

face to face with all the leading aspects of the many sided mind of man. For these studies did really contain, at any rate in embryo—sometimes, it may be, in caricature—what we now call Philosophy, Mathematical and Physical Science, and Art. And I doubt if the curriculum of any modern university shows so clear and generous a comprehension of what is meant by culture, as this old Trivium and Quadrivium does. The curricula in the Italian universities were practically identical with this. The universities exchanged professors, which we are only just beginning to do again; students often made portions of their course in one university, and were given credit for it in another; and the Popes, when they made their regulations with regard to university teaching, always insisted that the new universities which their decrees were bringing into existence should have standards as high, and should not give permission to teach—the equivalent of the Doctors degree in our day—unless after the completion of a course and the passing of an examination equal to that given at Paris or Bologna, these two universities being specifically named. These Pope-founded universities, ruled over by ecclesiastical chancellors, taught by scholarly members of the Mendicant Orders (for the greatest teachers of the thirteenth and fourteenth centuries were Dominicans and Franciscans), were teaching science. Professor Huxley says that the mental training they were giving men by means of the science they taught was better than was being given at our universities of the modern time in 1874. How ignorant then, of the real history of education, and, above all, of the history of science and scientific education, are those who talk of opposition between Church and science, or Church and education.

Scientific Education in the Papal States.

Very probably the most impudent and utterly shameless misuse of educational history has been made with regard to the supposed attitude of the Popes and the ecclesiastical authorities to medicine and scientific teaching. If the Church was opposed to science, then it is clear that the universities in the Papal States, where the Popes were not only the ecclesiastical, but the political, rulers, would have had nothing to do with science. The contrary is just what is true. Since 1512 Bologna has been in the Papal States; that is, until Napoleon's time. Bologna had for many centuries the greatest medical school in the world. All forms of physical science were taught there with eminent success. Students from all over the world flocked to Bologna for the opportunities that it presented for original work in science. The names of the Professors of Bologna are of world-wide reputation. Berengar of Carpi was there, Achillini was there, Vesalius was there, Varolius was there, Aranzi was there. Later, Malpighi and Morgagni were both there; and so the scientific tradition which originated with Mondino, the Father of dissection, continued through Vesalius, the Father of modern Anatomy; Malpighi, the Father of Comparative, and Morgagni, the Father of Pathological Anatomy.

After Bologna, in the importance of its medical school, came Padua and Rome. At certain periods Padua surpassed Bologna. For a full century, from the middle of the sixteenth to the middle of the seventeenth, the Roman Medical School was ahead of either of them, and had as its professors the greatest names in medicine in their time. The faculty included such men as Columbus, the discoverer of the pulmonary circulation; Eustachius, who taught us much about the anatomy of the head; and after whom the Eustachian tube is named; Varolius, whose work in brain anatomy is commemorated by the Pons Varioli; Cae-salpinus, to whom the Italians refer, and most modern historians of medicine think rightly, the discovery of the circulation of the blood before Harvey; Malpighi who was invited from Bologna to take the chair of Anatomy at Rome; Piccolomini, and many others of lesser note, though the greatest scientific physicians of their time. For three centuries, two out of the three most important medical schools in the world, at a time when the medical faculty taught most of the science that there was to be taught, were in the Papal States.

With this of definite historical detail before us, what nonsense do we not have to listen to from those who talk of the opposition of the Popes to science. There were two other universities in the Papal States, one at Ferrara, at least for a time, and the other at Perugia. Both of these had medical schools, whose standards were maintained on a high plane, and that of Ferrara, at least for a time, the rival of most of the other universities of Italy in this respect. The Popes have always, since the fifteenth century, helped the development of astronomy, and since the sixteenth have maintained, whenever their pecuniary circumstances would permit, an astronomical observatory in Rome. The first museum, in the modern sense of that word, was founded by Father Kircher, the Jesuit, at Rome, under the patronage and with the liberal assistance of the Popes, and is still in existence. Father Kircher wrote, at Rome, the text books in Physics which were most commonly used for several centuries. Four of them were important in the history of science: one on light (he is the inventor of the magic lantern); one on electricity, or rather magnetism, in which he suggested the possibility of the use of magnetism for the development of energy; one on sound, and one on geology and mineralogy, besides many other books on science, and these text books went through many editions with the constant approbation of the Popes.

When supposedly educated men—men who are intelligent enough not to have an opinion without a reason for it—talk about the opposition of the Popes to science and education, I, for one, cannot understand what they mean. Have they ever for a moment looked up the realities of the history of science and of education? Are they accepting expressions of this kind from others without looking them up. Our histories of education, it is true, are full of generalities with regard to the supposed opposition of the Popes to science; but we know that they are written mainly by superficial students of history, who are interested in education in our time, but know little about it in the past.

In the February number of *Extension*, in this Department, I quoted a sentence from a recent address of President Woodrow Wilson, of Princeton, in which he said: 'One of the principal objects of education should be enlightenment, or the unloading from the minds of the pupils of the misinformation that they have received.' There is much need for enlightenment and the unloading from the minds not alone of the pupils, but of the teachers, and, above all, the teachers of the history of education and of science in this country of the misinformation that they now hold for Gospel truth with regard to the attitude of the Church and the Pope to science and education. Their self-sufficient ignorance would be amusing, if it were not so amazing, and perhaps there is nothing that shows more clearly the superficiality of our university education here in America than the fact that the ideas usually entertained on this subject in university circles and by university professors still continue to be maintained, in spite of the development of documentary historical knowledge which in the past twenty-five years has so completely wiped out such views in Europe, and, above all, in Germany, where they go back to the original documents and do not repeat the foolish statements of their predecessors without looking them up.

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