of the first opportunity for employment as an engineer that presents itself?

The answer to this question is, I take it, to be found in a knowledge of how intimately connected are all the various branches of engineering, and over what a wide field of practical experience an engineer must work before he can hope to excel in any one specialty.

The young engineer should, therefore, I consider, take, no matter what his inclination may be, the first opening that offers in whatever line of engineering the opportunity occurs.

If he starts out by supposing that because he has in his mind to become a mechanical engineer, he therefore does not require a practical knowledge of hydraulics, or that because he intends to make a specialty of electrical engineering, he may be indifferent to railway practice, would be to begin life with a very mistaken idea of what is expected of an engineer of eminence in any one department of engineering.

The engineer with an established reputation as a specialist, is undoubtedly more familiar with his particular branch of the subject; but he must, to have obtained prominence in this, have a more or less comprehensive and practical knowledge of all others. So that the engineer who says within himself, "I have no room or use for any engineering experience outside my own specialty which I may be placed in a position of acquiring," makes a great mistake, as the want of knowledge in any one subject will surely be felt sooner or later. He must be sufficiently master of his profession in all its phases to be able, at least, to deal with all ordinary problems. You have only to consider some of the larger engineering works of the present day, to perceive, that for their inception and successful execution, they call for the display of engineering knowledge in all subjects of a high order.

Apart from exceptional works, the railroad engineer, so called, in the higher offices is brought into contact with electric work in block signalling, car lighting and haulage, with mechanical problems in storage of grain, handling of freight, movable bridges, etc.

Again, a city engineer in the larger cities is constantly called on to decide questions involving railroad practice and construction, electric lighting and traction, sanitary matters, water supply, and various other problems, embracing the whole field of engineering. It would only be a repetition were I to mention, in detail, other departments of engineering, as the same thing applies to all; to be successful in any one branch, a more or less intimate knowledge of them all is needed. When the engineer has acquired this, it will then be in order for him to select his specialty, should his inclination urge him to do so. But the probability is that when he has reached this stage he will already have been forced by circumstances into the more direct pursuit of some special subject.

In what I have just said I have no wish or intention, by magnifying the needful attainments of a thoroughly competent engineer, to intimidate or discourage anyone feeling within himself an inability to master so comprehensive a subject, from persevering. But I do wish to caution anyone against the fallacy of the belief that because he is tolerably conversant with some one of the subdivisions into which engineering is divided, he is therefore a finished engineer. An engineer, in this respect, is like a city, and should never be finished. But, again, few men actively engaged in the practice of their profession can keep in touch with or fully up in the progress of engineering in all the various departments with which they do not happen to be, at the time, immediately concerned. They must, as a consequence, expect to get somewhat rusty in some subjects. To overcome this difficulty, and as the next best thing to having any desired information, is the knowledge of where it is to be had; the engineer should, with this object in view, keep an index of all important articles on engineering matters he comes across, with a brief summary of their scope or contents, so that when suddenly called upon to consider any question, he may know just where to go for the most recent information on the subject. Such an index will be found, I think, of more use than any to be obtained in print, for it will recall, at least to some extent, the article, and enable the user to decide more readily than he otherwise could which to select as being most likely to meet his wants.

Having acquired all the requisite professional knowledge, the engineer may yet lack the power of applying it to advantage; this want of power is, however, to some extent, constitutional. The engineer requires, above almost anything else, to be endowed with a strong ingredient of common sense, without which all his theoretical and practical engineering knowledge will be of very little service to him. I do not say that common sense is not needed in all walks of life, but that it is more necessary in engineering than in some other professions or callings. The lawyer has, in most cases, precedent to follow, and fixed rules to guide him in the conduct of his affairs. The doctor has a tolerably exact science to rely upon, with a definite course laid down for him to follow in specific cases. Engineering, however, is not an exact science except in assumed cases or under assumed conditions, but as the conditions are never exactly alike in any two cases, in actual fact the engineer has no definite guide to follow, but must use his own judgment in selecting and applying theory to facts as he finds them, and it is here that the pure theorist or the young and inexperienced engineer is apt to go astray, and be led to conclusions which an experienced man would at once condemn as unsound. And this is not the fault of the theory, which may be all right, but in its wrong application due to a want of the common sense or practical experience needed to adapt the theoretical considerations to the case in point. Possessing a wide knowledge of his profession, with the discernment to make the best practical use of his knowledge, the engineer may yet lack some of the elements essential to a successful career. When I say successful I do not mean the mere getting of money; he may succeed in doing this and yet be no credit to his profession.

The engineer is subjected to peculiar and insidious temptations to deviate almost unconsciously from the strict paths of integrity, and I think it only fair to the younger members just entering into the active pursuit of their profession to caution them as to the character of these dangers. From the outset of his career the engineer is frequently placed in a p sition where he is called upon to measure and inspect contract work. He finds after a time that although trying to do his duty conscientiously, he is apparently forgotten, and that others less zealous and competent than he feels himself to be, are preferred before him; he soon perceives that the more fortunate ones possess "friends at court," or in other words, backing; he knows that his exact measurements and strict interpretation of the specifications, which it has been vainly urged upon him was not