

My old girl fell ill—the brokers came,
And “distressed” for a ten-pun’ note ;
Then our little ’un went—here, hand the glass,
The smoke is a-tickling my throat.

I hope, mates, none of you’ll see sich days,
And I hope *I* shan’t again ;
Them troubles, I think, falls all of a heap
Like thunder an’ lightning an’ rain.
I come home one night with a heavy heart,
And who in the world should I meet
But “Surly Bob,” like a midnight thief,
Skulking away in the street !


We spoke no words ; I got in-doors,
And drat me ! the broker warn’t there ;

A receipt in full for his money lay
All white and snug on a chair.
But wait, my lads, I haven’t done :
This warn’t by no means the end ;
Five pun’ in gold in a paper lay by,
For to start afresh—“ From a friend.”

Ye guess his name ? Now what *I* says, mates,
Is, Bob was a genuine brick ;
He didn’t sing out no gloomy words,
But he helped the poor and the sick.
And look here, mates—sure as I stand here,
I’ll make it a smart bit hot
For the chap who, when I says Bob was a
trump,
Just dares to maintain he was not !

REGINALD BARNETT.

GERMAN POLYTECHNIC SCHOOLS.



IN the February number of CASSELL'S FAMILY MAGAZINE we gave a short and popular account of the German Universities ; we now propose to devote a brief space to the notice of another important German educational institution, viz., the Polytechnic schools. In Germany everything is done very thoroughly, slowly it may be, but surely. The watchword of the German nation, like that of Laud and Strafford, might well be described in the one word “thorough.” When a German takes up any particular subject, be it war, politics, science, scholarship, theology, jurisprudence, trade, or manufacturing industry, he throws his whole heart and soul into the work, and hence the great success which has fallen to the lot of Germany in many departments of human activity. The German military system is the most complete and systematic the world has ever yet seen, let us hope that it ever may see. German philosophy has probed more deeply into the great questions of knowing and being, of human nature, its origin and its destiny, than any philosophy which has challenged attention since the time of Plato and Aristotle : indeed German thinkers at one time held that there had been no philosophy except that of the Greek and German schools. The German administrative system is a science in itself, requiring for its complete understanding the devotion of a life-time, and held for the most part within the grasp of a permanent bureaucracy.

Nor is all this due merely to application and industry. The German is not contented with mastering the mere dry detail ; he will leave that to the prosaic Englishman. It is his aim to endeavour to comprehend the meaning, and to grasp the essential underlying principles, of any given subject. In short, his aim is to classify facts, to comprehend isolated instances in complete generalisations—in a word, to organise com-

mon knowledge as science. But he is a plodder too ; he is not indifferent to the claims of laborious toil ; he is aware of the importance of exact knowledge ; he is a mean between the hard-working, patient Englishman, and the impulsive, rhetorical Frenchman. The well-known story of the camel will illustrate this difference between these three great nations. A Frenchman, an Englishman, and a German were commissioned, it is said, to give the world the benefit of their views on that interesting animal, the camel. Away goes the Frenchman to the Jardin des Plantes, spends an hour there in rapid investigation, returns, and writes a *feuilleton*, in which there is no phrase the Academy can blame, but also no phrase which adds to the general knowledge. The Englishman packs up his tea-caddy and a magazine of comforts ; pitches his tent in the East ; remains there two years studying the camel in its habits ; and returns with a thick volume of facts, arranged without order, expounded without philosophy, but serving as valuable materials for all who come after him. The German, despising the frivolity of the Frenchman, and the unphilosophical matter-of-factness of the Englishman, retires to his study, there to construct the idea of a camel out of the depths of his moral consciousness. *And he is still at it.* Such is the *jeu-d'esprit* : it scarcely does justice to the German, inasmuch as he is a patient worker, and investigates into actual facts as truly as the Englishman, but otherwise it well represents the insatiable German desire for comprehending a fact in its totality, for converting an ordinary series of facts into a brilliant generalisation, or into a complete and systematic science.

It is probably this scientific element of the German mind which has led that nation to establish within its borders a system of Polytechnic schools, in which systematic instruction is given in art, in applied science, and in the higher branches of mechanical industry. Thus the manufacturing operations in which so many thousands are engaged, are brought within the domain of science and of culture, to the manifest advantage

not only of the manufactures, but also of the people of Germany.

There are nine Polytechnic schools established among the German-speaking people, two of which, however, are outside the limits of the German Empire, viz., those of Vienna and Zurich; and the total number of students embraced in these institutions amounted in 1876 to nearly 7,000. The majority of the schools contain about 500 students each, but those at Vienna, Munich, and Zurich, the three largest schools, number about 1,000 each, a number equal to that of a good-sized German University. They are all State institutions, subject to the control of the Minister of Public Instruction for the State in which each is respectively situated. They also receive considerable sums of public money, which are appropriated for the purpose every year by Government. They are not, however, wholly dependent on State support, but are also enriched by munificent endowments from private individuals. These institutions, unlike the Universities, are all of recent establishment, having grown up to meet the wants of this great industrial age. That they are popular, and that they supply a real want, may be seen in the fact that the attendance in the schools is increasing every year, and also that their number is being added to, as in the case of Berlin, where the Prussian Government has appropriated 8,000,000 of marks (about £400,000) for the erection of a new Polytechnic school.

The general method of instruction in these institutions is very similar to that which obtains in the Universities, the teaching being given by means of lectures, and the students enjoying perfect liberty of choice in regard to their studies. A student, *e.g.*, in the department of civil engineering is only required to attend the lectures in connection with his department. There is no uniform course imposed on all. Each student, too, must show before he is admitted that he has received the full preliminary training which is given in the Gymnasium (real school). The subjects taught in the Polytechnic schools are mining, civil engineering, architecture, mechanics, practical chemistry, mathematics, drawing and design. Most of the schools, too, afford some opportunity for general education in modern languages, German literature and history, and those branches of science not embraced in the above list. This enables students from the Gymnasium to complete their general culture without going to a University, and at the same time to obtain a thorough and systematic knowledge of some one branch of mechanical or scientific industry. The proportion of teachers to students in these schools may be estimated by taking that at Hanover as a typical specimen; in that school there are 837 students, and there were last year forty-five professors and assistants. The museums, laboratories, libraries, &c., are complete and excellent, leaving nothing to be desired, while in some

cases the buildings are really very fine, comparing favourably with the ugly, and in one or two cases dilapidated, structures of the German Universities. As may be imagined, most of these schools attract a not inconsiderable number of students from foreign countries. In Dresden last year there were about 130 foreign students, while the school at Hanover contained ninety. These two instances are, however, beyond the average, and may be accounted for by the fact that Dresden is one of the most delightful and attractive places in Europe, while students of foreign nations are drawn to Hanover because there the German language is spoken in its greatest purity. All the schools, however, contain some foreign students, the whole number of whom amounts to several hundreds. The small cost of the instruction may be inferred from the fact that at Hanover the average annual fee paid by a student for lectures, use of the laboratory, library, &c., is less than £5. The cost of living, too, in most German cities is comparatively small, and these two causes are in themselves amply sufficient to explain to a certain extent the success of these institutions. Their complete success can, however, only be fully explained when it is borne in mind how thorough, systematic, and altogether admirable is the instruction given in these valuable schools.

In England we are not wholly unacquainted with similar institutions. We have our School of Mines and our South Kensington in London, our Yorkshire College of Science at Leeds, our College of Physical Science at Newcastle, and the Andersonian College at Glasgow. These are mostly very young institutions, and they are sowing seeds, the harvest of which is yet to be reaped. We cannot but think that an extension and enlargement of these institutions is desirable. The College of Science at Newcastle, *e.g.*, has about six professors, but if it were established in Germany it would probably boast of its thirty-six. It may be hoped that private generosity, such as that of Sir Josiah Mason at Birmingham, or Mr. Anderson at Glasgow, will do much for us; but we cannot but feel that, if we are to keep pace with Germany, State supervision and State support must supplement and consolidate the munificence of individuals. Some important branches of the higher industry are passing out of our hands into those of Germany and America; the manufactures of Berlin and of Chemnitz in Saxony are being extended at a rate of which few Englishmen are aware; and one of the most important operating causes of this fact is to be found in the superior trained intelligence of the German artisan. We cannot help feeling that England has greater natural capacity for industrial development than Germany, and consequently every exertion should be made, every means should be adopted, for directing that capacity into the right channels.