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NAVIGATING THE AIR.

SINCE the time when the first balloon ascension was made at Paris, in 1783, the interest in aerial navigation has been periodically revived. We are now in the midst of one of these revivals.

Two different systems of navigating the air have engaged the attention of inventors. One of the plans is to carry up, by means of a balloon, an engine which will work a propeller, and thus drive the balloon through the air. The other plan is to dispense with all buoyant power, and to rise and move through the air by the simple power of the engine beating the air, as a bird does in flying. The first of these methods is practicable, to a certain limited extent, in the present state of the arts. Balloons have been made capable of carrying up 1,700 lbs. There is no difficulty in making a steam-engine which, with its boiler, water, &c., and a moderate supply of fuel, would weigh less than 1,700 lbs. Such an engine, if properly attached to a suitable propeller, would move the balloon through the air. But a balloon, to support such a weight, requires to be so very large, and, consequently, the resistance of the air would be so great, that the motion through the air would be exceedingly slow. As the currents of air move with great velocity, the balloon would move mainly with them, and would be almost as much at the mercy of the winds as a balloon without any steam-engine attached. Of course, the resistance of the air would be more readily overcome by making the balloon pointed at the ends, or, as it is technically termed, of the cigar shape. Still, the weight of a steam-engine is so great in proportion to its power, and a balloon requires to be so large, even to support the weight of a man, that we have no faith in the idea of navigating the air, to any useful purpose, by means of balloons and steam-engines.

In regard to the other method of flying by the simple power of the machine, the problem reduces itself to the production of a machine which shall have a certain power in proportion to its weight. If we can get a machine which shall have the same power, in proportion to its weight, as the muscular power of a bird is in proportion to its weight, the machine can be made to fly. This proportion would have to be enormously greater than it is in the steam-engine, or any other engine at present known. It does not seem very probable that the thing will ever be accomplished; still, there is nothing to justify us in asserting, positively, that it never will be. A person who considers the past triumphs of science and skill is slow to affirm that anything cannot be done, unless it is physically impossible. We can conceive of a power being produced by gas generated by chemical decomposition, so as to dispense with a boiler. If such a power could be applied to driving an engine, by using a rotary engine and running it with great velocity, we should have a large power in proportion to the weight of the material; perhaps large enough to enable us to fly. At all events this is the point to which inventors who wish to navigate the air must direct their attention. No contrivance of wings and straps and pulleys and springs will enable a man to fly by means of muscular power, or by means of any of the engines at present in use. If this problem could be solved so that we could fly with as much facility as a bird does, it would furnish us with the most perfect of all modes of locomotion.

RICHARD COBDEN & AMERICAN MECHANICS.

High birth and great wealth place men in elevated positions, but they do not make them truly great, or honorable men. The man who, perhaps, exerted more political influence than any other personage in Europe during the last 30 years, was Sir Robert Peel, the calico-printer. The Corn Laws of England, which were enacted to conserve the interests of the nobles and large landed proprietors at the expense of the manufacturers and mechanics, were abolished through his influence while he was prime minister, after they had existed for half a century. The triumph which was thus achieved, he candidly acknowledged, was in a great measure due to the labors and light thrown upon the question by Richard Cobden, another calico-printer. This gentleman visited our country last winter, examined closely the working of our institutions, and returned home very favorably impressed with our country and people. To the credit of his countrymen, who esteemed him highly on account of his honesty and ability, he was elected to represent the constituency of Rochdale, while absent in America, a voluntary act on their part, as the position was unsolicited by him. On his return home last month, they gave him a grand entertainment at which there were several thousand persons present; and upon that occasion he made a speech which contained some remarks so complimentary to our mechanics that we cannot forbear publishing some of them. As a reformer he is also an advocate for voting by ballot in electing representatives to the House of Commons, and it was while discussing this question that he said:—

"I will mention one illustrative fact which I acquired in America on this subject. Now, understand, I am not going to quote America as a country where you should go for imitation in everything regarding her political institutions, which are as unfit for us in some respects as ours would be unfit for them. But this I may say, in passing, that the white men of the United States have a theory of government which they have laid down in their institutions, which, if the human instrument be equal to the political machine, means to deal justly and fairly by every man in their community. But now I confine myself to one fact that was given to me in my travels in America. I was speaking to a gentleman—whose letter I may read, for it is in but few words—whose name (Mr. Randall) is known to some of our statesmen here, for I remember he gave evidence before a committee of the House of Commons upon which I sat to inquire into the mode of proceeding of our Houses of Parliament, in order to furnish information as to the rule of the Congress of the United States. He is a man standing high, both socially and politically. He mentioned this fact in conversation with me, and wishing that I should have the full benefit of the information under his own signature, he wrote me a letter after I left Philadelphia, where the gentleman lives (and I shall take care to have it published), addressed to me at Washington. It contains these lines: 'I have been for fifty years connected with political and party movements in Philadelphia, and I never knew a vote bought or sold.' That is one of the largest cities in America, and contains one of the largest populations of mechanics and workmen, for Philadelphia has changed its character from being as it formerly was a leading seaport, and has become almost entirely a manufacturing city, with 600,000 or 700,000 inhabitants."

For quite a number of years Richard Cobden was under the ban of the aristocratic politicians in Parliament, because, while they despised him for his comparative poverty, they were envious and jealous of his mental powers, and he was thus shut out from office, while men of far less ability were put in. The honest *right* however has triumphed at last; he was offered a seat in the present Cabinet with Lord Palmerston, which he refused, and he is now an independent member of Parliament, unshackled with office and aristocratic connections, so that he can advocate the rights of the people with a warm heart and "clean hands."

HARD INDIA-RUBBER.

The long-disputed question is settled at last! "There is nothing like—india-rubber." Having given, last week, a description of the manufacture of the great staples of soft india-rubber, and wishing to complete the account of the business, we stepped (yesterday) into the warehouse of the American Hard Rubber Company, No.

63 Maiden-lane, this city. If the soft rubber manufacture surprises us by the great quantity of its staples, that of the hard rubber does not less astonish us by the endless variety of its products. We were shown, first, a vast assortment of druggists' articles, syringes, caustic-holders, medicine bottles, ear-trumpets, stethoscopes, trusses, tunnels, tumblers, tooth-picks, &c.; secondly, saddlery and hardware goods, martingale-rings, whip-sockets, &c.; and, finally, a great variety of stationers' goods and fancy articles, such as pens, pen-holders, pencils, paper-folders, paper-weights, rulers, wafer-boxes, sand-boxes, finger-rings, watch-chains, brooches, bracelets, necklaces, shirt-studs, ear-rings, tidy-needles, crochet-needles, tatting-needles, crosses, table-casters, thimbles, thread and needle-cases, dice-cups, photographic apparatus, salad-forks and spoons, canes, combs, hair-pins, bonnet-pins, tape-measures, napkin-rings, knife-handles, door-mats, curry-combs, rules and scales for draughtsmen and surveyors, and numerous other articles.

The properties of the hard rubber seem to adapt it to a larger variety of uses than, perhaps, any other substance. It is not perceptibly affected by most of the acids, oils and alkalies; it absorbs no moisture, and is consequently very durable in the atmosphere, and does not shrink and expand by being wet and dried. When used for setting teeth, it does not absorb the moisture of the mouth, and consequently remains inodorous. Efforts have been made to use it for shuttles, billiard-balls, and various other new purposes; and, though the difficulties have not yet been overcome, they will probably yield to the ingenuity of our inventors.

Hard india-rubber is made by mixing one pound of sulphur with two pounds of india-rubber. The patent was granted to Nelson Goodyear (brother of the famous Charles Goodyear), on May 6, 1851.

DEFLECTION OF GIRDERS UNDER DIFFERENT SPEEDS.

Some time ago a statement was made in the London *Athenaeum* that a bridge &c. was not so much affected with a load passing over at a high as a low speed. To this assertion, a correspondent makes the following reply:—

"I have waited to see whether any one would point out the fallacy of Stephenson's statement that 'either iron or ice will bear a weight passing over it at a greater velocity, which it could not bear if it went slower;' and that 'when it goes quick the weight in a manner ceases.' The very reverse of this is the truth, as was clearly established by the Iron Commission, which was appointed a few years since, to inquire into the causes of the breaking down of the iron bridge over the Dee. And the principle so established is now universally acted upon throughout our railroads: the speed of trains, upon approaching bridges of any considerable length, whether of iron or wood, is usually slackened to eight, six, or even four miles an hour, according to circumstances; and the same rule, viz., of going slow, and not quick, is always observed in passing over an unsound part of an embankment. I myself was present at some very interesting experiments made by this commission at the iron bridge of the South-eastern Railroad, near Epsom, in the presence of Lord Wrottesley, Sir W. Cubitt, the Astronomer Royal, and several others. Professor Willis had contrived a very ingenious apparatus, which, fixed to the center of one of the iron girders, measured and registered the deflection of the bridge at the passing over of any weight. An engine with a heavily-loaded tender was then passed over the bridge at speeds varying from 10 to 60 miles an hour, and it was found that the greater the speed the greater the deflection of the girder."

THE AURORA ELECTRIC BATTERIES.—During the prevalence of the brilliant Aurora which lately visited this region, the best evidence of its electrical character was afforded to our telegraphic operators. The atmospheric electricity became so powerful that it overcame the battery current, which in some instances was shut off, and messages were actually sent between Philadelphia and this city by the Aurora. In this case the atmospheric current was no doubt positive, and this affords some proof that the design for storing it up and employing it for useful purposes by balloons, as described on page 9, this volume, SCIENTIFIC AMERICAN, was not so hypothetical as some persons have supposed.