

shop from the beginning of the apprentice half-year, and their practice extends over the whole course of three and a half years.

"*Firstly*—The shop is managed as a manufacturing establishment in order that the students may always work in the wholesome atmosphere of real business. Excellence in construction is sought as a necessary force in construction. As great a variety of work is secured by contracts as is compatible with thorough teaching, and the determination on the part of the Superintendent of the Washburne Machine Shop to maintain the highest standard of workmanship has so far been successfully carried out, and is, undoubtedly, the only way to fulfill the design of the shop. The Jurors at the Centennial Exposition decreed an award to the shop for its tools for working metals, which were exhibited in Machinery Hall, and first premiums have been awarded wherever these tools have been exhibited. *Secondly*—The work of each student is done under the personal supervision and direction of a skilled workman, and with the advantage of the best obtainable tools and machinery; for it is as true in handicraft as in the training of the intellect that no teaching and no tools are too good for the instruction of boys. *Thirdly*—Each student receives daily training in free-hand drawing during the apprentice term. Such discipline of the sense of form and proportion is secured in this way, and so much dexterity in developing various forms is acquired by the students, that when they undertake shopwork, they make more rapid and satisfactory progress than those who have not had the advantage of this training. *Fourthly*—The weekly practice is distributed so as to occupy five hours of each of two days. Every student is required to render a strict account of these hours. The time thus spent serves the double purpose of practice and of exercise; and fifthly, each student advances as fast as possible, unchecked by the difficulties of his neighbor, or the business necessities of his employer.

"The great idea," added Professor Thompson, "is that this institute offers a good education—based on the mathematics, living languages, physical sciences and drawing—and sufficient practical familiarity with some branch of applied science, to secure to its graduates a livelihood. It is specially designed to meet the wants of those who wish to be prepared as mechanics, civil engineers, chemists, or designers, for the duties of active life."

"What time does the training of students for mechanical engineers take?"

"Three and a half years, that of all others three years, of forty-two weeks each. There are, therefore, four classes, viz.: Apprentice, Junior, Middle and Senior."

"Have any of your graduates made way in the world yet?"

"Oh, dear, yes. I keep track of them all. Every young fellow who graduates here writes me yearly. See, here is my letter-book," placing a ponderous tome for my inspection.

"They all do well. Several of them have salaries of \$4,000 a year. One is a partner in a Boston patent lawyer firm; another is superintendent of the Pennsylvania Lead Works; another, superintendent of the Atlas Engine Company, Indianapolis; another, superintendent of the Atlanta Giant Powder Company. The Atcheson, Topeka and Santa Fé Roads have eight of our graduates in charge of different sections of the line. We have turned out four hundred graduates, and we have never lost four hundred cents by them. Their moral tone is superb. Here is a piece of cloth woven by one of our graduates on a loom invented by himself," and, with a pride that did him honor, the professor displayed the piece of cloth. "Now for a walk through the shops."

We passed into the Department of Physics, where half a dozen young fellows were attending to the instruction of a learned pundit, and from there into the Chemical Laboratory, where one young gentleman was cautiously experimenting in explosives. Then we crossed the yard to the machine-shop. The shop is a three-story brick building, one hundred feet long by forty feet wide, with a wing sixty-five by forty feet, for engine, boilers and blacksmith shop. These rooms are all equipped. Here was machinery performing its hard-handed mission, superintended by earnest students, smut-begrimed as to face and blue-black as to hands, who bent over their tasks with an attention that spoke a whole library of certificates in favor of their ultimate success.

"We commence with wood," observed Professor Thompson, "and not with iron. We get enough of work in this department, aided by a backing of \$3,000, to run it. There is necessarily a good deal of waste and spoil on account of inexperience, hence our uphill work to make it pay."

We ascended to the wood-room, passing on the way a great glass-case containing models and decorations won for the Institute at various expositions, and arrived in a large, airy, well-ventilated apartment, bearing the refreshing aroma of sawdust.

"My faith in the Institute speaks for itself," laughed the Professor, as he introduced his son to me, a bright, handsome young lad, engaged in constructing a wooden seat, one of the first tasks to which the neophyte is put.

The lads board in different house in the town, and here is a chance for a philanthropic donation towards the erection on the grounds of a suitable house wherein the youthful workers can eat, drink and sleep. Such an institution would make them more clannish; it would tend to good-fellowship; the rush off for breakfast and dinner, with its attendant trudge into the city, would be avoided. A library might be added, and, in a word, a great boon conferred on these aspiring and earnest youths.

"The work executed in the shops is sold, and the sum received placed to the credit of the institution. The following is the outline of the course of study. Recitations and practice are assigned to the classes according to the following scheme, the figures indicating hours per week:

"*FIRST HALF YEAR.*—*Seniors*—Theoretical Mechanics, 5; French or German, 3; English, 2; Chemistry, 1; Physics, 4; Mechanical Drawing, 5; Practice, 10. *Middlers*—General Geometry, 5; Descriptive Geometry, 3; German, 2; English, 1; Chemistry, 4; Free Drawing, 2; Mechanical Drawing, 6; Practice, 10. *Juniors*—Algebra, 4; Geometry, 4; German, 3; English, 1; Chemistry, 2; Free Drawing, 6.

"*SECOND HALF YEAR.*—*Seniors*—Applied Mechanics, 5; French or German, 3; English, 2; Chemistry, 4; Mechanical Drawing, 6; Practice, 10. *Middlers*—Calculus, 5; German, 3; English, 1; Physics, 4; Free Drawing, 2; Mechanical Drawing, 6; Practice, 10. *Juniors*—Trigonometry, 4; Algebra, 4; German, 3; English, 1; Chemistry, 4; Free Drawing, 6; Practice, 10. *Apprentices*—English, 5; Free Drawing, 10; Shop Practice, 39.

Candidates for admission to the Junior Class should have attained the age of sixteen years, and must give evidence of proficiency in the common English branches, viz.: History of the United States, geography, grammar and arithmetic, and in algebra as far as quadratic equations. In general, students at the end of the second year in the High School are prepared for the studies of the Institute, though a full High School course is desirable.

If every student before admission could learn as much French as is contained in Keble's "Elementary Grammar," the "language time" of the Institute course after Junior year could be devoted to German and English—a result greatly desired.

The entrance examination is intended to satisfy the faculty that each candidate gives reasonable promise of success in the studies of the Institute. All candidates are held to be on probation till the end of the first half-year, and the student's standing at that time determines his future course.

Students can enter an advance class at any time, but only after satisfactory examination in the studies already pursued by that class.

There is no charge for tuition to residents of Worcester County. Others are charged one hundred and fifty dollars per year, payable semi-annually in advance.

All students are charged the cost of chemicals used in the laboratories, and for breakage in every department. The regular charge in the chemical laboratory is eight dollars a year. Students who practice in the laboratory are charged fifteen dollars each."

I parted from Professor Thompson, and wended my way to the fine old residence of the munificent President of the Institute, Hon. Stephen Salisbury, LL.D. This venerable gentleman, whose eye flashes like that of an eagle, went into considerable detail as to the admirable effects of the working of the Institute, and of the part taken by the late Mr. Washburne, whose gift of the machine-shop has proved of such infinite value. Mr. Salisbury expressed a lively hope that this class of Institute would soon become an "epidemic" in the United States.—*Frank Leslie.*

WORKMEN's pantaloons often become too filthy to wear, on account of being saturated with oil and grease, long before they are really worn out. The following method of washing such articles of clothing, so as not to discharge the color, is recommended. It is impossible to wholly prevent fading, but if not left in the water too long the washing out of the dye will not be very great: Water 1 gallon; soap  $\frac{1}{2}$  lb.; boil to dissolve; add 2 ozs. borax; dilute with about 8 gallons water; work the goods through as quickly as possible and rinse without wringing. An aqueous solution of 1 part copperas and 7 parts logwood extract may be used for reviving the faded color of cheap black goods after cleansing as above.