation. The identical operation was performed on the large British freighter "Milwaukee" five or six years ago, when she went on the rocks off the coast of Scotland. Her after part was then floated to dock and the front part rebuilt on, by one of the large Scotch shipbuilding firms.

ARTHUR E. TIMMIS,
Mechanical Draftsman.

Northern Pacific Railroad Company, Tacoma, Wash., May 1, 1907.

Some Ideas on Mechanical Flight.

To the Editor of the SCIENTIFIC AMERICAN:

The mechanics of bird flight have often been in dispute, considerable misapprehension still exists on the subject, and as the successful aeroplane will have to conform very closely to the laws governing bird flight, the subject is of some importance. It may be questioned whether rapid and sustained flight is sufficiently accounted for on the hypothesis of peculiarities in wing curvature, strength of the pectoral muscles, and the sustaining power of the wind. Whoever has observed the flight of a homing pigeon or the leisurely flappings of the crow, carrying it over the fields with the speed of an express train—and who knows something of the power expended in driving a wing model a few yards—must have been conscious of a deficiency somewhere in the accepted theory. A bird in rapid horizontal progress acquires momentum, the mode of flying undergoes a change, the wings are not then used solely for elevation and propulsion, but act in a third capacity, as supporters and accelerators of momentum, it might almost be said that momentum flies the bird. While this is not strictly true, certain it is that it plays an important part in determining the ability of the bird to perform those evolutions and gyrations that have so astonished observers. Prof. Graham Bell in his treatise on kites, mentions having observed a kite advance into a strong breeze by virtue of its weight and velocity, and enunciates the law that momentum is the sum of weight and velocity. By it, flight may be accomplished without the use of the retaining cord. Success in aerial navigation will be obtained by a small, compact, high-powered machine of considerable weight, which will fly at a high speed, and having acquired momentum, consume very little power, if designed so as to utilize the force of gravity, as do some of the smaller flying creatures—principally the sparrow—which in a flight of some duration makes a series of swift descents and ascents, regaining, by a few strokes of the wings, when near the top of the rise, the height lost in friction—a considerable saving in the power ordinarily required, could be effected. For a time dirigible balloons and slow-flying machines of large wing area will impede progress, but eventually these will be discarded in favor of the swifter machine, not only for reasons of economy, but because of the very much more important fact that its small wing area, great weight, and high speed will enable it to penetrate and successfully combat the prevailing wind currents; in short, make it independent of the wind, which after all is the chief desideratum. It may be said in passing that the labors of Count Zeppelin and his contemporaries are so much time and money wasted. However much we may admire the courage and pertinacity of the Count, his judgment in spending a large fortune on such an unreliable and manifestly imperfect thing as a balloon—regardless of the form it may be made to assume—is scarcely to be commended. The balloon offers a quick and comparatively safe method for getting into the air, but its usefulness begins and ends there, for reasons that are too well known to need repetition. A good illustration of the comparative value of the balloon and flying machine, and which these latest attempts at locomotion in a measure parallel, is the old-time sailing vessel, wholly dependent on the wind, and owing its safe arrival to a favoring breeze, and a modern, up-to-date liner, forging its way into the teeth of the fiercest gale by virtue of its weight and inherent power. My own design for an aeroplane—the construction of which must remain in abeyance, through lack of funds—shows a machine of 350 pounds including the weight of its operator (137 pounds) with a supporting surface of one square foot per pound, divided into two sets of superimposed planes, placed one behind the other and curved in the direction of their length. The framework to be constructed from elliptical steel tubing supported on a long, slender, boat-shaped hull. I am experimenting with a means for obtaining automatic stability, which I am confident will not only conquer this greatest of difficulties, but also that of arising vertically and alighting with safety. Granting that the means were forthcoming to properly perfect it, a machine of this description—with the hull fashioned from prepared paper, say, to secure strength and lightness, and the superstructure of elliptic-shaped tubing to reduce the friction, equipped with my device for insuring perfect automatic stability and driven by four two-bladed propellers, actuated by a 25-horse-power engine of the lightest possible construction—would mark an advance in the line of march toward perfection so great as to leave very little to be accomplished. In regard to its sphere of usefulness, a misconception exists that requires correction. Even present-day writers on the subject have fallen into the error of ascribing as the principal retarding cause in the way of its more speedy perfection the fact that it cannot be used in competition with existing modes of transportation; but we have seen the automobile achieve a great success, chiefly as a pleasure vehicle, and there is no doubt that in its final analysis the flying machine will come to be regarded as the pleasure craft *par excellence.*

JOHN C. PRESS.

South Norwalk, Conn.

Aeronautical Enthusiasm.

To the Editor of the SCIENTIFIC AMERICAN:

The over-enthusiasm shown by a large majority of would-be flying-machine inventors, and their desire to at once appear before the footlights of the world's stage, upon the first conception or dream of a plan to navigate the air is wonderfully apparent.

Many of them, too, get no further along in the mystery of this great problem than the making of a few drawings, when, lo! it is announced to the world that Mr J. W. has, after years of study, practically solved the problem. Two or three of J. W.'s aerial flyers and a few hundred pounds of dynamite are the only essentials needed to strike terror to all warring nations.

How beautifully this dream of the airship inventor has been portrayed in the past few years, and how truly idiotic it proved to be after its exploitation!

The writer has in mind a few of these inventors, who, previous to the breaking out of the Spanish-American war, were telling the public how, upon short notice, with their dirigible balloons and flying machines, they could bring a war to a sudden close, once it had started.

To the believer in anything and everything, this was interesting reading; but, at the pop of the first gun, what become of these patriotic geniuses? Did they show up? Did any of them go to the front, and prove that they had really solved the great problem by destroying the enemy's army, or forts, or battleships? Did any of them destroy anything more than the paper upon which their boasts were written?

I believe that the Wright brothers, of Ohio, and Santos Dumont, of Paris, are working along lines that offer the most feasible means of mechanical flight; but there is a great field for practical experiment before them. Mr. Hiram Maxim spent much time and some thirty thousand dollars on a purely mechanical machine of the aeroplane type, and then threw up his hands by donating his work to the British Museum.

I have had many suggestions placed before me for mechanical flight, some of them with merit; but in each case there was no money for experiment. I believe that the government should hold a fund to be portioned out in the way of assistance to sincere inventors in this line, the same as is done in some foreign countries.

The experiment which Prof. Robert W. Wood and Otto Luyties, of Baltimore, are about to try, that of raising a vessel into the air by means of propeller wheels, is not new. The experiments of Hiram Maxim in England and Prof. Ritchell, of Connecticut, both of whom have given their experience in testing the pulling power of propeller wheels of large and small diameters, and at high and low velocity, were, as nearly as I can recall, about as follows: Hiram Maxim found that an 8-foot wheel driven at a velocity of 150 revolutions exerted a pulling force of about eight pounds, and Prof. Ritchell found that a 24-inch wheel at a velocity of 2,000 revolutions, exerted about the same pulling force, 8 pounds.

These tests do not appear to hold out much inducement to experiment along the lines of Prof. Wood and some others I know with similar ideas.

N. R. BRIGGS.

[Mr. Briggs does not mention the lift per horsepower, which is the criterion by which propellers are judged as to their efficiency. Prof. Wood has obtained a lift of 3 pounds with an 8-foot propeller driven at about 150 revolutions per minute by a 1-12 horse-power electric motor. This corresponds to 36 pounds to the horse-power, while 20 is a fair average. In Maxim's experiments it was found that a small, high-speed propeller was more efficient than a large slow-speed one, while Prof. Wood claims the reverse to be the case.—EDITOR.]

Solution to the Watch Problem.

The following is the solution to the watch problem which appeared in our issue of April 20 on page 335:

A watch derives its power of motion from the recoil of the mainspring, and the recoil is governed by the balance and lever. For instance, if it takes 24 full turns of the stem to wind the watch, and the watch runs 24 hours when fully wound, then for each turn of the stem it will run one hour. A more simple method is to hold the stem firmly between the fingers and turn the watch around. In winding the watch to run for one hour, the ratchet on the main spring will click, say, 30 times, which proves that this watch runs two minutes for each click of the ratchet which is attached to the main spring. We will suppose it was 12 o'clock noon when the watch was last wound up, and you now wish to know the time. Beginning to wind it up, you count the clicks, and find that before it is again wound up fully it (the ratchet) clicks 130 times. By dividing this by 30 we get 4 1-3, or 4 hours and 20 minutes, which added to 12 o'clock makes the hour 4:20 P. M. While watches are not all exactly alike, the principle is the same, and it is simply a case of mental arithmetic in order to be able to tell the time. But you must always remember the time of the starting point or first winding, and after that the time at the last winding.

The above was the method used by the poor old peasant, whose life mostly depended on his release, and who was immediately rewarded by the king with his liberty and a life pension.

Death of Sir Benjamin Baker.

Sir Benjamin Baker died on May 19 at Pangbourne, Berkshire, England.

He was born in 1840, and was undoubtedly one of the greatest engineers of the world.

The two engineering works by which he will be best remembered are the Forth Bridge in Scotland, and the Assouan Dam. Eiffel, the French engineer, declared the former "the greatest construction in the world." It is 2,765 yards long and cost $15,000,000. It is built on the cantilever principle and its main spans are each 100 feet longer than the main span of the Brooklyn Bridge. Its steel towers, 360 feet high, give 151 feet headway above the Forth at high water.

The Assouan Dam also cost about $15,000,000. It is a mile and a quarter long and raises the level of the Nile sixty-seven feet.

The dam is 120 feet high, and varies in thickness from 82 to 26 feet. Behind it, in a lake of 140 square miles, is stored water sufficient to insure the irrigation of the Delta in the dryest season.

For his work as consulting engineer of this great work Sir Benjamin received from the Sultan the First Class of the Order of the Medjidie. He had already been made a Knight of the Order of the Bath and of St. Michael and St. George. He received several honorary degrees from the leading universities of Great Britain, and was a Fellow of the Royal Society.

The Current Supplement.

The current SUPPLEMENT, No. 1639, opens with an article entitled "The Fate of the Temples of Philæ." Apprehension is felt by archeologists concerning the ultimate fate of the ruins of the temple as the result of the projected increase in height of the Assouan barrage across the Nile by 23 feet. The current SUPPLEMENT'S article presents an admirable study of the subject. The Census Bureau has just issued a report presenting statistics of women at work. This publication of nearly 400 pages is carefully digested, so that its more striking facts are readily available. A simple gas generator for laboratory use is described by W. M. Mills. "Ionic Therapeutics" is the title of a contribution in which the therapeutic effects of electrolytic treatment are graphically described. The problem of protecting concrete from freezing and thawing is one which has baffled the engineer. Mr. Richard K. Meade describes how calcium chloride may be used for the prevention of freezing. The demolition of the great wheel at Earl's Court, which for twelve years has formed so conspicuous a feature of the London landscape, involved engineering problems of no mean order. It was inadvisable to blow down the structure by means of dynamite because of the presence of neighboring buildings; accordingly, it was necessary to take the wheel down piecemeal. How the work was accomplished is very thoroughly described in a well-illustrated article. A history of the Wright brothers' aeronautic experiments is given by Octave Chanute. A good review of experiments on European systems of electric canal haulage is published. Prof. Alexander Graham Bell's paper on aerial locomotion is continued. For nearly eight months in the year the householder in the eastern parts of the United States is confronted with the problem of heat, ventilation, catarrh, and coal bills. The condition of the air breathed in dwellings and offices is, therefore, worthy of attention. Mr. Wilford M. Wilson throws a flood of light on the subject.