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## THE PRESENT RIGHTS AND DUTIES OF SCIENCE.

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The great truth underlying the subject of this paper is that everything human has its ethical aspect. A stone, a brick-bat, an ounce of dynamite, or an ounce of gold, may in itself be absolutely unconnected with the domain of morals; but so soon as it comes into human hands questions of right and duty cluster round it. If this is true of merely material things, still more is it true of operations of mind. Every thought, every imagination, every conclusion, has direct relations with the moral nature as well as the intellect. It becomes us, then, in viewing the materials of our modern civilization and social systems, to regard them from this point of view, and not to allow any great power to be abroad in the world without questioning it as to its duties and ascertaining what are its rights. It is in this ethical aspect that I desire for a little to regard the developments of modern science.

Science is a term of wide application, and may include any of those subjects of human thought in which facts are systematically arranged and referred to definite general principles. I propose here to take a narrower range, and to restrict myself to those sciences which relate to matter and force—the physical and biological sciences. Not that, with one of our modern schools of thought, I regard these as including all sciences worthy of the name, but because these have in our times attained a growth so vast, and have come to bulk so largely in the eyes of men as agencies for good or evil.

The rapid advance of precise knowledge and of inductive results with reference to matter and the energy which actuates it, and the myriad ap-

plications of this knowledge to the arts and utilities of life, constitute indeed one of the main features of our time—one by which it is markedly distinguished from bygone ages, and one by which it will probably be characterized in the estimates formed of it by ages to come.

The cultivators of science have also come to be a most important class, even in numbers, and in influence greatly more important; and while on the one hand they appear as patient, self-denying plodders, toiling for the good of their fellows, on the other they become aggressive and troublesome when they attempt too rudely to explode our old ideas or to change our old ways.

What duties, then, does society owe to science and its cultivators, and what reciprocal rights devolve on them? Or, to put in the converse way, What are the rights of science in relation to society, and what its duties to society in return?

With reference to its rights, science has fared very differently in different periods. In the dawn of civilization we can see in Chaldea and in Egypt bodies of learned men sheltering their scientific pursuits under the garb of religion, and cultivating, as a means of securing consideration, no little chicanery in the form of astrology and divination. Yet these adventitious claims were sometimes dangerous as well as profitable. If the magi of Babylon had not mixed up their science with the forecasting of events and the interpretations of dreams, Nebuchadnezzar would not have condemned them to be slain and their houses made a dunghill. It is not to be concealed that similar baseless pretensions may still produce conflicts between science and other powers in society.

In the Græco-Roman period, with a few exceptions, among which Aristotle

stands pre-eminent, science wandered from the safe paths of accurate investigation into those of speculative philosophy, prematurely grasping at the ultimate explanations of things; and so lost credit and cultivated opposition and contempt. We shall see that still the same tendencies produce like results.

The Arabian science, one-sided and unequal, and never penetrating the mass of the people, owed whatever it possessed of good to the inheritance of the practical culture of the East as distinguished from the speculations of Greece. Short-lived and leaving only a few brilliant results, it has at one time been unfairly overlooked and at another unduly exalted.

In the Middle Ages, amidst the exiles of the distant old world and the birth of Arabia, the dread realities of life and death pressed too heavily on men's minds to permit much scientific activity, and caused them to cling to civil and ecclesiastical despotisms subversive of free thought and fatal to scientific progress. Yet in those dark ages were laid many foundations of good things to come.

With the emergence of the modern world out of the chaos of the Middle Age, came the revival of learning and the birth of modern science—from the first a healthy babe, cradled by the ancient and modern literature and the reformed religions; at first walking hand in hand with them, but latterly showing a tendency to use its young vigor to smite down these its old nurses and associates, and to claim the whole field of humanity for itself. It is this young Sampson, revelling in his earlier strength, who presents himself to us now, that we may consider what right he should enjoy, what duties he should perform.

The right of investigation may be said to be freely granted to acc-