and mechanic arts, which other nations had had the foresight to establish, more than to anything else. England had thought that the establishment of such schools was the business of private benevolence, and that they should be supported by private patronage. Experience contradicts her notion. The plant is expensive, the profits uncertain and slow. All education is expensive, and to be made general, must be afforded and sustained by the state. Industrial education is much more expensive than classical or liberal education. It takes longer to develop its facilities. It requires more apparatus. It requires larger corps of instruction. It took Europe half a century to find this out; but the results of the experiment warranted the sums expended.

We in America have special reasons for fostering this kind of education. Our indusrrial arts are in their infancy, yet we must compete with the full grown industrial organizations of the old world. Mechanical science is now so far developed that the mere artisan, the man who gives all his time and his whole energy to the manual labor of his employment, cannot possibly have any comprehensive knowledge of the industry in which he works, and which he would promote. Besides, under our system of elaborate division of labor, the laborer usually knows only one thing, and can perform only one of the many operations that go to make up a product. He remains ignorant of the principles involved. He is only a machine, a part of a system of machinery. The industry gains in one way by the skill of this human machine, but it looses in another way by the lack of the intelligent inventive genius—the lack of the man of observation, thought, and experience. The days of apprenticeship are over. No American boy will remain seven years with a master to the processes and principles of any industry. To use a slang expression, "Life is too short," to spend seven years in "picking up" the knowledge necessary to the mechanic.

Our industries, while not yet the controlling factor in our body politic, are already one of the tremendous powers. Our political future is to be shaped largely by our ability to manufacture as well and as cheaply as any other nation. To accomplish this, intelligence must be put into our shops, and theoretical instruction and manual training must be put into our schools. Our shops and our schools must be occupied by American muscle, and American brain. Too large a porportion of our master mechanics and foremen are foreigners, the product of European technical schools, or of apprenticeships, not in keeping with the genius of our institutions. We must continue to import skilled mechanics, or else educate them here. There is a large, and well defined place, then, for the work of our mechanical or engineering departments—where may be taught the sciences on which our industries depend, and where paactice may be had in all manner of iron, brass and woodwork. The workshop is no longer sufficient. In this there is neither time nor opportunity for a discussion of general principles on which the industry is based. There must be institutions capable of making intelligent mechanics, engineers, machinists, experts in all the mechanical laws of heat, sound, light, motion, in the kinds and strength of material, of application of force, of inertia, of friction and resistance, of steam, electricity, and all the laws of chemistry, with enough manual skill to embody this knowledge in a concrete product. Any man with this knowledge can soon and easily distance his competitor ignorant of the general principles of science. Industrial skill is much more serviceable when it goes hand in hand with scientific knowledge. The object of this mechanical department of the college is to give the young man who has aptitude and taste in this direction a thorough course in drawing and design, thorough instruction in all the principles of science mentioned, give him daily work at the forge, the lathe, the bench, the engine and at the end of his course send him out as a journeyman or foreman or engineer, with an intelligence fitting him for leadership, with a moral purpose, not above working himself and with his capability of directing work developed. Such a man is on the road to the head of his industry, whether in the shop or in the engineering corps.

It must be granted that college bred mechanics are generally shunned by employees, because of their tendency to be above their calling. Their attitude toward labor depends on the college where they are eeucated. The average literary college necessarily tends to educate away from work. It is liable to breed contempt for a manual labor, and the man who performs it. It too often gives its students very stilted notions about the dignity of education and culture, and the exalted kinds of work that awaits them as college graduates. Students possessing this notion are not calculated to blossom out into the common sense, aggressive, enterprising citizens who are ready to do anything honorable till something better truns up, and sure to make their own way in the world. I believe it possible for a college to educate the scholar and preserve the mechanic, to give culture to the man, and yet save the farmer, to make the woman intellectual and not destroy the housewife. I believe the Agricultural College of Utah is such an institution. It is the purpose throughout the student's career at the college to give to manual labor an intellectual character, to make it illustrative of principles, and suggestive of such inquiries as become a mind awake to the beauties of the natural world and the grandeur of the forces, and the laws that explain the operations and products of nature. Labor may have added to it intellectual dignity.

Not all men, however, can till the soil. Not all men who do not till the soil can manufacture the material produced in the field, the forest, the mine. Some must attend to the exchange and interchange of commodities. To succeed in this and render a real service to their communities, men must conduct business on sound principles. The law of *meum* and *tuum* must be observed. Uniform and intelligible records of transactions must be made where debits and credits are involved. The laws governing in commercial transactions must be understood. The principles of finance, as practiced in banking and other forms of loaning and exchanging money, must be clearly grasped. For these purposes the Commercial Department is an important part of the school. Here banking—desks and business counters, college currency and college coin afford students opportunity to buy and sell on their own account; to rent places of business, and keep accurate accounts of all transactions. Business is made as real as possible, and a thorough study of commercial law is insisted on. Everything here is on the boratory plan.

Our course in domestic arts is intended to educate home-makers. Home happiness depends largely on good health, supplemented by good feeling and good manners. Good health depends largely on sound sleep and a healthy stomach. Our girls are taught home hygiene. They are not above giving careful attention to a bed and its surroundings. Energy, virtue and religion depend largely on the condition of the stomach, and this depends on the quality and quantity of food. A well fed man reasons better, loves more warmly, gives more generously, prays more fervently, and is generally more agreeable than a starveling.

It is not always true that a man unadorned is adorned the most. We all demand tidiness, taste, fitness in the costumes of our lady friends. We all respect either man or woman, or ourselves the more for being well dressed. Recognizing the importance of this element of household and social economy, we teach our girls to design, cut, fit, and make all kinds of garments from the simplest collar to the most elaborate ball or reception costume or wedding "outfit." In addition to facilities for these equipments for practical home life, opportunity is afforded for the study of history, literatue, and the commonly spoken modern languages, excepting American slang. Any young woman, therefore, in completing this course, ought to be able to make or direct an ideal home, and do her part of all social duties, no matter in what community her lot may fall.

No school in the land more fully realizes the ideal of the new education. "Learn to do by doing." At every step application goes with principle. We have not merely a school of observation and instruction, but a school where students work in all its departments—on the farm, in the garden, in the laboratories, in the museums, on the rostrum, on the drill ground, on the dissecting and operating tables, and in the shops.

I may have insisted so strongly on the material facilities afforded for instruction as to have given an impression that little care or stress is laid upon the general culture of our students. If there is such an impression I wish to correct it. Nothing could be more mistaken, and nothing is farther from our intention. We cannot ignore the fact that the man and the woman are before the farmer, the mechanic, or the housewife, and that any system of education, to be harmonious and complete, must include that liberal culture that forms so essential a function in the permanent work of any worthy life. We do not forget that pure English, sound logic, wide historical reading, a thorough knowledge of the fundamental principles of the laws governing commerce, and governing social life, well defined views on political science and mental and moral philosophy, are necessary elements in a practical education. For all these ample provision is made. But above all, beyond all, we remember that morality