GRADUATES LETTERS

To the Editor of The Tech,
Mass. Institute of Technology.

Dear Sir:—Down here in southwest Missouri we have ideal conditions for mining. The climate is favorable, as there is no severe weather in summer or winter. Although the thermometer keeps around 95 degrees during the summer months, the nights are always cool. There is no danger of the fever, or unhealthy conditions which surround many mining camps. Joplin, a city of about 20,000, is the center of the camp. There is an interurban electric line which reaches nearly all parts of the city. This makes it possible for one to live very comfortably in town and yet be able to be "on the job" in the morning when the shift starts. I think these few remarks will explain why this country is an ideal one in which to mine.

It is a poor place for a man to come who is specializing in geology alone. The formation here is practically the same thoughout the entire district. Surface indications or outcrops are of little value in determining the value of an ore-body. Therefore, a study of geology helps a miner but little in either finding or tracing an ore-body after it is once located. As none of the deposits lie at a greater depth than 30 feet, drilling with a Keystone drill is used as a means of locating mineral in nearly all cases.

On the other hand, this camp offers great advantages to a man who wishes to learn the mining business from a practical standpoint.

Most of the ore is obtained from the "sheet-ground" deposits. As a rule these mines only carry from two to four per cent. of recoverable mineral. It becomes necessary then to mine as cheaply as possible. Large tonnage, as high as 1000 tons daily, are handled at a total mining and milling cost of under 80 cents per ton of rock handled. The labor is highly efficient, being entirely American. A foreigner is not tolerated here for even a day. There are no unions, so many of the labor difficulties met with in the West are avoided. The above reasons indicate what a good place it is to gain experience, as a man will gain first hand knowledge in a short time, of mining, milling, power and pumping problems.

The salaries paid are not as high as in the western camps, as the mines are not rich enough to stand fancy prices. A man coming down here with a good technical training will get from $75.00 to $90.00 a month his first year. After that he ought to be capable of superintending a small property, and such a position will pay about $125.00 a month. From this he can work up into more responsible positions, paying as high as $500.00 a month among the large companies. Opportunities are plentiful, however, for making money on the side once a man has established a reputation. Expert examinations are often called for, as well as advice on other questions relative to the mining game. Technically trained men are comparatively few, and are usually sought after, when it is evident they have learned and understand the conditions peculiar to the mining in this district. Another opportunity to make money here is in prospecting. There is much undiscovered mineral here, and as prospecting is not costly, with a little judgment a fellow is likely to strike a good mine. Of course it is more or less a question of luck, but it strikes me as being one of the advantages of the district.

To sum up, this district offers the following advantages: It gives a man a good opportunity to learn the business from the ground up, as he can start in at a small mine where he has to be ground boss, jigman, pumpman, mastermechanic, and superintendent all in one. He has a good chance to become an operator, as a good mine, when once found, can be developed on a few thousand dollars. He learns to handle an independent, although highly efficient class of labor. Last but not least, he has a pleasant home, and has not the hardships of the western camps. Living is fairly cheap, so he can marry if he wishes, and raise a family in surroundings as pleasant as the suburbs of Boston.

Very truly yours,
J. H. POLHEMUS 1906.

Salt Lake City, Utah, Dec. 15, 1909.
To the Editor of The Tech,

Dear Sir:—A perusal of the list of subjects offered in the courses in mining and metallurgy, as printed in the latest catalogue, gives the impression that an attempt has been made to supply such a broad foundation as the varied experience of the graduates has found to be most desirable. There must have been much discussion, and much compromising, before the details were settled, for no two men have the same experiences and the same needs, and during the few years immediately following graduation each man is inclined to suggest that more time be given to that particular subject in which he has found himself lacking. Thus the young graduate who is asked to help sharpen drills complains that he has not been taught this at the Institute, and the man who gets a position as chemist at a vanadium property feels that he should have learned the details of the analysis of vanadium ores. When I reported for duty at the office of a plant soon after leaving Tech, the manager said: "Go down to the pump station where the carpenter is putting some wooden cogs in the gear of the power pump: we have to shut down every other day on account of a break there, and I want you to find out what is the cause of the trouble." It was then that I wished I had taken the mechanical option. A few years later, when I was employed to lay out the development and equipment of a property on the coast of Alaska, it was stipulated that I should furnish a design for a wharf, with estimates in detail of the cost, completed, with necessary warehouses, and determine the best location for it. About the same time I had a letter from a man who wished to learn the value of a mine which had been worked years before, and had a shaft 200 ft. deep, with levels and stopes. After describing the property in detail he added this postscript to his letter: "Can you give me this information without having the mine pumped out?"

Based on these latter experiences I suggested to Prof. Richards a course in the study of ocean currents, and the use of the diving bell in the examination of the sea bottom, and of flooded mines. Naturally it does not appear in the new curriculum, because it does not belong there, though undoubtedly the knowledge gained might occasionally be useful. So might many other things which have been suggested. But four years is too short a period to afford time for study, or practise, of even one-tenth of the numerous subjects, a knowledge of which would at one time or another be of service to this or that man. Yet hundreds of Technology men have solved the new problems which have arisen because the Technology training fits a man for just this work. Looking back over an experience of nineteen years as chemist, assayer, smelter superintendent, mill superintendent, mine superintendent, consulting metallurgist, manager, and consulting engineer, I believe that the course now offered is well nigh the best that can be developed for undergraduates. The general studies, which were largely unknown to the '90 men, are along lines which everyone may find of value. Personally, I believe the study of Spanish should be made an equivalent of French and German. There are few engineers in general practice who do not have work in Spanish-speaking countries, and there are many opportunities for the young engineer in these countries to the south of us. However, another man may feel the same with regard to Chinese. And I believe it is a fact that a Tech graduate who took advantage of the opportunity to learn that language from his Chinese cook subsequently was selected to represent a big English syndicate in China, and later was officially "interpreter to Li Hung Chang."

No course could be devised which would present a tithe of the problems any one man will be called upon to solve. Each mine to be opened, each ore to be treated, is a problem unto itself, and the graduate must erect upon his Technology foundation a structure built with experience before he can become an engineer. When he leaves Tech he is only a "S. B." Perhaps some day, as do certain schools of the West today, Tech will confer, on those of her sons who have built worthily, the degree of "Engineer."

Sincerely yours,
G. A. PACKARD 1890.

To the Editor of The Tech,

Dear Sir:—Replying to your letter asking for some experiences, I feel that the best way to answer you is to tell briefly the work I have done.

After graduating in 1892, I accepted a position in the blast furnace department of the Maryland Steel Co., at Sparrows Point, Md., and started to work in the "monkey-wrench" gang in July, 1892. As a "learner" I was paid $40.00 a month for the first year, no matter what work I did, or how long I worked, though I did turn work before the end of the year that was worth over $60.00 a month. I worked as machinists' helper, pipe-fitter, oiler, pumpman, and helped to run and repair blowing engines and pumps. In the fall I put outside at the furnace proper, and learned to tend stoves and the hot blast. There was much hard, hot, dirty work, and more or less danger in this job, but as I was learning all the time I didn't mind it. In the spring I took extra turns as foreman, especially on night turn, with one of the older foremen. Shortly after a bad explosion at one of the furnaces I got my first promotion, and then inspected coke, limestone, and other ore, and did some experimental work around the blast furnaces. One job was to remove the "salamander" from the hearth of a furnace and recover the lead that had accumulated from some foreign iron ores (mostly from Spain and Seriphos). I even made an assay for silver in the lead.

In the summer of 1894 Prof. R. H. Richards offered me the position of private assistant to help especially in the preparation of his "Notes on Iron." Then followed over a year of the most agreeable and useful work I ever did; the surroundings were ideal (I lived in the home of Prof. Richards) and my work seemed more like a post-graduate course than like earning one's living. In this work English, German, French, mechanical drawing, and laboratory work were all put to use, and I reaped the benefit of "Memoirs." After this came "Ore Dressing," and "Mineral Industry," and perhaps by this time I would have been on the staff of some technical school if I hadn't taken the first chance to get back to the furnaces.

In the short-lived boom of 1895 I went back to Maryland, this time as assistant superintendent, and I stayed till October, 1896, when there was another shut-down. This time I got experience in burdening the furnace, and in running the plant by myself. Being out of work again, I returned to Prof. Richards, and worked on his books and experiments with him.

Late in December, 1896, I took an offer to go to Everett Furnace, Bedford, Pa., as assistant superintendent under J. E. Thropp, Jr., M. I. T. 1894, who was superintendent of his father's blast furnace and ore mines. The following September Thropp, Jr., was made general manager of the furnace, mines, coal and coke works, and I was made superintendent. Then followed a year and a half of hard work and long, long hours. In the spring of 1899 I wanted more money and a change, so I accepted an offer through G. F. Knapp, M. I. T. 1884, and went to Seetonia, O., as assistant to the president of the Salem Iron Co.

The furnace plant of this company was being rebuilt and improved, and I had much engineering and construction work here. I looked after contracts and did the purchasing, and also got some excellent experience in office work. Again, Mr. Knapp recommended me to a better place, and in June, 1902, I went to Johnson City, Tenn., as General Manager of the Cranberry Furnace Co., in charge of their blast furnace in Johnson City, and their famous Cranberry ore mine in Mitchell Co., N. C. Now came mining, ore-dressing, magnetic concentration, transportation, water power, diamond drilling, and many other mining problems, besides the cost sheets, correspondence, banking, commissaries, and office work.

In the summer of 1904 I went to Sault Ste. Marie, Ontario, as superintendent of the blast furnace of the Algoma Steel Co. One furnace was the largest charcoal blast furnace in the world, and we made some new records for charcoal furnaces. Climatic conditions developed suitable equipment for this northernmost furnace, and there were many new experiences.

A very favorable proposition, with prospects of permanency brought me back to the States in November, 1907, to my present position, where there are special problems in water supply and purification, and in fuel economy and labor-saving devices. My attention has been especially called lately to metallurgical questions concerning blast furnace practice; chiefly regarding increased output, fuel economy, regularity of product, and safety in operating modern furnaces.

There is a demand for technically trained men who can get results out of blast furnaces, and there is still a broad field for investigation and improvement in blast furnace metallurgy. The rewards are ample for those who will do the work, and I have found that a man can double his salary every four years if he doesn't live too long. There is great satisfaction in making new furnace records, and then beating them again; it is a game that when one wins all the others gain too, and there is satisfaction all around.

Yours sincerely,
R. H. SWEETSER 1892.

One of the many thoughts which come to a man in his professional work just after leaving college is the recollection that he has left undone many things he should have done; and, on the other hand, done many things he wishes he never had. He regrets, perhaps, that he pursued a certain subject diligently which he does not use, and passively neglected other work which is now of paramount importance to him and which gives him many nights of study and care in order that he may hold his job as a Tech man should. The moral is obvious: Clinch every professional subject in your course so well that you are able to apply your knowledge at any time,—for you may be reasonably certain that the unexpected will be just what you are expected to do.

What I have just referred to concerns the preparation of a prospective engineer,—the hardest problem that faces the "educational engineers," the teachers in all our technical schools. What follows is not going to be a thrilling story of dangers met and overcome and fearful experiences of the "Soldiers of Fortune" type,—because these are generally creatures of the imagination, and because no experience is so terrible after it is over,—but a few lessons learned that have remained long after the incidents which created them.

First, forget that anything like a watch or a clock exists to you. Do what is expected of you as soon as you can, and let "quitting time" mean that the particular thing you have in hand is finished, whether it be the closing line of a survey, a calculation for a beam, or the examination of a distant outcrop. I have worked with men whose creed was "knock off at five," who wondered why their pay was not raised oftener, and who forgot that "pull" and "push" are the expressions of the same force,—but opposite in direction.

Willingness and confidence are great assets. Some men dislike to do certain jobs that come up in routine work. Don't show this to your superior because he may find it convenient to hunt out similar things for you to do in an effort to try you out. Be confident in yourself. Tackle your problems squarely and when you find yourself in trouble go to the man who knows for assistance and you will get it. Above all, don't be afraid to acknowledge a mistake; you will find that you are better liked for it than if you tried to hide your error by subterfuge.

Cultivate the habit of correct speech and writing. Every engineer is called on to make reports, on one kind or another, in writing, and sooner or later he will be asked for an opinion or an explanation. He should always be ready to clearly outline on paper his suggestions or conclusions, and should be equally prepared to stand before a body of men and intelligently express his ideas. The engineer then becomes more than a mere unit in a system,—he is endowed with personality and that personality finds its expression in his written or spoken thought.

These thoughts are not given as any indication of what one's future professional life may be like, but rather as a suggestion, drawn from a short professional experience, to the prospective engineer, who will make the same mistakes and learn the same lessons that every one of his predecessors has made and learned.

JOSEPH DANIELS 1905.