

## SCIENCE IN THE MAGAZINES.

MR. CHAS. DIXON has discovered a new law of geographical dispersal of species, and he expounds its capabilities in the *Fortnightly*. Here is a statement of his conclusions:—"Species in the northern hemisphere never increase their range in a southern direction; they may do so north, north-east, or north-west, east or west. Species in the southern hemisphere never increase their range in a northern direction; they may do so south, south-east, or south-west, east or west. The tendency of life is to spread in the direction of the poles. Among the six corollaries which I have drawn from this law, mention may be made of the following. By the fourth corollary, species never retreat from adverse conditions. If overtaken by such they perish, or such portion of the species that may be exposed to them. By the fifth corollary, extension of range is only undertaken to increase breeding area. By the sixth corollary, contraction of range is only produced by extermination among sedentary species, and probably also by extermination (through inability to rear offspring) among migratory species that are neither inter-polar nor inter-hemisphere. . . . If this law of geographical distribution be true, polar dispersal of species—in other words, from the direction of the poles towards the equator—is a myth." Mr. Dixon brings forward a number of facts in support of his theory, which will no doubt be given the consideration it deserves.

An address by Mr. Leslie Stephen, on the choice of books, appears in the *National*; but, to prevent misconception, it is just as well to state at once that scientific literature is altogether ignored. Yet it is difficult to understand why this should be, for writings of men of science are apparently included in the definition stated by Mr. Stephen himself. "Literature, in short," he writes, "is one utterance of Matthew Arnold's *Zeitgeist*—the vague but real entity which is a summary of all the sympathies and modes of thought and feeling characteristic of the best minds at a given stage of human progress." A few natural history notes will be found in the *National*, in an account, by Miss Balfour, of a journey through the British South Africa Company's territory, in 1894.

Among other popular articles on natural history in the magazines received by us, we notice "Nestlings," by the Rev. Theodore Wood, in the *Sunday Magazine*, and "Snake-Taming" in *Chambers's Journal*. This periodical also contains a very readable elementary description of the great Indian Trigonometrical Survey. Mr. L. N. Badenoch describes a number of species of Plasmidæ in *Good Words*. In the same magazine Sir Robert Ball writes on the life and works of Copernicus. Under the title, "Tesla's Oscillator and other Inventions," a good account of some of Mr. Tesla's recent electrical work is given in the *Century*, by Mr. T. C. Martin. The article "discloses a few of the more important results he has attained, some of the methods and apparatus which he employs, and one or two of the theories to which he resorts for an explanation of what is accomplished." It is illustrated with fifteen figures, all of which possess points of interest. Mention must be made here of a short biographical sketch of Helmholtz, contributed by Mr. Martin to the March number of the *Century*, but overlooked at the time. The sketch is illustrated by a fine engraving from a photograph of Helmholtz, taken in 1893. A brief note in *Cassell's Family Magazine* describes some curious tubular dwellings constructed against the side of a small aquarium by the species *Amphithoe littorina*. The tubes are semicircular, and composed of sand and small pieces of seaweed, cemented together with a glutinous matter secreted by these shrimps.

The practicability of constructing a railway from the Mediterranean to India is discussed by Mr. C. E. D. Black in the *Contemporary*. Over India proper there are 18,500 miles of lines open to traffic. But westward these lines break off at Peshawur, Chaman, and Kurrachee. It is proposed that a line should be constructed from Port Said, through Northern Arabia, along the edge of the Persian Gulf, to Kurrachee—a distance estimated at 2400 miles.

In addition to the magazines mentioned in the foregoing, the *Humanitarian*, *Scribner*, and *Longman's Magazine* have been received. A portrait of Prof. Bonney accompanies an article on "Science and Faith" in the first of these magazines.

PRECIOUS STONES, AND HOW TO DISTINGUISH THEM.<sup>1</sup>

AMONG the duties which fall to the lot of an official in the Mineral Department of the British Museum, in his otherwise unromantic and sternly studious life, is one which is not altogether devoid of human interest. It may happen, for example, that a lady having inherited a priceless heirloom in the shape of a large emerald, travels from the Antipodes in order to sell it in England for its true value, and desiring to display its charms brings it to the Museum. To inform such a person that the stone is but green bottle glass cannot be a pleasant task.

Only within the last few months came an Afghan prince who had sold his worldly goods, travelled to the coast of India, and worked his passage to England, having secreted about his person a stone which he supposed to be of enormous value. His story was that as he slept upon the hillside, Mahomet had appeared to him and told him that he would find a rare jewel under his hand. The poor man could not be convinced that a stone with this celestial guarantee could be anything common; for, as he said, "Mahomet cannot lie." Be this as it may, the stone was quartz, and its princely owner could only be advised to repair his fallen fortunes in some Oriental fashion at Constantinople—Kensington.

It is curious that the stones brought by such people are always, in the opinion of their owners, gems of the greatest value and rarity. Could they but have consulted some competent expert nearer home, they would have been saved time and money and bitter disappointment.

But after such interviews, I have always been very forcibly impressed by the fact that even the experts do not seem in the least aware of the simple and certain methods which have been placed at their disposal by recent mineralogical research. There is, perhaps, no subject in which experts have been so slow to take advantage of practical methods supplied by science as in the manipulation and discrimination of precious stones.

The stones brought by these chance visitors have often been bought and sold over and over again under totally false names. There is, I suspect, scarcely a collection, public or private, in which some of the jewels are not wrongly described.

Mistakes are constantly made; and these are sometimes of considerable commercial importance. It may be remembered, for example, that a few years ago much excitement was caused by the discovery of rubies in the Macdonell Range in Southern Australia. Much time and money was wasted in their extraction before it was discovered that, like the so-called Cape rubies, they were merely garnets.

I should be the last person to underrate the great value of that knowledge which results from long experience, or to deny that in ninety-nine cases out of a hundred an expert may be absolutely right. Every one must admire the confidence with which a practised eye can even pick out from several packets of diamonds those which came from a certain mine.

Such a professional expert may in five seconds pronounce a judgment which it might require half an hour to establish by scientific methods, and one which may be equally correct.

But there is a vast difference between "may be" and "is," and scientific men are not satisfied with that sort of judgment, but require actual proof.

One ought to distinguish between two sorts of expert knowledge—that which results from long experience and the training of eye and hand, and that which results from familiarity with scientific methods. To have confidence in the non-scientific expert, one must place reliance upon his personal character and the soundness of his senses, and be sure that his actual experience has included problems similar to the one submitted to him, and even then he may fail in that hundredth case.

But the scientific tests cannot err; moreover, they furnish a proof which carries conviction to all who see it. The opinion of the expert need convince none but himself.

An exact parallel is to be found in medical practice. It is no doubt often possible for a doctor of experience to diagnose diphtheria and phthisis by their symptoms. But in recent years new methods have been made available by the discoveries relating to bacteria, and at the present time no diagnosis of diphtheria or of the early stages of consumption would be con-

<sup>1</sup> A lecture delivered at the Imperial Institute, by Mr. H. A. Miers.