

THE WONDERFUL CENTURY

ANYTHING from the pen of Alfred Russell Wallace, the co-formulator with Darwin of the doctrine of the survival of the fittest and the greatest living writer on natural history, is entitled to our respectful attention, be the subject what it may. In *The Wonderful Century. Its Successes and its Failures*, Mr. Wallace has chosen a field in which his ripe

THE WONDERFUL CENTURY. Its Successes and Its Failures. By Alfred Russel Wallace, author of "The Malay Archipelago," etc., New York. Dodd, Mead & Co.

years and long memory, his power of lucid disquisition and his skill as a dialectician have abundant room for display. He spreads before our eyes the gains of the present century in the arts and sciences, and contrasts them favorably with the discoveries and generalizations of all preceding ages of the world.

Leaving aside fire, which all mankind seems to have known from the remotest ages, and which is by far the greatest of human discoveries, the author finds only five inventions of the first class in the centuries preceding our own, namely, the telescope, the printing press, the mariner's compass, Arabic numerals and alphabetical writing, and to these he adds, with some hesitation, the steam engine and the barometer, reminding us that Watts's engines were used almost entirely for pumping before the year 1800. Of theoretical discoveries before the present century he mentions the foundation of modern chemistry, the foundation of electrical science, the theory of gravitation, Kepler's laws, the differential calculus, Harvey's proof of the circulation of the blood and the determination of the velocity of light by Jupiter's satellites. We may point out here that writing and printing have been the means of preserving for mankind the vast accumulated capital of discovery and speculation, together with the earnings acquired from using it by each succeeding generation, thus forming a sort of universal bank where all may draw and none may waste, where the interest returned by a single mind in a century may more than make up for the apparently fruitless toil of millions of other minds. The Arabic system of numerals, with its decimal notation, has given the world a universal standard of value, so that quantities of things of the same kind can be counted and their relation to other quantities seen by men of different tongues and races with certainty and without mental effort.

Of the discoveries of the present century, Mr. Wallace places railways first and steamships second, as they happen to be in point of development and as they undoubtedly are in the importance of their effect upon the destinies of the human family. A great military critic has forcibly pointed out the similarity of conditions which applied alike to Alexander the Great and Napoleon, by reminding us that between Arbela and Waterloo the limitation in time of human action was the speed at which a horse could gallop. If the electric telegraph had not been invented we should now have railway trains running at a speed of at least 150 miles an hour to subserve commercial needs. As it is, mechanical transportation has more profoundly altered the conditions of human existence than all other discoveries put together. Only seventy years ago the growth of London was limited to the number of mouths which could be fed by the fields of Kent, Essex and other surrounding counties within horse-and-cart radius; to-day, London eats fresh mutton from New Zealand and bread from the Dakotas. That this change is due directly to the substitution of mechanical traction for horse-haulage is proved by the fact that, in New York city to-day, the cost of hauling a ton of coal one mile by horses is approximately fifty cents under the most favorable conditions, while the same ton is profitably hauled one mile on the railway for half a cent, or one-hundredth of the cost of horse traction. Nearly all the colossal fortunes of the present have been due, either directly or indirectly, to mechanical transportation, whether by an increase in the value of city property, by the bringing of outlying sources of raw material within the radius of manufacturing centres, by the quick and frequent turnover of capital invested in the wholesale collection and distribution of commodities, by the direct profits of transportation

or by the gambling in securities based upon one or other of these forms of tangible wealth. Nor are the political and social changes less remarkable, though these are probably as yet only in their infancy. The concentration of the multitude in cities has given it vast powers of political action and an audible voice, has endowed it with fierce aspirations for some of the comforts and ease of exhibited wealth, and has allowed the passion of envy its first opportunity to turn the minds of whole communities from honest toil to the legislative pillage of the earnings of their more fortunate neighbors.

We must pass rapidly over the remaining subjects given as successes by Mr. Wallace, merely pointing out the chapter on dust, which is now believed to give us our moderate rains, our brilliant sunsets and our diffused daylight, as equal in fascinating lucidity of statement to anything ever written by Tyndall on kindred topics, and assuring the reader that the remaining chapters of this part are quite as alluring in every respect except that of novelty as the one devoted to dust. These chapters deal in broad yet accurate outlines with the electric telegraph and similar discoveries, lucifer matches, photography, spectrum analysis, physics, cosmic theories, geology and natural selection. We miss in Mr. Wallace's treatment of modern successes only the invention of Bessemer steel and the long-distance transmission of electrical energy.

The second and larger half of Mr. Wallace's work is devoted to what he terms the failures of the present century, and includes the rejection of phrenology and psychical research as subjects worthy of the undivided attention of eminent men of science; some statistical arguments which he believes are absolute proofs that vaccination is a delusion; and chapters on the curse of militarism, on the demon of greed, and on the plunder of the earth.

Phrenology has hitherto been rejected as a concrete science by those best qualified to judge, because it has no "constant," as mathematical men would say. The thickness of the skull is most variable over that very part of the brain which is believed to be the seat of the higher intellectual powers. Pathologists have repeatedly seen cases of accidental injury to the brain substances where functions at first suspended by the injury or loss of a portion of the brain, have subsequently been resumed, thus showing that brain functions are not strictly localized, but may be transferred elsewhere should the necessity arise. If we add to these two damaging disproofs of phrenology, as now understood, the one fact about which psychologists seem agreed, namely, that no classification of the attributes of mind can arrange its component parts in strictly defined independent spheres, we may see that an accurate terminology—the first requisite—is wholly wanting.

We have far more sympathy with Mr. Wallace's plea for a deeper consideration of hypnotism and its allied studies. Here we are willing cheerfully to acknowledge that the palpable methods of weighing and measuring applicable to more material studies may fail wholly to give us the possible results attainable. It may even be that the presence of a hostile critic at attempts to penetrate lesser known psychological phenomena may have an action as disturbing as the proximity of a dynamo would have on a delicately poised magnetic needle. Such facts are only negative disproofs at best, and should be considered as part of the difficulties to be surmounted before the phenomena themselves can be studied with any hope of arriving at the truth. Surely there is nothing more marvelous in "thought transference" than in the action of gravity. In both cases there is action at a distance, through an utterly unknown or

purely hypothetical medium by some means incomprehensible to our senses. Yet, since Newton saw the apple fall and formulated the law of the attraction of bodies to each other, we have all believed in gravitation, though we know no more about how it is carried into effect to-day than its discoverer did two centuries ago. Newton, however, was able to provide himself with a working hypothesis, capable of the widest verification, while the channels through which we must approach the study of obscurer mental phenomena are choked up with charlatanism, fraud, pure hallucinations, mere coincidences against enormous odds and simple self-deceit. We regret that Mr. Wallace utterly destroys the strength of the case by giving as "proofs" of what he asserts a reference to the performances of Eusapia Paladino, who was publicly exposed as a fraud in Cambridge, England, by Mr. Maskelyne, the conjurer (see note on page 211; also, letter from Mr. Wallace to the *Daily Chronicle*, January 24, 1896). We are firmly convinced that no ground will ever be gained by the employment of professional mediums, while noble and useful minds may be unbalanced by such means. But between the line which shuts out mediums and the line where crass sceptics stand shouting out "animism," "the conservation of energy," and other scientific exorcisms, there is a wide belt of neutral ground, occupied by men like Sir William Crookes and Professor Oliver Lodge.

We have left ourselves no room to speak of Mr. Wallace's views on vaccination, which must lead him to reject as false and unfounded all the researches of Pasteur and Koch. Nor can we deal with his socialistic methods of feeding the poor, believing, as we do, that the result of putting his plans into action would be starvation, anarchy and the positive decline of our present civilization. The last chapter, however, which he calls, "The Plun-

der of the Earth," is most suggestive, and starts the inquiry as to whether mankind as a whole is under any moral obligation not to waste recklessly the natural resources of coming generations.

E. H. Mullin.
