

SCIENCE

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THE GROWTH OF SCIENCE is well illustrated in the recent appearance in the *Century* of the series of articles on the new astronomy by Prof. S. P. Langley. These have been republished in book form by Messrs. Ticknor & Co. of Boston. We now have a new chemistry, a new physics, and a new astronomy; and, owing to the way in which the older brothers or older sisters have been endowed, these new-born sciences find themselves without the pecuniary means for their proper support. To quote from Professor Langley's preface, it is not generally understood that among us not only the support of the government, but with scarcely an exception every new private benefaction, is devoted to the old astronomy, which is relatively munificently endowed already, while that which he has called the new, so fruitful in results of interest and importance, struggles almost unaided. The great national observatories, like Greenwich or Washington, are the perfected development of that kind of astronomy which was only interested in recording the movements of the solar system. From primitive times man knew where the sun would rise on a certain day; and the record of this knowledge is left us in the prehistoric buildings, if such they may be called, of Britain. At Greenwich the moon has been observed, with scarcely an intermission, for a hundred and fifty years, but not for the purpose of seeing what it was made of, but for the purpose of forming the lunar tables, which, by means of the moon's place among the stars, will give the navigator his positions. In the same way at the Washington observatory one may see a wonderfully exact instrument strongly bolted to massive piers, and so immovable that the sun can be observed by it but once daily as it crosses the meridian. This instrument is the complete attainment of that long line of progress in one direction of which the prehistoric stones at Stonehenge mark the initial step,—the attainment, that is, purely of precision of measurement. The new branch of astronomy, which has had its entire growth within a few years, studies sun, moon, and stars for what they are in themselves and in relation to ourselves. Its study of the sun, beginning with its external features, led to the further inquiry as to what it was made of, and then to finding the unexpected relations which it bore to the earth and our own daily lives on it. This new branch of inquiry is what Professor Langley calls the 'new astronomy;' and it is for this new astronomy—this study of the celestial bodies to find out their nature and their relation to us, rather than for the purpose of simply recording their relative motions—that Professor Langley has made so beautiful and so eloquent an appeal for the proper endowment of this new field of research. No one can read this book of Langley's without feeling that astronomy has acquired an entirely new interest for him. It now results in something more than the dry-looking pages upon pages of tables.

THAT THE ORIGIN of color-blindness lies in the brain, and not in the eye, has been suggested by Professor Ramsay. While engaged in teaching in Brooklyn some years ago, the principal of a school insisted in treating every case of the sort as dependent on the will of the pupil. His remedy was the rod. This certainly seemed a tyrannical and unwarranted treatment, but the result was favorable to his theory. Is it possible that a thorough examination will ultimately demonstrate that the fault lies very largely in the shiftless methods of observation which have grown up under the old classical system of education, and which have to a large extent

become hereditary? Professor Ramsay's suggestion and his argument deserve careful attention, and, if found correct, we have another and overwhelming reason for the newer education. At first sight, it is not perfectly clear, on the above theory, why it is that color-blindness should be more common among men than among women; yet it is possible that this will be found to bear out the suggestion made above, for, with the discontinuance of the wearing of colors by the men, their interest in colors to a large extent must have ceased; and if our old methods of education were to be continued much longer, it may be, that, with the less use of color by women in their dresses, an increase of color-blindness might result among them as well. It is doubtful, however, whether the introduction of the rod as a quick corrective will find many advocates.

VOLAPÜK.

THIS is the name of an artificial language recently devised for international use. Similar attempts have been made at various times to produce a vehicle of uniform expression for the world's speakers; but modern literature knows nothing of these efforts. All have been abortive. Will Volapük be more successful?

A universal language must have a phonetic representation—a 'real character'—that shall be easily and uniformly intelligible to all readers. The new candidate for universality is in the mean time unprovided with any international medium of writing. It cannot, therefore, while this want is unsupplied, be diffused as a spoken language. Take, for example, the title 'Volapük.' The English reader deciphers this word into the syllables 'Vol-a-puk,' with customary sounds; but the intended pronunciation is 'Voh-lah-puek.' A French or a German reader would have no difficulty with the syllable 'pük,' but the English system of letters can give our readers no idea of the sound. The employment of Roman letters, while they have such diverse phonetic values in different languages, must effectually prevent the oral use of Volapük in different countries. As a written language it might still, however, be of service.

Is Volapük the best language that science can create for this ideographic purpose? Is it superior to previous essays of the same kind? The most elaborate and complete of all earlier schemes for a universal language is undoubtedly that of Bishop John Wilkins. This system was printed for the Royal Society in 1668. The analysis and the classification of ideas, on which the 'Philosophical Language' is founded, are beautifully ingenious. A similar principle of arrangement was afterwards adopted by Dr. Roget in his well-known 'Thesaurus of English Words and Phrases,'—a book, by the way, which owes its existence to the labors of Bishop Wilkins, although no acknowledgment of such indebtedness is to be found within its pages. The bishop's scheme for a universal language is indeed referred to, but only as having been "soon found to be far too abstruse and recondite for practical application;" while no mention is made of the grand feature of the work, on which the whole scheme is based,—the fundamental grouping of thoughts and expressions. This feature is simply, silently appropriated in the 'Thesaurus.' The latter is a very cleverly executed work; but the credit of its plan, however improved by Dr. Roget, should have been ascribed to the original designer, Bishop Wilkins.

Before examining the details of Volapük, let us look at some of the characteristics of the older scheme. The complete categories of ideas are comprised under forty 'genuses or heads,' to each of which a radical sign is appropriated. This sign is susceptible of the addition of subordinate marks, which, on defined principles, signify species, differences, etc. The resulting geometrical figures make up the 'real character.'

The application of the system is illustrated in the Lord's Prayer