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THE EXTENSION OF SENSE.

In "What the Coming Man may be" we considered, not long ago, some of the possibilities of humanity in respect to the development of man's moral and intellectual faculties; and seeing, with the hero of Locksley Hall, that the thoughts of men are widened with the process of the suns, we looked forward to a time when faculties such as Shakespeare, Newton, Mozart, Michael Angelo, and other men of great genius enjoyed shall be the common inheritance of the race: a time when the average man shall as far surpass the highest men of today in moral and intellectual force as the latter do the lowest savages or the most brutal of our prehistoric ancestors.

In his suggestive address before the American Chemical Society, Dr. Draper touched another aspect of the question, the extension of man's faculties of sense. Referring to the two well known classes of nervous fibers—those which gather the impressions of external things and convey them to the nerve centers, and those which transmit the dictates of the will from within outwards—he observed that, in the improvement of the capabilities of one of the former by telescopes, microscopes, and other sight-aiding contrivances, we have an earnest of what may hereafter be done as respects the four other special organs of sense: while as concerns the second class, the increase of man's power is not less remarkable. The resolves of the will may already be transmitted beyond us with even a greater velocity than in the living system itself, and that across vast terrestrial distances and beneath the sea. "Telegraphic wires are, strictly speaking, continuations of the centrifugal nerves, and we are not without reason for believing that it is the same influence which is active in both cases."

The learned lecturer might have added that the extension of sight by no means exhausts the improvements of special sense already arrived at. In range and delicacy of action, the aural apparatus of the skilled musician surpasses that of the savage even more than his visual organs do: while the extension of sight by means of lenses is all but paralleled in hearing by means of modern acoustic apparatus. Already we may here by telegraph the intonation of a speaker, or the notes of an instrument, many miles away; the entanglements of sound are analyzed by the inventions of Helmholtz as completely as those of light are by means of the prism; while by Koenig's apparatus the eye is constrained to do the work of the ear, sounds inaudible by the ear are, so to speak, heard by the eye, and the range of human knowledge and capacity for investigating Nature, are thereby vastly extended.

In a scientific point of view, Dr. Draper goes on to say, such improvements in the capabilities of the organs for receiving external impressions, such extensions of the distances to which the results of intellectual acts and the dictates of the will may be conveyed, constitute a true development, an evolution none the less real though it may be of an artificial kind. "If we reflect carefully on these things," he adds, "bearing in mind what is now known of the course of development in the animal series, we shall not fail to remark what a singular interest gathers round these artificial

developments—artificial they can scarcely be called, since they themselves have arisen interiorly. They are the results of intellectual acts. Man has been developing himself. He, [so far as the earth is concerned, is becoming omnipresent. The electrical nerves of society are spread to a plexus all over Europe and America: their commissural strands run under the Atlantic and Pacific."

When shall this line of development have an end? In his reach of sense-perception, his mastery of time and space, his ability to foresee and control the course of Nature, making the powers of earth and air to serve him and do his bidding, the man of today surpasses the gods of yesterday. Who shall say what the man of tomorrow may not be?

It is high time to cease canting about the degeneracy of of man in these latter days. Those who spend their lives among the dreams of the ancients, knowing nothing of the powers and achievements of modern man, may be pardoned for proclaiming their own inferiority; but they have no call to speak for the real men of the real world about them, the men who are doing the world's work, at the same time steadily lifting humanity to higher and yet higher planes of capacity and power.

In spite of those who persist in facing backwards, denying that scientific progress is any measure of human evolution, the progressive development of human force and faculty is a reality. Where the ancient athlete could strike a blow of a hundred pounds, the modern mechanic can deal one of as many tons; the steam hammer, the rifled cannon, the rock-riding dynamite being as truly human as the muscle on his shoulder. In creating them, man has added to his personal power as truly as if he had increased by so much the forces of his right arm. The telescope, the microscope, and the spectroscope are extensions of his eye. The resonator, the manometric cell, and the electric sounder are additional ears. The electric telegraph enables him to be and to act in a thousand places at once. Indeed all that science and art have done to make man master of the conditions and forces of Nature may be considered so many extensions of his organic endowments.

Yet, much as has been accomplished in this direction, much as the civilized man excels the savage in scope and reach of faculty and force, the scientific development of human capabilities has but just begun. As Dr. Draper happily expresses it, we have in what has been done merely an earnest of what the future has in store. In the direction of taste and smell, the Universe is almost entirely unexplored. Properly disciplined and aided by mechanical and other means of increasing their range and acuteness, these senses may prove as efficient in the exploration of Nature, as serviceable for the mental and material advancement of humanity, as either sight or hearing. Already we have an intimation of what discipline may do for the sense of touch in the exquisite tactile sensibility of some blind people, in the extreme sensitiveness of the bat's wing and the antennæ of insects: and even greater promise is held out by taste and smell as exhibited in the chemist's ability to distinguish thereby many rapid or odorous substances, in quantity too small to be otherwise detected. Still more strikingly are the possibilities of these senses manifested in certain nervous states produced by drugs or disease, especially that condition of exalted sensibility known as hyperæsthesia. And it is quite possible that, as the microscope, acting externally, increases the natural acuteness of vision, so the range and acuteness of the senses excited by contact may be correspondingly increased by substances acting interiorly through the nervous system.

It is true that such exaltations of sense-perception are apt to be attended with mental disturbances more or less disqualifying the subject for logical thinking; but we cannot pronounce it impossible for chemistry to discover or produce compounds capable of bringing about the one state unattended by the other: in other words, capable of heightening in any desired degree the acuteness of any sense without deranging at the same time the proper balance of the purely mental faculties. Besides, a telescope or a microscope in the hands of an untrained savage is quite as puzzling in its action, as confusing in its results, as the direct testimony of our senses is under hyperæsthesia. And it seems not less reasonable to suppose that the mind may learn to adjust itself to the new conditions of perception as readily in the one case as in the other. In either event—the discovery of other means of exalting sense, or the education of the mind to act normally under such new conditions—an enormous extension of human faculty must result; and the coming man may find therein the means of surpassing us, as signally as we do the most brutish of barbarians, in our power of penetrating the secrets of Nature and turning them to our advantage.

THE GREAT CYCLONE IN BENGAL.

If the disasters which have overtaken the unfortunate inhabitants of Bengal, India, had occurred in ancient times, we should now possess traditions of punishments inflicted by an offended deity, besides which the legends of the Flood, Sodom and Gomorrah, and the Egyptian plagues would be altogether inconsiderable. The population of the province is now as numerous as that of the United States. Through the failure of the rice crop in 1878, owing to protracted droughts, a famine occurred which killed off the people by the hundred thousand, and the deaths would undoubtedly have reached millions had not the British Government exerted itself to send immense quantities of food among the starving cultivators of the land. Now comes one of the most terrible hurricanes ever experienced in that land of typhoons and fierce storm; and official reports tell us that over 250,000 people have fallen victims to the three great