

SCIENCE IN THE MAGAZINES.

A FULLY illustrated description of Mr. Maxim's experiments in aerial navigation is contributed to the *Century* by Mr. Maxim himself. The account of the new flying machine and its various parts is the best we have seen. The total result of Mr. Maxim's experiments is now fairly well known. It has been proved that a machine, carrying its own engine, fuel, and passengers, can be made powerful and light enough to lift itself in the air. The experiments also prove that an aeroplane will lift a great deal more than a balloon of the same weight, and that it may be driven through the air at a very high velocity, and with an expenditure of power very much less than that required to drive a balloon at even a moderate pace. In addition to this, they have clearly shown that a well-made screw propeller obtains sufficient grip on the air to propel a machine at almost any speed, and that the greater the speed the higher the efficiency of the screw. These results have certainly forwarded the problem of aerial navigation. The *Century* also contains an article on customs, fêtes, and celebrations in American Colleges for Women; and, in the same magazine, a brief description is given of the new anti-toxin treatment of diphtheria.

In the *National*, Mr. Stanley Lane-Poole pays tribute to the memory of the late Sir Charles Newton. (A notice of some of the researches of this distinguished archæologist will be found on p. 250.) Prof. Foxwell replies, on behalf of professed economists, to Lord Farrer's article in the October number of the same review, upon the Standard of Value. Towards the end of a contribution on the present state of the Royal Navy, Mr. W. Laird Clowes expresses himself upon the subject of the education of naval officers. Referring to the training of a naval officer, he remarks: "A century ago . . . it was not necessary that he should know anything of chemistry, of engineering, of hydraulics, of pneumatics, of electricity, and of half a dozen other subjects concerning which he must now know more than a little. . . . But at present, if an officer goes to sea, he has to suspend, in a great measure, the progress of his education. Theory is at the base of nearly all of it, and the theory is just as requisite as the practical experience, and, indeed, in some matters, even more so. . . . The seaman is in process of becoming the engineer; every year he becomes more and more the engineer; and I am certain that a much briefer experience of the sea than was formerly needed is now required towards the formation of a good officer. *Per contra*, he who would be a good officer requires very many things which are more easily obtainable at Portsmouth than in mid-Atlantic. We may regret the change, but we must not shut our eyes to facts. And I think the sooner the change is fully recognised, and the whole scheme of the education of naval officers is radically altered, the better will it be for the service." Mr. Clowes, however, does not seem to have sufficiently taken into account the difference between the duties of the navigating officers of the navy, and the engineers. Naval engineers at the present time receive admirable training in both the theory and the practice of the machinery with which a modern battleship is equipped. Does Mr. Clowes hold that navigating officers should receive the same kind of training? The statement that the seaman is in process of becoming the engineer, will hardly be accepted literally by those acquainted with the naval service. The engineers and engine-room artificers are fast becoming the most important men on board, but the distinction between them and the navigating staff is as hard and fast as ever it was.

In the *New Review* are some verses having a singularly strange and appropriate rhythm, by the late R. L. Stevenson, in which he has expressed his keen sense of the struggle for existence; and we find in the critical article upon this last among the many losses of 1894, by Mr. Archer, how profoundly modern scientific thought had affected his philosophy. There is also the first instalment of an eccentric story by Mr. H. G. Wells, in which, after certain rather paradoxical dealings with the four dimensions, a "Time Traveller" starts into futurity upon a *Time Machine*. What he found there remains to be told in a subsequent number, but there certainly seems scope for the scientific imagination in such a story.

A paper on "Feeling of Beauty in Animals," in *Chambers's Journal*, will interest students of nature. So long ago as 1866 a letter was published in the *Athenæum* under the same title, and attracted the notice of Charles Darwin. Birds offer, perhaps, the best proofs of a feeling for beauty exterior to themselves. There are the Bower Birds of Australia, and the Gardener Bower

Bird of New Guinea, each of which decorates its bower with various objects. The Hammerkop or Hammerhead also nourishes æsthetic tastes, and other instances of birds showing a decided taste for ornament are described in the article referred to.

A passing notice will suffice for the remaining articles on scientific subjects in the magazines received by us. Some interesting reminiscences of the late Oliver Wendell Holmes as professor of anatomy, are given by Dr. T. Dwight in *Scribner's Good Words*—the first number of a new series—contains the first part of a paper on Sir Isaac Newton, by Sir Robert Ball; and some speculations by the Rev. Canon Scott on the physiological consequences that would have resulted if the earth rotated from east to west instead of west to east. Mr. Grant Allen writes another "Moorland Idyll," in the *English Illustrated*. To the *Humanitarian*, St. George Mivart contributes the concluding part of his popular exposition of the doctrine of heredity. We are glad to note that the second number of the *Phonographic Quarterly Review* contains several scientific articles, each of which will help to familiarise phonographers with scientific phrases. The *Contemporary* has an article on the London County Council, by Mr. Sydney Webb, in which the work of the Technical Education Board is incidentally referred to. In addition to the magazines and reviews named in the foregoing, we have received the *Fortnightly*, *Longman's*, *Cornhill*, and the *Sunday Magazine*; but in none of these is science given a place.

SEASONAL CHANGES ON MARS.¹

FOR the substantiation of changes on the surface of Mars, it is of paramount importance that the drawings to be compared should all have been made by the same person at the same telescope, under as nearly as possible the same atmospheric conditions. So much, at least, is fulfilled by the drawings referred to in this paper. For they were all made by Mr. Lowell at the same instrument, under the same general atmospheric conditions. Even the different eye-pieces used vary chiefly in a manner to minimise, if anything, and so emphasise the differences observed. For with increasing image the higher power used tends to decrease the contrast. The result is that it largely offsets the difference in contrast due to nearer approach, and leaves simply a case of magnification, with the values untouched.

Since, furthermore, the drawings were all made in the months preceding and following one opposition, secular changes are practically out of the question; and any changes that appear, are presumably of a seasonal character. They constitute of themselves a kinematical as opposed to a statistical study of the planet's surface.

The resulting phenomena are much more evident than might be supposed; indeed, they are quite unmistakable. As for their importance, it need only be said that deduction from them furnishes, in the first place, strong inference that Mars is a very living world subject to an annual cycle of surface growth, activity, and decay; showing, in the second place, that this Martian yearly round of life must differ in certain interesting particulars from that which forms our terrestrial experience.

The phenomena evidently make part of a definite chain of changes of annual development. So consequent and, in their broad characteristics, apparently so regular are these changes, that it is not difficult to find corroboration of what appears to be their general scheme in drawings made at previous oppositions. In consequence it will be possible in future to foretell, to some extent, the aspect of any part of the planet at any given time.

The changes in appearance presented by the planet described by Mr. Lowell, refer primarily not to the melting of the polar snows, except as such melting forms the necessary preliminary to what follows, but to the subsequent changes in appearance of the surface itself. To their exposition, however, the polar phenomena become inseparable adjuncts, since they are inevitable auxiliaries to the result.

With the familiar melting of the polar snow-cap, therefore, this account properly begins, since with it begins the yearly round of the planet's life. With the melting of the Earth's Arctic or Antarctic cap might, similarly, be said to begin the

¹ Abstract of a paper by Mr. Percival Lowell, in *Astronomy and Astrophysics* for December.