

## GRADUATE LETTERS

(Continued from page 71.)

cially helpful. In numerous other cases it is hard to see that the training of this Course is any more helpful than that of other courses.

Much the same remarks apply to the work in connection with the preparation of applications for patents. It depends upon the character of the apparatus or device for which a patent is sought. If it be a wireless telegraph outfit a Course VIII. man would be especially qualified to write up an application for a patent and conduct its prosecution before the Patent Office.

As to the question of patent litigation, it is essential if a man is to appear as counsel in a patent suit that he be a member of the bar. To attain this position he must pass a bar examination, and this involves preparation. While there does not appear to be much connection between Course VIII. and a course in law, it is evident that in law as in science a man must know how to study to best advantage, must be able to distinguish the important from the unimportant, and must be able clearly to discuss and reproduce upon examination that which he has previously studied.

I hope that the foregoing will in a measure answer the question as to the preparation which Course VIII. gives for patent work, but the subject may be considered from so many joints of view that it is impossible to give it complete treatment in a brief letter.

WALTER J. GILL, JR.

At the request of Dr. H. M. Goodwin I beg to hand you this letter, which I trust may contain something of interest and help to your readers, particularly those who contemplate following the profession just beginning to be known as Electrochemical and Electrometallurgical Engineering.

Three years of electric furnace work have given me some insight into the possibilities in this new field. Electrometallurgical engineering is a branch of engineering which, perhaps more than any other, will be useful in accomplishing greater economies in the production of certain manufactured products, especially the metals, and is destined, I think, to play a very important part in the conservation movement which is growing so rapidly today.

My connection with this branch of engineering began in Oregon in 1906, where the talk of smelting the "Black Sands" by electricity created quite a sensation. I brought some of these sands back to the Institute for the purpose of smelting them if possible, and, together with Mr. F. S. MacGregor, built an electric furnace for this purpose along the lines of the furnace built by Dr. Paul Heroult, the gentleman so well known for his electric furnace work in connection with aluminum and iron and steel. The possibility of using the water power, so plenty in the West, to reduce iron ore, attracted me greatly after leaving the Institute, and since then I have devoted practically all my time to the application of electricity in connection with the smelting and refining of iron, going where the opportunity offered to further acquaint myself with this work. I was connected with the Noble Electric Steel Company in California, where Dr. Heroult built his 2000 K. w. electric iron ore smelting furnace, and assisted in the tests made in that furnace. I later entered the employ of the Illinois Steel Company, where now a 15-ton Heroult steel furnace is being operated. At the present time I am acting as engineer for the American Electric Smelting and Engineering Company, devoting my time exclusively to electric furnace engineering work.

This field is so broad that the preparation for it should include the same preparation as for electric engineering work, and also that for chemical and metallurgical work. The requirements of an electrical engineering nature are of utmost importance, especially those touched on in the course of Theoretical Electricity, such as given by Professor Clifford at the time I attended the Institute; and, on the other hand, the metallurgical and the chemical requirements are equally essential, based on the course on Theoretical Chemistry, which I was fortunate enough to take under Dr. Noyes. The field is also so new that the opportunities to be found

in connection with the electrochemical laboratories of the Institute are very attractive. One appreciates these very much more after leaving, when he can no longer take advantage of them. Happily I did take advantage of them while there, and I have been very thankful for that ever since. In this connection, and as a suggestion to those looking for thesis subjects, the possibilities of controlling metallurgical reactions at elevated temperatures, independently of the source of heat and the matter of solution of gases in molten baths, offer a most fertile field for research. I trust that my letter may impress some man, undecided as to what course to take, or even as to the choice of thesis, with the opportunity before him of working in an almost untouched field. If thesis subjects were chosen by the end of the first year I think it would make many courses more valuable, because the student could see more clearly their use.

As to our engineering training proper, it seems impossible to get this until after one leaves school and actually gets out in the work. Perhaps some day, when our engineers are better able to co-operate with our educational systems, and our professors, in the development of our industries, it may then be possible to enable a man to make much more of these opportunities which he later on realizes were before him at the Institute, but it is at least possible now for us who are out to indicate what parts of our course have been most useful and to urge others to think of these things.

The application of the principles of physical chemistry and electricity to practical work is very important. I wish to cite just one example of the present waste in one of our industries, due to lack of more efficient processes, where this branch of engineering should bring about a solution. For every ton of steel produced in this country from pig iron there is about 3 per cent. of iron oxidized, which must be again reduced in a blast furnace or some other furnace. This means that in the production of the fifteen million tons of steel made annually in the United States the loss of iron from this source alone amounts to 450,000 tons. This further means that the coke used to again reduce this oxidized iron is approximately 450,000 tons. This amount of coke is a dead waste. It would seem that the theories of conservation are applicable in the steel mill as well as in the forest. The application of electrometallurgical methods is the only possible means now apparent for saving this extreme waste, and there are many other examples of waste just as large where this branch of engineering can produce most important savings.

The Institute offers, in Course XIV, a unique educational preparation for such a profession by combining the important parts of the electrical engineering course and of the chemical courses with increasingly good laboratory facilities. The courses on Theoretical Electricity and Theoretical Chemistry, as given when I attended the Institute, were theoretical in name, but these courses have been of greatest practical value to me. In combination with these, the electrochemical laboratory offers precious opportunities, and if our metallurgical courses can include such work as outlined in Professor J. W. Richards' book on "Metallurgical Calculations," it seems to me that the Institute offers advantages which can hardly be found elsewhere.

ALBERT E. GREENE, 1907.

In response to your request for a few words in regard to the preparation which has been received by a graduate of Course XIV, I give below an outline of my impressions after five years of technical and business experience.

When the young man graduates from the high or preparatory school, his experience in the world has seldom been sufficient to warrant a final judgment of a choice of occupation for life. Mentally he scans the various branches of personal endeavor, to his mind classified as teachers, scientists, lawyers, doctors, engineers, and business men. By the process of elimination he sets aside those vocations in which he feels confident he would not care to engage, and then, arranging the others in order of their interest to him, he considers at what school general opinion (often bound by convention and dominated by the expressions of academic graduates) advises him to pursue his training. In

much the same manner, but in a more restricted degree, and with the advice of men whose interests are more nearly his own, this same method of selection is followed at the time of making a choice of course in the Institute.

I would divide the aims of the men who enter the Institute into three classes: to become a teacher or scientist; to become primarily and essentially an engineer, a man whose success in later life will be measured by the weight given to his opinion of engineering possibilities (in whatever branch he may have devoted his energies); or to become, with his technical education as the path thereto, essentially a business man (in the sense of managing manufacturing or engineering enterprises). There is still a prevalent feeling that the young man who looks forward to a purely business career should attend an academic school, there to study—What? The subjects or the benefit of the curriculum are seldom considered. But it now seems that the developing ramification of business, the many industries falling under one head and directed by the same group of men, the necessity of being familiar with the principles underlying these various industries without long study "in the works" of each branch, are all tending to alter this old idea, and as the graduates of technical schools consider these matters, they are bringing about a sentiment toward technical education as the best preparation for business life.

It is from this point of view that the writer, speaking from his own experience, would suggest a careful consideration of the Electrochemical Course at the Institute. Not that this is the only attraction offered by the course, for Course XIV provides a specific training, laying an excellent foundation for the engineer who has to deal with any of our great chemical plants, using electricity as an agent of their production; a unique training for the man purposing to study patent law; an excellent preparation for the future teacher, and so on; but the aspect of the preparation as a training for engineering business, it seems to me, has not been given the consideration which its merits deserve.

It seems to the writer that Course XIV, with its thorough and detailed study of one important department of applied science which has much in common with several departments of engineering, gives an efficient starting point for a man's subsequent study, if fortune leads him into a business career in connection with any industry of which he has learned the technical fundamentals.

HENRY A. WENTWORTH, 1905.

**Castle Sq.** Daily 2 and 8  
Tel. Tremont 5

The John Craig Stock Company

RAFFLES

Prices 15c., 25c., 50c., 75c.  
Down-town Ticket Office, 15 Winter St

## GLOBE THEATRE

The New Prosperity Edition

### HANLON'S SUPERBA

Trick Scenery, Startling Illusions, Marvellous Sensations. More Wonderful Than Ever Before.

MAJESTIC THEATRE

Evenings 8:15 Matinees 2:15

RETURN ENGAGEMENT  
Beginning Tonight

### Viola Allen

In F. Marion Crawford's Play,

### THE WHITE SISTER

With a Superb Company Including  
James O'Neill, Wm. Farnum,  
MINNA GALE.

SHUBERT THEATRE

Tonight at 8  
Matinee Saturday at 2.

FOR TWO WEEKS ONLY

DAVID BELASCO PRESENTS

### BLANCHE BATES

In W. J. Hurlbut's

### THE FIGHTING HOPE

(One Year in New York)

Mail Orders will receive prompt attention

KEITH'S THEATRE

ONLY NEW SHOW IN TOWN.

### GERTRUDE HOFFMANN

IN HER NEW REVUE

Produced and Staged Personally by  
Miss Hoffmann.

25—PEOPLE—25

The Holloways, Haines and Vidocq,  
Madden and Fitzpatrick, Ila Grannan,  
Bennett Trio and

JARROW

Introducing His Great Lemon Trick.  
Overture at 1.45 and 7.30

BIJOU DREAM THEATRE

B. F. Keith, Proprietor

545 WASHINGTON ST., BOSTON

Motion Pictures

Carefully selected, of the best foreign  
and American producers

One-Act Plays.

Music

Of High Grade, both Vocal and  
Instrumental.

Open from 9.30 A. M. to 10.30 P. M.

## Asbestos Wood Company

Nashua, N. H.

MANUFACTURERS OF

## Fireproof Substitutes for Wood

AND

## Electrical Insulating Materials

H. W. JOHNS-MANVILLE CO.

SOLE SELLING AGENTS.

New York  
London  
Chicago  
Boston  
Philadelphia  
Pittsburg  
Cleveland

Detroit  
Milwaukee  
Minneapolis  
Baltimore  
St. Louis  
New Orleans  
Kansas City

Buffalo  
Indianapolis  
Los Angeles  
Dallas  
San Francisco  
Seattle  
Toronto