

**LITTLE MASTERPIECES
OF SCIENCE: THE
SKIES AND THE EARTH**

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Little Masterpieces of Science: The skies and the earth by Various

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VARIOUS

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Little Masterpieces
of Science

Edited by George Iles

THE SKIES AND THE
EARTH

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LITTLE MASTERPIECES OF SCIENCE

GENERAL INTRODUCTION

THIS is the golden age of science, a time of creative energy, broadening horizons, new revolutionary truth—an age which the race for centuries to come will esteem great and memorable as the epochs of Pericles, Augustus or Elizabeth. Like travel-worn wayfarers, whose delight in a new and commanding prospect suffers subtraction in the fatigues and perplexities of their journey, the strife through which the great conquests of our time have been reached prevents our prizing them as they deserve. In eras of the past triumphs have been won in the fields of empire, art, imagination; those of this age are in the universal realms of science. Not a few men of prophetic vision had glimpses of these triumphs long ago. Nearly two centuries have passed since Alexander Pope could say:—

All are parts of one stupendous whole,
Whose body Nature is, and God the soul;
That, chang'd thro' all, and yet in all the same;
Great in the earth, as in th' othereal frame;
Warms in the sun, refreshes in the breeze,
Glow's in the stars, and blossoms in the trees,
Lives thro' all life, extends thro' all extent,
Spreads undivided, operates unspent.

And how much richer is Nature, as we know it to-day, than the Nature of the times of Queen

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Anne! Not only has man been winning knowledge of her in a thousand fields of exploration, experiment and philosophy, but each of the myriad strands in her skein is traced as subtly bound to every other in ways unimaginable to the most piercing intellects of eras past. Some of the finest of Pope's verse was inspired in the garden he loved to pace, but how much more he would see around him there were he living now! He would find the whole scheme of heavens and earth implicated in that garden's beauty. Its soil telling of forces of storm and heat and chemic war, all at work, in time too extended for computation, to grind primeval rock to fertility. He would see the incomparable tints of every flower conferred by diverse elements aflame in an orb a celestial diameter away; elements akin to the flower's own substance. Other indebtedness would be detected in the tribes of buzzing insects surrounding each blossom, insects, which, while sipping a flower, lend vital aid in continuing its race. No hue or scent here without its use in enticement of this winged ministry! And were the poet's garden only various enough in its tenantry, he might count among his flowers many strictly conforming to the mould of their insect visitors. Wheresoever he might turn his eye in the whole realm of Nature he would see it fuller, richer; its every province more intimately interlaced than when he penned his eloquent Essay on Man.

Whilst the study of Nature has been revealing

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so much as the generations have swept along, there has been a parallel advance in knowledge at work, and a parallel alliance there of near and remote. As the web of science is unfolded the more closely do we find its threads knit together.

At the beginning of the nineteenth century certain salts of silver were found sensitive to light, and photography was born. In its latest employment it has reproduced books; seized every detail of a bird's flight; enabled the rainbow to paint its every hue; depicted stars and nebulae far beyond telescopic vision; caught the shadow of a bullet buried in human bones. Progress in photography is no more than abreast of progress in chemistry, electricity, engineering. Every discovery of a cardinal fact or law extends the range of applied science with a bound, and with a bound which ever lengthens. For each fact and law has a vital tie with every other, and adds one to the multiplier enriching thought and life; when the capital of science increases, so also does the rate of interest at which it compounds.

In its material and immediate sphere, we are in little danger of forgetting the rapid growth of the wealth of science. We are daily informed of some fresh marvel of ingenuity in railroad appliance, in the creations of naval and engineering architecture. Every newspaper tells us of some new piece of scientific ingenuity—electric, telescopic, chemic—all intended to enlarge human powers, or to confer upon man powers wholly new. Remarkable as all these practical applica-

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tions of science may be, it is not in these so much as in its broadening and correction of human thought that this age will be memorable for all time. Upon men not yet old, new heavens and a new earth have dawned in the successive decades of their lives. A generation or so ago the word "universe" had a significance faulty and meagre in comparison with its meaning to-day. To be sure, the visible contents of space were regarded as one, but that there was an equal unity of law, of sequence in nature, was not understood. Then, current theories of the universe were theories of creations, annihilations, suspensions of natural law. Year by year has science advanced until order has at last dislodged magic from every stronghold of her ancient territory; the universe has been discovered to be in agreement with itself.

In an important point of view the history of modern knowledge is the history of identification, of tracing the many in the one, or reducing what seemed antagonism to concord, difference to unity. It was in physics that this process of identification first took place. Fifty years ago electricity was imagined a fluid. Chemical affinity was deemed essentially different from either heat or mechanical motion. Observers and experimenters have in our day established that every phase of physical force is in its last analysis motion, and is therefore identical with every other; that throughout all its maze of transformation, its quantity remains ever the