tendency, then, of the industry of England to develop in an artistic direction can hardly fail to be of benefit to the artisan. But, still, comparing the immense relative progress made by France and Germany in the art and industrial education of their workmen with the slower progress of England in that direction, there can be no doubt that much requires to be done in this country. Moreover, an inquiry into the causes of the great increase of manufactures on the Continent during the last half-century will show that this increase has been to a considerable extent due to good artisan-education, and will prove that money expended upon technical education will be a profitable investment.

When once it has been decided that technical education is needful for the artisan, it becomes at once important to determine what the nature of it shall be; for, after distinguishing it from purely literary or scientific or art education, it may still be either of a theoretical or practical kind. It may merely endeavour to teach the workman how to apply scientific principles in the execution of his work, or else it may go far beyond this, and endeavour to educate him in manual dexterity. Now, for each of these two kinds of technical teaching there is a proper place. The technical school is the place to learn the application of theoretical and scientific principles to industry, but technical dexterity can only be acquired in the workshop; and, the boundary of them not being always very easy to define, all the more care is needed that neither of these shall intrude on the functions of the other. There is little danger that the workshop will ever become too theoretical, but there is great danger that the technical school may entirely miss its mark, by stepping out of its proper position and trying to become a workshop; and there is also great danger that the attractions of the technical school may blind us to the fact that no technical school can ever efficiently replace the workshop. The barrister is formed at the law-courts and in chambers, not in the lecture-room; the doctor by walking the hospitals, not in the study; and the engineer and mechanic must follow the course; for the generality of men trained purely in the laboratory will never learn to deal with the difficulties of life in the world of practice so well as those who have been brought up face to face with it. Moreover, it must be remembered that no technical school can possibly acquire all the plant and machinery necessary to teach various trades, and to keep constantly up to date in improvements; and, further, that, even if it could, it is impossible to see how a whole population of boys could be fed and clothed while they were learning; for the parents could not support them. And, as trade concerns, technical schools can never be made to pay. If these views be correct, it follows that the apprenticeship-school is to be condemned, and that all technical teaching should be carefully relegated to its true sphere—that of methodizing and systematizing practice, of teaching the reasons for empirical rules, and showing how to reach new ones by skilful inference.

The object of technical-school instruction should be not to make workmen, but to prepare men to become workmen; and, thus understood, it will at once elevate the mind and improve the wage-earning capacity of the artisan. This truth is generally recognised in Germany and in England; but in France a contrary opinion prevails, and apprenticeship-schools have been established there which cost the most fabulous sums to maintain, and which in no way return an equivalent for the money spent upon them. We therefore require a number of theoretical technical schools, well equipped, and adapted for boys and men of all ages from about fourteen upwards. To these schools those will go who can afford to spend some years without earning their bread, and to those schools also will go the cleverer boys who are fortunate enough to win scholarships. But, in addition to this school-course, they will, if their parents are wise, also go thoroughly through the workshop. They may, as is done in Scotland, spend the summer at the workshop and the winter in the school, or they may take two or three years of one, and then spend some time at the other. But for the mass of artisans, at least unless socialism is to come into force, this long course at day technical schools will be impossible. They have to earn their bread, even at fourteen; their parents cannot afford to support them; and, therefore, if elaborate day-schools are provided for them, the result is that these schools will gradually tend upwards, and become the property of the richer classes. It is no use providing for the artisan what he cannot make use of, and you cannot give scholarships for every boy in the whole nation.

This, then, brings us to the two things that we can do. We can at least prepare them in some degree in the elementary schools; we can provide them with evening-classes during their apprenticeship-years, and we can do all in our power to persuade masters and boys to take advantage of these advantages. I propose to consider what method is the best to adopt in the elementary schools. What we want is to prepare an artisan for his work. Now, after arithmetic, the five sciences which are probably most useful to the artisan are geometry, algebra, mechanics, physics, and chemistry. For instance, the making of a clock brings in simple geometry, algebra, and mechanics; a steam-engine requires these and some knowledge of physics also; while a gas-engine demands an elementary acquaintance with all of them. Now, as the first of these I have placed geometry. And I specially desire to include in this the art of looking at a thing, and then being able to remember how it was put together, to make a sketch of it, and to be able to show any one how to make one like it; and the converse—of being able to see a picture of a thing, and then make the thing from the picture. As an example of how much instruction is required in what appears so simple, I here exhibit five little clay models. They were done by five children (of from nine to eleven years of age) selected at random, and quite without any previous training in form, and executed from the drawing that you see of a pyramid. You will notice that there is no idea in their minds of the sharp edges of the pyramid. They have made pear-shaped cones. This shows at once how much they need instruction. Therefore it is here suggested that the elements of geometrical drawing should be taught in the elementary schools, using rulers and compasses, and closely in connection with a carpentry class. The course should not go far, but be thorough, and should include the principal properties of the straight line and circle. Repeated practice should be given in making drawings upside down, reversed, and of different dimensions. (It will be found that very many boys who can do a given problem in Euclid cannot do it if the figure is turned upside down.) The figures should