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VII

THE PURSUIT OF KNOWLEDGE
UNDER DIFFICULTIES.

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King of the South

THE
PURSUIT OF KNOWLEDGE
UNDER DIFFICULTIES.

BY

GEORGE L. CRAIK, M.A.,

PROFESSOR OF ENGLISH LITERATURE, QUEEN'S COLLEGE, BELFAST.

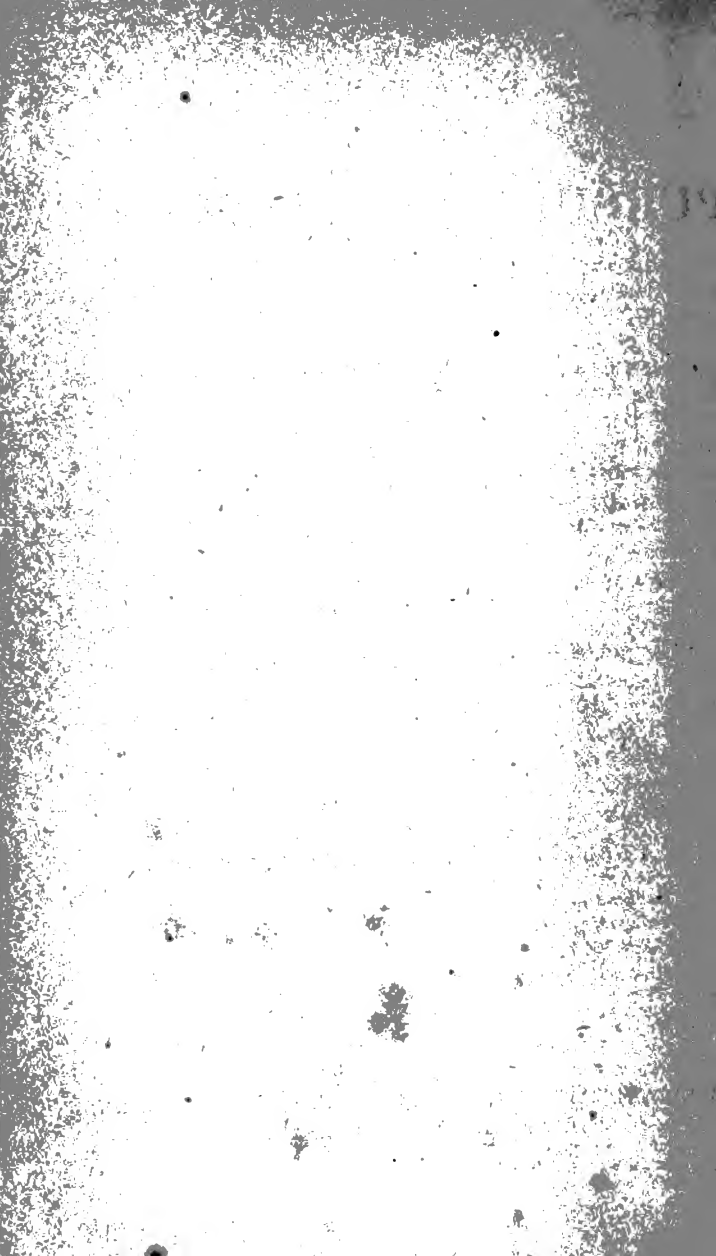
A NEW EDITION, REVISED AND ENLARGED.

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1865.





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P R E F A C E.

THIS book was originally published, in 1830, under the superintendence of the Society for the Diffusion of Useful Knowledge; and it was reproduced in another form, under my own care, in 1845. The revision which it underwent on that occasion, however, extended only to such statements as were affected by the lapse of time. Appearing now with the name of the writer, it is restored throughout more nearly to the state in which it first left my hands; and I have also taken the opportunity of introducing a few additional notices of eminent individuals, some of them still living, who have distinguished themselves by one form or another of what may be called the Pursuit of Knowledge under Difficulties. Of that happy title, however, which has had the fortune to become a sort of proverbial phrase, or "household word," and to which the book, no doubt, owes much of whatever success it has had, I ought to say that I cannot claim the credit; it belongs, I have always understood, to Lord BROUGHAM, who, finding time for everything, honoured the little work by going over the proof-sheets, at least of the first volume, and some other touches of whose expressive pen, it may interest the reader to know, are elsewhere to be found in it; although I would not have his Lordship, or any one but myself, to be held responsible for either its statements as to matters of fact, or any indications of opinion on controverted questions; of which last, however, there are really none, I believe, that can give pain or offence to anybody.

G. L. C.

By the kind permission of Mr. CHARLES KNIGHT, we are enabled to print the following extract from his " Passages of a Working Life " (vol. ii., p. 133), giving a detailed account of the origin of this volume :—

It was not only in the meetings of our committees that I had the advantage for my editorial guidance of the opinions of men of accurate minds and sound information; but I was frequently also in correspondence with those who took a more than common interest in particular works. Such a work was that well-known contribution to the " Library of Entertaining Knowledge," which first established the reputation of Mr. George Lillie Craik as a sound thinker and an accomplished writer. To myself, individually, the recollection of that Autumn of 1828 is especially dear, for it was the commencement of an intimacy which ripened into the unbroken friendship of six and thirty years. In the preliminary stages of discussion on the objects and mode of treatment of a book such as this, which was to embrace a vast number of illustrative anecdotes of the love of knowledge overcoming the opposition of circumstances, there were necessarily different estimates of the value of scientific and literary studies, whether " for use," or " for delight," or " for ornament." The great distinction be-

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tween the love of knowledge for its own sake, and the love of knowledge as the means of worldly advancement, may be traced very distinctly in the two popular volumes of Mr Craik, and the equally popular "Self Help" of Mr. Smiles. Mr. Craik's views upon this cardinal point are very clearly expressed in a letter written to me by him in the Autumn of 1829, but having no date except the day of the week (a very perplexing custom for the historian or biographer). His views are so interesting that I make no apology for the length of the quotation:—

"Our concern, it appears to me, is neither with individuals who have *in any way* been exalted from one region of society to another, nor even with such as have been chiefly the authors of their own exaltation; for the fact of their exaltation is not at all the one upon which we wish to fix attention, even although we should make it out to have been in every case the consequence of their abilities and attainments. What, then, is our subject? Not the *triumphs* of genius, nor of perseverance, nor even of perseverance in the pursuit of knowledge, because it is not the *success* of the effort, at least in a gross and worldly sense, we would point attention to; nor is it by any means what is called *genius* to which we are exclusively to confine ourselves, while we still less mean to include every *species* of perseverance. But we want a category which shall embrace, for example, the cases at once of Lady Mary Wortley Montague, of Franklin—of all, in short, who, whether in humble or high life, have pursued Knowledge with ardour, and distinctly evidenced, by the seductions they resisted, or the difficulties they encountered and overcame for her sake, that she was the first object of their affections: and that the pursuit of her, even without any reference to either the wealth, the power, or the distinction which she might bring them, was, in their estimation, its own sufficient reward. It appears to me, then, clearly that our title must be not anecdotes of self-taught genius at all, for that is greatly too limited, but *Anecdotes of the Love of Knowledge*—that being in truth the one distinction which we find common to all the examples we would embrace, as well as the disposition which we mean to excite and foster."

Mr. Craik had written a preliminary dissertation, in the sound views of which Mr. Brougham expressed himself to me as generally coinciding. But in a portion of a letter, dated from Westmoreland, in September, 1828 (and I judge, therefore, to have preceded by a month or two the letter from Mr. Craik which I have quoted), Mr. Brougham takes a different view of the range of such a work as that proposed. "His (Mr. Craik's) idea of the line to be drawn as to self-educated men in modern times is also quite correct; but we must, nevertheless, confine the examples to cases which are quite plainly those of men who have greatly altered their situation by force of merit—as Watt, Arkwright, Franklin, Burns, Bloomfield, Mendelsohn—making, the ground of division or classification, self-exaltation rather than self-education, though they often will coincide. This field is quite large enough for one book; but the work might be followed by another comprehending the rest of it, and including all self-taught genius in the larger sense. To give an example: I should certainly exclude Newton, though, like Pascal, he taught himself mathematics: also Granville Sharpe, though he raised himself by his merit to great fame; but he was grandson of the Archbishop of York, and could not be said to alter his station in life. I look forward to Mr. Craik's labours as of the greatest use to the Society, and to the good cause, having the greatest confidence in his sound principles, and a very high opinion of his talents."

This interesting discussion was continued between Mr. Brougham, Mr. Hill, Mr. Craik, and myself, till it was seen how the opposite views could be resolved into a general agreement. I have before me Mr. Brougham's *proof* of Mr. Craik's first volume. To Mr. Brougham is to be assigned the merit of giving to the book in this proof the title which has come to be one of the commonest forms of speech,—

THE PURSUIT OF KNOWLEDGE UNDER DIFFICULTIES. The title originally stood—
THE LOVE OF KNOWLEDGE OVERCOMING DIFFICULTIES IN ITS PURSUIT.

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THE

PURSUIT OF KNOWLEDGE

UNDER DIFFICULTIES.

CHAPTER I.

CLASSIFICATION OF DIFFICULTIES : OUR NATURAL LOVE OF KNOWLEDGE : THE PHILOSOPHY THAT LIES IN COMMON THINGS : NEWTON ; GRAVITATION : GALILEO ; THE PENDULUM : TORRICELLI AND PASCAL ; THE BAROMETER : PRINCE RUPERT ; MEZZOTINTO : MONTGOLFIER ; THE BALLOON : SELF-TEACHING.

THE various individuals who, in every age of the world, have distinguished themselves by their devotion to intellectual pursuits in the midst of more or less unfavourable circumstances, might perhaps be conveniently enough comprehended in four classes ; to be designated, for shortness' sake, the Conquerors of Ignorance, the Conquerors of Adversity, the Conquerors of Business, and the Conquerors of Custom. Under the head of the Conquerors of Ignorance would come all who, by their own efforts, have emancipated themselves from ignorance, whether by partially or wholly educating themselves, or by seeking and finding instruction notwithstanding the discouragement or opposition of friends, the difficulties arising from scantiness of means, a neglected youth, or any of the other causes which usually produce permanent illiteracy. The Conquerors of Adversity would be those who have clung to the pursuit of knowledge in spite of menial, laborious, or other uncongenial employments, depressing poverty or dependence, confinement, persecution, disease, or deficiency of any of the ordinary corporeal senses. The Conquerors of Business would include all who have made themselves remarkable by their acquirements or achievements in literature or science, while beset by the usually engrossing demands of what is called active life. Finally, the title of the Conquerors of Custom would

take in all those who, in their pursuit of knowledge, have had to surmount impediments interposed by the habits, fashions, or prejudices of the society in which they moved.

But, although instances of all these different kinds of conquest will be found in the following pages, they will not be found arranged with any rigorous adherence to this classification. Our little work is not intended to be a scientific treatise, but only a sort of *florilegium*, so to speak, or selection of the examples and histories belonging to our subject which are likely to prove the most attractive and stimulating. The classification, therefore, having been once stated, need not further embarrass us.

It is a pity that, as we grow up towards the maturity of our faculties, we fall away in so many respects from what we were in our childhood; for the most beautiful and perfect character of all would be that in which the man, with his larger experience and full-grown powers, was still in heart and disposition a child. If we could but retain with us always the ingenuousness, the guilelessness, the docility, the simple but yet warm affections of opening life, unimpaired by the hardening influences of the world, we should not only be the happier for it, but should without doubt be gainers too, as to those things which most engage the ambition and flatter the pride of manhood. We should be wiser if we sought wisdom more like little children. SIR ISAAC NEWTON, of all men that ever lived, is the one who has most extended the territory of human knowledge; and he used to speak of himself as having been all



SIR ISAAC NEWTON.

his life but “a child gathering pebbles on the sea-shore;”—expressing by that similitude, probably, not only his modest conviction how mere an outskirt the field of his discoveries was, compared with the vastness of universal nature, but an allusion likewise to the spirit in which he had pursued his investigations, as having been that, not of selection and system-building, but of child-like alacrity in seizing upon whatever contributions of knowledge Nature threw at his feet, and of submission to all the intimations of observation and experiment. On other occasions he was wont to say, that, if there was any mental habit or endow-

ment in which he excelled the generality of men, it was that of patience in the examination of the facts and phenomena of his subject. This was merely another form of that teachableness which constituted the character of the man. He loved Truth, and wooed her with the unwearied ardour of a lover. Other speculators had consulted the book of Nature principally for the purpose of seeking in it the defence of some favourite theory; partially, therefore, and hastily, as one would consult a dictionary: Newton perused it as a volume altogether worthy of being studied for its own sake, and hence both the patience with which he traced its characters, and the rich and plentiful discoveries with which the search rewarded him. If he afterwards classified and systematized his knowledge like a philosopher, he had first, to use his own language, gathered it like a child.

It is in childhood that we may be said most to love knowledge for its own sake. We know none of its uses except the gratification which it gives, and receive it, like the light of heaven or the fragrance of the flowers, as an enjoyment that needs no ulterior utility to make it delightful to us. Curiosity awakens in the infant breast with thought itself; and at that most interesting period especially, when the mind, like a seedling that has just made its way through the ground, is pushing forth, as it were, its first leaves and buds of promise, this passion, for it is then truly such, seems to be almost master of all the rest, so that a lively child shall in general be easily seduced at any time from either his food or his rest, or a sport which merely gives occupation to his physical activities, by the attractions of anything which offers him intellectual excitement and exercise, provided it do not present itself to him in the shape of a task, or be made revolting to his imagination by the associations of task-work. For it is not merely an entertaining tale that arrests the ear at this period, but knowledge of whatever kind, if communicated simply as knowledge. You never stated a fact to a child, in language which he could comprehend, to which he did not listen with eager attention. The questions he asks, and he is ever asking questions, are not confined to subjects that engage and amuse the fancy, but are more commonly directed to points having something of a solid and philosophic importance. It is matter for reflection that he seeks something, not to divert the *ennui* of the moment, but to store up and grow wise upon. Savages, too, who are men in physical powers, but children in intellectual tastes and habits, bear a like attestation with children to the love which we naturally have for knowledge, by the eagerness with which, unless when brutified by vice or misery, they uniformly listen to whatever information may be imparted to them by their civilized visitors. Nothing is so intensely interesting, either to a child or to a savage, as a philosophical experiment—except the explanation of it. The excited curiosity in this case hungers for its aliment

in both, with a keenness which does indeed show strikingly how much might be done in the work of education, merely by appealing to this principle of our mental constitution, and tempting us to the pursuit of knowledge by the love which we naturally feel for it. When the sense of ignorance is once fairly awakened, it is almost too painful to be borne; and the instructor's easy and delightful task, therefore, if he would but give himself to it, is mainly to excite in his pupils this natural thirst for knowledge, and then to lead them to the fountain where they may drink and be satisfied.

But to return to the teachableness preserved by such minds as those of Newton to the very end of life. It is indeed most interesting and instructive to consider the manner in which both this great man and many others, possessing a portion of his observant and inventive genius, have availed themselves, for the enlargement of the boundaries of philosophy, of such common occurrences as, from their very commonness, had escaped the attention of all less active and original minds. We are not now speaking of such lucky discoveries as mere chance has sometimes suggested, even to the most inattentive understanding. How far we are indebted to this source for many of those ordinary arts, the origin of which is lost in antiquity and fable, it would not be very easy to determine. The accounts relating to such subjects have been principally handed down to us by poetry and popular tradition, both which are lovers of the mysterious and the marvellous. Hence, there is reason to believe that they are much too full of those wonders which strike an unlightened fancy; and that, instead of the slow and successive efforts by which the arts in question were actually discovered and improved, there has been substituted, in many cases, the more dramatic incident of a sudden inspiration, merely for the sake of effect. Nay, in those times, the discoverer himself might probably be not unfrequently the first to contrive and spread the fiction; preferring, as he would in all likelihood do, the credit of being the chosen transmitter of supernatural communications to his fellow-mortals, to that of excelling those around him in such mere human and unvalued attributes as philosophic sagacity and patience. Or he might be self-deceived by his own ardour. The legend of a mystical origin, besides, was not only the best recommendation by which any invention could, in the early ages of the world, be introduced to the notice of men, but perhaps, under the tyranny of a jealous and engrossing superstition, was almost a necessary passport to its reception. However this may have been, it is worth remarking, that the current tales had probably some share in leading away the spirit of antiquity from that investigation and application of facts, whence chiefly has arisen the glory of the philosophy of modern times. Speculation and conjecture are now permitted to work only in association with observation and experiment.

But, of all sorts of observation, that which exhibits the most penetrating and watchful philosophy is, when, out of the facts and incidents of every-day experience, a gifted mind extracts new and important truths, simply by its new manner of looking at them, and, as it were, by the aid of a light of its own which it sheds upon their worn and obliterated lineaments. From one of these simple incidents Sir Isaac Newton is said to have read to the world, for the first time, the system of the universe. It appears to have been in the twenty-third year of his age, or the autumn of 1665, that this extraordinary man was sitting, as we are told, one day in his garden, when an apple fell from a tree beside him.¹ His mind was perhaps occupied, at that fortunate moment, with one of those philosophical speculations on space and motion which are known to have, about this time, engaged much of his attention; and the little incident which interrupted him was instantly seized upon by his eager spirit, and, by that power which is in genius, assimilated with the substance of his thoughts. The existence of gravitation, or a tendency to fall towards the centre of the earth, was already known, as affecting all bodies in the immediate vicinity of our planet: and the great Galileo had even ascertained the law, or rate, according to which their motion is accelerated as they continue their descent. But no one had yet dreamed of the gravitation of the heavens,—till the idea now first dimly rose in the mind of Newton. The same power, he may be supposed to have said to himself, which has drawn this apple from its branch, would have drawn it from a position a thousand times as high. Wherever we go, we find this gravitation reigning over all things. If we ascend even to the top of the highest mountains, we discover no sensible diminution of its power. Why may not its influence extend far beyond any height to which we can make our way? Why may it not reach to the moon itself? Why may not this be the very power

¹ It "was doubtless," writes Sir David Brewster, "in the same remarkable year 1666, or perhaps in the autumn of 1665, that Newton's mind was first directed to the subject of gravity. He appears to have left Cambridge some time before the 8th of August, 1665, when the College was 'dismissed' on account of the plague, and it was therefore in the autumn of that year, and not in that of 1666, that the apple is said to have fallen from the tree at Woolsthorpe, and suggested to Newton the idea of gravity. Neither Pemberton nor Wiston, who received from Newton himself the history of his first ideas of gravity, records the story of the falling apple. It was mentioned, however, to Voltaire by Catharine Barton, Newton's niece, and to Mr. Green by Martin Folkes, the President of the Royal Society. We saw the apple-tree in 1814, and brought away a portion of one of its roots. The tree was so much decayed that it was taken down in 1820, and the wood of it carefully pre-

served by Mr. Turnor of Stoke Rocheford. See Voltaire's *Philosophie de Newton*, 3me part. chap. iii.; Green's *Philosophy of Expansive and Contractive Forces*, p. 972; and Rigaud's *Hist. Essay*, p. 2."—*Memoirs of Life, Writings, and Discoveries of Sir Isaac Newton*, 1855. Vol. I., pp. 25, 26, 27.—All that Pemberton says is—"The first thoughts which gave rise to his *Principia* he had when he retired from Cambridge in 1666, on account of the plague. As he sat alone in a garden, he fell into a speculation on the power of gravity; that, as this power is not found sensibly diminished at the remotest distance from the centre of the earth to which we can rise, neither at the tops of the loftiest buildings, nor even on the summits of the highest mountains, it appeared to him reasonable to conclude that this power must extend much farther than was usually thought. Why not as high as the moon? said he to himself," &c.—*View of Sir Isaac Newton's Philosophy; Preface.*

which retains that planet in its orbit, and keeps it revolving as it does around our own earth? It was a splendid conjecture, and we may be sure that Newton instantly set all his sagacity at work to verify it. If the moon, he considered, be retained in her orbit by a gravitation towards the earth, it is in the highest degree probable that the earth itself, and the other planets which revolve around the sun, are, in like manner, retained in their orbits by a similar tendency towards their central and ruling luminary. Proceeding then, in the meantime, upon this supposition, he found by calculation, and by comparing the periods of the several planets and their distances from the sun, that, if they were really held in their courses by the power of gravity, that power must decrease in a certain proportion, according to the distance of the body upon which it operated. This result he had already anticipated from the consideration that, although we could not detect any such diminution within the comparatively small distance to which our experience was limited, the fact was yet consistent with the whole analogy of nature. Supposing, then, this power, when extended to the moon, to decrease at the same rate at which it appeared to do in regard to the planets which revolved around the sun, he next set himself to calculate whether its force, at such a distance from the earth, would in reality be sufficient to retain that satellite in its orbit, and to account for its known rate of motion. This step of the discovery was marked by a very singular circumstance, and one strikingly illustrative of the truly philosophic character of this great man's mind. In the computations which he undertook for the purpose of his investigation, he naturally adopted the common estimate of the magnitude of the earth, which was at that time in use among our geographers and seamen. Indeed, no other yet existed for him to adopt: but it was even then known to scientific men to be loose and inaccurate. It allowed only sixty English miles to a degree of latitude, instead of sixty-nine and a half, which is the true measurement. The consequence was, that the calculation did not answer; it indicated, in fact, a force of gravity in the moon towards the earth, less by one-sixth than that which was necessary to give the rate of motion actually possessed by that satellite. Another might have thought this but a trifling discrepancy, and, in such circumstances, might have taxed his ingenuity to account for it in a variety of ways, so as still to save the beautiful and magnificent theory which it came so unseasonably to demolish. But Newton was too true a philosopher, too single-hearted a lover of truth, for this. In his mind the refutation was a complete one, and it was admitted as such at once. He had made his calculation with care, although one of its elements was false; it did not present the result it ought to have done, had his hypothesis been as true as it was brilliant; and, in his own estimation, he was no longer the discoverer of the secret mechanism of the heavens. By an act of self-denial, more heroic than

any other recorded in the annals of intellectual pursuit, he dismissed the whole speculation from his mind, even for years. We need hardly state how gloriously this sacrifice was in due time rewarded. Had Newton, instead of acting as he did, obstinately persevered in the partially erroneous path into which he had thus been misled, it is impossible to say into how many additional misconceptions and mis-statements he might have been seduced, in order to cover the consequences of his first blunder : or how much the simplicity of the grand truth which had revealed itself to him, as it were, for a moment in the distance, might have been eventually complicated and disfigured by the vain imaginations of the very mind which had discovered it. The progress of science would, no doubt, at last have swept away all these useless and encumbering fictions ; but that honour would, probably, have been reserved for another than Newton. Committed to the maintenance of his adopted errors, and with his mental vision even unfitted in some measure for the perception of the truth, he might in that case have been the last to take in the full brightness of the day, the breaking of which he had been the first to descry. But by keeping his mind unbiassed, he was eventually enabled to verify all, and more than all, that he had originally suspected. No other speculator had yet followed him in the same path of conjecture ; when, a few years after, upon obtaining more correct data, he repeated his calculation, and found it terminate in the very result he had formerly anticipated. And what a moment of triumph and inconceivable delight must that have been, when he saw at last that the mighty discovery was indeed all his own ! It is said, that such was his agitation as he proceeded, and perceived every figure bringing him nearer to the object of his hopes, that he was at last actually unable to continue the operation, and was obliged to request a friend to conclude it for him.

Another very beautiful example of the way in which some of the most valuable truths of philosophy have been suggested, for the first time, by the simplest incidents of common life, is afforded by GALILEO'S discovery of what is called the *isochronism* of the pendulum, or the equality of its oscillations in point of time. It was while standing one day in the metropolitan church at Pisa, that his attention was first awakened to this most important fact, by observing the movements of a lamp suspended from the ceiling, which some accident had disturbed and caused to vibrate. Now this, or something of the same kind, was a phenomenon which, of course, had been observed many, thousands of times before. But yet nobody had ever viewed it with the philosophic attention with which it was on this occasion examined by Galileo. Or if, as possibly was the case, any one had been half unconsciously struck for a moment by that apparent equability of motion which arrested so forcibly the curiosity of Galileo, the idea had been allowed to escape

as soon as it had been caught, as relating to a matter not worth a second thought. The young philosopher of Italy (for he had not then reached his twentieth year) saw at once the important applications which might be made of the thought that had suggested itself to him. He took care, therefore, to ascertain immediately the truth of his conjecture by careful and repeated experiment; and the result was the complete discovery of the principle of the most perfect measure of time which we yet possess. How striking a lesson is this for us when we discover, or think we discover, any fact in the economy of nature which we have reason



GALILEO.

to believe has not previously been observed! Let it be at least verified and recorded. No truth is altogether barren; and even that which looks at first sight the simplest and most trivial may turn out fruitful in precious results.

It seems, after it is stated and described to us, to have been an exceedingly obvious thought which struck Galileo, when, after having

ascertained the regular oscillation of the pendulum, he proposed employing it as a measure of time. Some, indeed, may imagine that there was no such extraordinary merit as is generally supposed, even in the grand conjecture of Newton, and that it amounted, after all, merely to the application of a law to the movements of the heavenly bodies, which was already known to affect at least every body in the immediate neighbourhood of the earth. But these things are only simple after they are explained. Slight and transparent as we may think the veil to have been which covered the truths alluded to, and others of a similar nature, immediately before they were detected, it is yet an unquestionable fact that this veil had been sufficient to conceal them, for thousands of years, from the observations of all the world. The phenomenon of a heavy body swinging to and fro from a point of suspension, had been familiar to every generation from the very earliest times; and yet, although men had long been very desirous of possessing an accurate and convenient measure of time, and had resorted in different countries to a great variety of contrivances to attain that object, nobody before Galileo had thought of effecting it by means of the pendulum. And, in the same manner, with regard to the law of gravitation: the fact of bodies generally having a tendency to fall to the earth, must of course have forced itself upon the attention of the very earliest inhabitants of our globe, every day and hour of their existence. But yet Newton's application and extension of this law had occurred to nobody, not even to Galileo himself, who had not many years before been engaged in investigating the exact amount of its influence within the field in which alone it had hitherto been supposed to operate. And Newton not only applied the law of gravitation to the heavenly bodies; but, as the principle, when affecting bodies in the neighbourhood of the earth, was that of a force apparently constant, he had to discover and demonstrate the law of its variation.¹

But, perhaps, the most striking illustration we can give of the strange manner in which important truths will sometimes hide themselves for a long while from observation, even after science has approached almost so near as to touch them, is to be found in the history of the different discoveries relating to the mechanical properties of the air. The know-

¹ "The assumption of an attractive force emanating from the sun," says the writer of the article on Newton in the *Penny Cyclopædia*, "was at this time far from being a novelty; and it had even been asserted by Bouillaud [in his *Astronomie Philolaïca*, published in 1645] that, if such a force really existed, its intensity would vary inversely as the square of the distance from the attracting body; but neither Bouillaud nor those who entertained similar opinions had given any proof, either empirically or otherwise, of what they had asserted; and

certainly none appear to have attempted to establish that the forces which retain the planets in their orbs were identical, as to their nature, with that which draws a stone, when let fall, to the surface of the earth. Newton showed that the law of the inverse square of the distance is that which really exists in nature; and, further, that this law was a necessary consequence of the analogy already discovered by Kepler between the periodic times and the mean distances of the planets."

ledge of its positive weight, or gravity, is as old as the days of Aristotle. Even its elasticity was well known to the ancients; one of whose philosophers, HERO of Alexandria, had, about a century before the birth of Christ, constructed upon that principle the fountain, or *jet d'eau*, which still goes by his name. The common suction-pump is a still older invention, the effect of which, depending, as it does, entirely on the pressure of the atmosphere, might have suggested the true philosophy of that subject, it may be thought, to some one of its innumerable observers. But, in reality, although all the while the air was known to be really a heavy body, nobody for two thousand years found out the true reason why, on its removal from the barrel of the pump by the elevation of the piston, the water rose into the vacant space. The unlearned multitude attributed the phenomenon to a *suction*, or power of draught, in the pump, and gave it the name of the suction-pump accordingly. They saw a phenomenon which they did not understand, and they called its cause, of which they were ignorant, suction. But the theory of the philosophers was more irrational than that of the multitude: only that, professing to rest upon one of the great laws of nature, it looked somewhat more solemn and imposing. The water rises in the pump, it was said, upon the removal of the air, because *Nature abhors a vacuum*; and thus the matter rested, as we have said, for nearly twenty centuries—the alleged abhorrence of nature for a vacuum never having been established, either by experiment or reasoning, or in any other way, but at the same time being always so gravely propounded as a universal truth, that it never was questioned by anybody. Let us not, however, deride with too much levity these errors and follies of the old interpreters of Nature. We ourselves are only yet casting off the yoke of that ignorance, in the guise of wisdom, under which the men of other times were wont so submissively to bow; and, if not in physics, at least in other departments of knowledge, we are still too much given to accept mere words and phrases, in the place of philosophy. At least let what we are now to relate restrain a little the expression of our contempt for the philosophy of the schoolmen, as to the present matter, and our exultation in a superiority over them which we do not owe to ourselves.

The illustrious Galileo himself, unquestionably one of the greatest men that ever lived, even after advancing to the very confines of all we now know, stopped there, and could find nothing better to offer than the old solution of the difficulty, in a case attended with circumstances which to us would seem to have made the necessity for abandoning it obvious. A pump of more than thirty-two feet in height having chanced to be erected at Florence, while Galileo resided in that city, the philosopher, finding that the water would not rise as usual to its top, set himself immediately to endeavour to account for the unexpected

phenomenon ; and, after examining the case, came to the conclusion, that Nature certainly abhorred a vacuum, *but for the first two-and-thirty feet only!* It was his pupil, TORRICELLI, who first demonstrated the true cause of the phenomenon, by a most happily-imagined experiment. The water, rising as it does only to a certain height, must in fact, he remarked, be not drawn, but pushed up into the barrel of the pump ; and it can only be so pushed by the pressure of the atmosphere on the exposed portion of it. The thirty-two feet of water in the body of the pump are merely a counterbalance to a column of air of equal basis, reaching to the top of the atmosphere. But, if so, it then occurred to him, another liquid, heavier or lighter than water, will, in similar circumstances, ascend to a correspondingly less or greater height, a less or greater quantity of it being, of course, required to balance the atmospheric column. Mercury, for example, is about thirteen times and a-half as heavy as water ; it ought to mount, therefore, only to the height of about twenty-eight inches, instead of thirty-two feet. So, taking a glass tube of about three feet in length, and hermetically sealed (that is, made air-tight) at one end, he first filled it completely with mercury, and then closing it with his finger reversed it, and plunged it into a basin of the same liquid metal : when, withdrawing his finger, he had the gratification of seeing the liquid in the tube, now forming one body with that in the basin, descend, until, exactly as he had anticipated, there remained suspended a column of twenty-eight inches only. Well, by this experiment, in every way a most ingenious and beautiful one, Torricelli had in reality invented the instrument we now call the Barometer : and yet, strange to say, it was left to another to discover that he had done so. It was the great PASCAL, a man of sublime and universal genius, who, upon hearing of Torricelli's experiment, first made the remark, that the inference which he had deduced from it might, if true, be confirmed beyond the possibility of dispute, by carrying the mercurial tube to a considerable elevation above the earth, when, the atmospheric column being diminished, that of the mercury, which was supposed to be its balance, ought to be shortened likewise in a corresponding proportion. We had thus, therefore, a measure of the weight of the atmosphere in all circumstances, and consequently of the height of any position to which we could carry the instrument. The experiment was performed, and the result was what Pascal had anticipated. In this way, at length, was completed a discovery, the first steps towards which had been made two thousand years before : during the whole of which period the phenomena best fitted to suggest it were matter of daily observation to every one ; but which, nevertheless, at last escaped even several of the greatest philosophers who had made the nearest approaches to its development.

To return, however, for a moment to the subject of the happy appli-

cation to philosophical purposes of common facts. This subject is the more worth our attention, as it opens a field of invention and discovery to which all men have, in one sense, equal access ; although it is only the mind which has been rightly prepared, by previous knowledge and reflection, that is in a condition to profit by the opportunity. Another example which may be given is that of the discovery of the mode of engraving called Mezzotinto, if we are to accept the account which ascribes it to the famous PRINCE RUPERT. It is said to have been suggested to him by his observing a soldier one morning rubbing off from the barrel of his musket the rust which it had contracted from being exposed to the night dew. The prince perceived, on examination, that the dew had left on the surface of the steel a congeries of very minute holes, so as to form the resemblance of a dark engraving, parts of which had been here and there already rubbed away by the soldier. He immediately conceived the idea that it would be practicable to find a way of covering a plate of copper in the same manner with little holes, which being inked and laid upon paper, would undoubtedly produce a black impression ; while, by cutting or scraping away, in different degrees, such parts of the surface as might be required, the paper would be left white wherever there were no holes. Pursuing this thought, he at last, after a variety of experiments, invented a species of steel roller, covered with points, or salient teeth, which, being pressed against the copper-plate, indented it in the manner he wished ; and then the roughness thus occasioned had only to be scraped down, where necessary, in order to produce any gradation of shade that might be desired.¹

The celebrated modern invention of the Balloon is said to have had an origin still more simple. According to some authorities, the idea was first suggested to STEPHEN MONTGOLFIER, one of the two brothers to whom we owe the contrivance, by the waving of a linen shirt, which was hanging before the fire, in the warm and ascending air. Others tell us, that it was his brother JOSEPH who first thought of it, on perceiving the smoke ascending his chimney one day, during the memorable siege of Gibraltar, as he was sitting alone, and musing on the possibility of penetrating into the place, to which his attention had been called at the moment by a picture of it, on which he had accidentally cast his eyes. It is known, however, that the two brothers, who were paper-makers, and as such conversant with an apparently convenient material for their proposed experiment, had, before this, studied and made themselves familiar with Priestley's work on the different kinds of air ; and it is even said that Stephen had conceived the idea of navigating

¹ This is the account given by Vertue the engraver. But others maintain that mezzotinto scraping was the invention of Lieut.-Col. de Siegen ; that he thus engraved the portrait of the Landgravine of Hesse, in 1643 ;

and that Prince Rupert learnt the art of him, and carried it into England, where he much improved it. See Heineken, *Idée des Éstampes*, p. 208.

the heavens, by the employment of a gas lighter than common atmospheric air, on his way home from Montpellier, where he had purchased that book.¹ Newton, also, is well known to have been indebted for the first hint of certain of his great optical discoveries to the child's amusement of blowing bubbles out of soap; and, as Dr. Pemberton has ingeniously observed, in his account of that great man's philosophy, "it is suitable to this mode of thinking that he has, in his 'Observations on Daniel,' made a very curious as well as useful remark, that our Saviour's precepts were all occasioned by some ordinary circumstance of things then especially before him."

Such is the way in which out of a very little matter has not unfrequently grown a large produce of philosophy. Originally, all human knowledge was nothing more than the knowledge of a comparatively small number of such simple facts as those from which Galileo deduced the use of the pendulum for the measurement of time, and Newton the explanation of the system of the heavens. All the rest of our knowledge, and these first rudiments of it also, a succession of individuals have gradually discovered, each his own portion, by their own efforts, and without having any teacher to instruct them. In other words, everything that is actually known has been found out and learned by some person or other, without the aid of an instructor. There is no species of learning, therefore, which even self-education may not overtake; for there is none which it has not actually overtaken. All discoverers (and the whole of human knowledge that has not been divinely revealed is the creation of discovery) have been self-taught at least in regard to that which they discovered. The person who first attempted the representation of sounds by writing must have taught himself his alphabet. This is the first consideration for all those who aspire, in the present day, to be their own instructors in any branch of science or literature. Furnished as society now is, in all its departments, with accommodations in aid of intellectual exertion, such as, in some respects, even the highest station and the greatest wealth in former times could not command, it may be safely asserted, that hardly any unassisted student can have any longer to encounter difficulties equal to those which have been a thousand times already triumphantly overcome.

¹ "In point of fact, the first balloon sent up by the Montgolfiers at Annonay, near Lyons, the place where they carried on their paper manufactory, on the 5th of June, 1783, was raised simply by means of common air heated. It was not till the 27th of August following that the first balloon filled with hydrogen ascended from the Champs de Mars, Paris. The first attempt, nevertheless, of the Montgolfiers had been with hydrogen, but it proved a failure, as a similar attempt had been in the hands of Cavallo, at London, about the same time, in the year 1782. Long

before this the idea of rising into the sky by means of a ball formed of some light substance, and filled with inflammable air (or hydrogen), had occurred to Dr. Black of Edinburgh immediately on reading Mr Cavendish's announcement of the great levity of that gas, which was published in the *Philosophical Transactions* for 1766. Lord Brougham states (*Lives of Men of Science*, First Series, p. 337) that Black actually showed to a party of his friends the ascent of a bladder filled with inflammable air in that same year.

Above all, books, and especially elementary books, have, in our day, multiplied to an extent that puts them within the reach almost of the poorest student; and books, after all, are, at least to the more mature understanding, and in regard to such subjects as they are fitted to explain, the best teachers. He who can read, and is possessed of a good elementary treatise on the science he wishes to learn, hardly, in truth, needs a master. With only this assistance, and sometimes with hardly this, some of the greatest scholars and philosophers that ever appeared have formed themselves, as the following pages will show. And let him who, smitten by the love of knowledge, may yet conceive himself to be on any account unfortunately circumstanced for the business of mental cultivation, bethink him how often the eager student has made his way through a host of impediments, much more formidable in all probability than any by which he is surrounded. Want of leisure, want of instructors, want of books, poverty, ill-health, imprisonment, uncongenial or distracting occupations, the force of opposing example, the discouragement of friends or relations, the depressing consideration that the better part of life was already spent and gone—these have all, separately or in various combinations, exerted their influence either to check the pursuit of knowledge, or to prevent the very desire of it from springing up. But they opposed the force of the strong natural passion and upward-tending determination in vain. Here then is enough both of encouragement and of direction for all. To the illustrious vanquishers of fortune, whose triumphs we are about to record, we would point as pioneers and guides for all who, similarly circumstanced, may aspire to follow in the same honourable path. Their lives are lessons that cannot be read without profit. Nor are they lessons for the perusal of one class of society only. All, even those who are seemingly the most happily situated for the cultivation of their minds, may derive a stimulus from such anecdotes. No situation, in truth, is altogether without its unfavourable influences. If there be not poverty to crush the spirit, there may be too much wealth and too much ease, to relax and enervate it. He who is left to educate himself in everything, may have many difficulties to struggle with; but he who is permitted to educate himself in nothing is perhaps still more unfortunate. If one mind be in danger of starving for want of books, another may be surfeited by too many. If a laborious occupation leave to some but little time for study, there are temptations, it should be remembered, attendant upon rank and affluence, which are to the full as hard to escape from as any occupation. Or should there be any one who stands free, or comparatively free, from every kind of impediment to the cultivation of his intellectual faculties, he especially may be expected to feel a peculiar interest in the account of what the love of knowledge has achieved in circumstances so opposite to his own. It can hardly fail to stimulate his own exertions, and to

remind him that his acquisitions ought to be in some degree commensurate to his advantages. Finally, for all who love to read of bold and successful adventure, and to follow daring ambition in its career to greatness, it cannot but be interesting to contemplate the exploits of some of the most enterprising spirits of our race,—the adventurers, namely, of the world of intellect, whose ambition, while it has soared as high, and performed feats as brilliant as any other, never excites in us an interest which it is dangerous to indulge, nor holds up to us an example which it would be criminal to follow.

CHAPTER II.

STRENGTH OF THE PASSION FOR KNOWLEDGE.—PYTHAGORAS;
ARCHIMEDES; LEIBNITZ; GALILEO; HEYNE.

THE ardour with which knowledge has frequently been pursued amidst all sorts of difficulties and discouragements, is the best evidence we can offer of the strength of the passion which has sprung up and lived in circumstances so unfavourable to its growth, and therefore of the exquisite pleasure which its gratification is found to bring with it. If the permanence of any pleasure, indeed, is to be looked upon as one of the elements of its preciousness, there are certainly none but those of virtue and religion that can be compared with the pleasures of intellectual exertion. Nor is successful study without its moments, too, of as keen and overpowering emotion, as any other species of human enjoyment is capable of yielding. We have seen how Newton was affected on approaching the completion of his sublime discovery; when the truth shone full upon him, and not a shade remained to create a doubt that it was indeed the truth which he had found and was looking upon. Every other discoverer, or inventor, or creator of any of the great works of literature or art, has had, doubtless, his moments of similar ecstasy. The ancient Greek philosopher PYTHAGORAS is said to have been the first who found out, or at least demonstrated, the great geometrical truth, that the square described on the hypotenuse, or side opposite to the right angle, of a right-angled triangle is exactly equal in area to the two squares described on the other two sides; and such was his joy, we are told, on the occasion, that he offered up a hecatomb, or sacrifice of a hundred oxen, to the gods, in testimony of his gratitude and exultation. When ARCHIMEDES, the Sicilian, the most renowned geometer of antiquity, achieved what we may call the completion of the method of ascertaining specific gravities, or the comparative weights of equal bulks of different substances, he is said to have rushed forth naked from the bath in which

he chanced to be when the idea struck him, and to have run about in that state through the streets of Syracuse, exclaiming, in his native Greek, *Eureka! Eureka!* (I have found it! I have found it!) No better example can be given, than is afforded by this anecdote, of the manner in which the most common and apparently insignificant fact will sometimes yield to the contemplation of genius the richest produce of philosophy. It was the simple circumstance of the water chancing to run over the sides of the bath that revealed to him what he sought. His friend and patron Hiero, king of Syracuse, had set him a problem to solve. It was suspected that a crown, which Hiero had employed an artist to make for him out of a certain quantity of gold, was composed partly of some inferior metal. The weight was the same with that of the gold, but the bulk was apparently too great. The question really was merely to obtain an exact measure of the bulk; for, of course, the bulk of any given weight of pure gold was known, or could easily be ascertained. If the crown could have been melted and the metal reduced to a regular shape, there would have been no difficulty; but it was necessary that its exact bulk should be determined without breaking it up. As soon as Archimedes saw how a portion of the water in the bath was displaced by the immersion of his body, he perceived that he had found what was wanted; the quantity of water, or any other liquid, which the crown similarly immersed should displace would at once give the bulk of the crown. All the rest was matter of the simplest calculation. Assuming the alloy, when it was found that there was an alloy, to be silver, the exact proportions in which the two metals had been mixed together would be an easy and immediate deduction from the comparison of the bulk of the crown, ascertained in the manner that has been described, with that of the same weight of gold on the one hand and that of the same weight of silver on the other. The discovery consisted solely in the manner of ascertaining the bulk of the crown, or of any other body however irregular in figure. This, indeed, is not the method of finding the specific gravity of bodies that is now commonly employed; the modern method, by means of the contrivance called the hydrostatic balance, is not even founded upon the same principle with that discovered by Archimedes. But it is evident that his would equally answer, at least for all such cases as the one which was first solved by it. It was not the specific gravities of gold and silver which Archimedes discovered on this occasion, but only a way of ascertaining the specific gravity of irregularly-shaped bodies. It is said that Hiero, who was himself a man of science, was so much struck with the decisive solution of his problem, that he declared he should never from that moment be able to refuse his belief to anything that Archimedes might tell him.

The illustrious LEIBNITZ, when only in his sixteenth year, conceived the brilliant idea of reducing the elements of thought to a species of

alphabet, which should consist of the representatives or characters, as it were, of all our simplest ideas, and serve to express distinctly their different combinations, just as the sounds of speech are expressed by the common letters. Without attempting to maintain the practicability of this notion, it is impossible to deny that it evidenced great subtilty and originality of mind in the young metaphysician : and we can well conceive the delight with which such a conception must have been contemplated by a spirit like his, ardent in the pursuit both of knowledge and of distinction ; and beholding, as it were, in this dazzling speculation a new and untraversed continent of thought in the distance, wherein it might spend its first strength, and rear for itself immortal trophies. In a paper, written many years after, his History (in Latin) of a Universal Language, Leibnitz himself describes to us what he calls the infantine joy which this idea brought with it, when it first suggested itself to him, filling his mind, as it did, with the hope and confused vision of the great discoveries to which it promised to conduct him ; and although, in the multiplicity of his subsequent pursuits, he had never been able to accomplish the high enterprise which he had so early planned, he declares that, the deeper he had carried his reflections and inquiries, he had only become the more convinced of its practicability. Such allurements are there even in the veiled countenance of a new truth !

But beyond all, perhaps, that a discoverer ever felt, must have been the surprise and rapture of Galileo, when, having turned for the first time to the heavens the wonderful instrument which his own ingenuity had invented, he beheld that crowd of splendours which had never before revealed themselves to the eye, nor even been dreamed of by the imagination, of man. While Galileo resided at Venice, a report was brought to that city, that a Dutchman had presented to Count Maurice of Nassau an instrument, by means of which distant objects were made to appear as if they were near ; and this was all that the rumour stated. But it was enough for Galileo. The philosopher immediately set himself to work to find out by what means the thing must have been effected ; and in the course of a few hours satisfied himself that, by a certain arrangement of spherical glasses, he could repeat the new miracle. In the course of two or three days, he presented several telescopes to the Senate of Venice, accompanied with a memoir on the immense importance of the instrument to science, and especially to astronomy. He afterwards greatly improved his invention ; and brought it to such a state of perfection, that he was in a condition to commence, by means of it, the examination of the far-off firmament itself. It was then that, to his unutterable astonishment, he saw, as a celebrated French astronomer has expressed it, “ what no mortal before that moment had seen—the surface of the moon, like another earth, ridged by high mountains, and furrowed by deep valleys—Venus, as well as it, presenting phases

demonstrative of a spherical form; Jupiter surrounded by four satellites, which accompanied him in his orbit; the milky way; the nebulæ; finally, the whole heaven sown over with an infinite multitude of stars, too small to be discerned by the naked eye." (*Biographie Universelle*: Art. "Galileo.") Half a century afterwards our own Milton, who had seen Galileo, thus sung some of these new wonders in immortal numbers:—

"The moon, whose orb,
Through optic glass, the Tuscan artist views
At evening from the top of Fesolè,
Or in Valdarno, to descry new lands,
Rivers, or mountains, in her spotty globe."

A few days—what days of intoxicating delight they must have been!—were spent by Galileo in rapidly reviewing the successive wonders that presented themselves to him; and then he proceeded to announce his discoveries to the world by the publication of a paper, which he entitled the *Nuncius Sidereus*, or *Herald of the Heavens*, which he continued from time to time, as he found new objects to describe. From this period the examination of the heavens became the sole object of Galileo's thoughts, and the occupation of his life. He wrote, he talked of nothing else.

Every mind which is yet a stranger to science, is, in some respects, in the same situation with Galileo, before he turned his telescope to the heavens; and such a mind has a world of wonders to learn, many of which are as extraordinary as those which then revealed themselves to the philosopher. It has, in fact, to behold all that he beheld; not certainly, like him, for the first time that any one of the human race had been admitted to that high privilege, but yet for the first time, too, in so far as itself alone is concerned. The thrilling consciousness of discovery was Galileo's alone; the novelty and sublimity of the sight remain the same for all by whom it has been yet unenjoyed. And so it is with every other sort of knowledge. Although it may have been in reality discovered for the first time a thousand years ago, it remains as new a pleasure as if it had only been found out yesterday, for him who has not yet acquired it. Such pleasures, in truth, are the only ones that admit of being indefinitely multiplied. The enjoyments of sense, to say nothing of their comparatively brief endurance, their certainty to pall upon repetition, and the positively injurious and destroying tendency of many of them, are, from the nature of things, necessarily extremely limited in point of number; for the senses themselves are but few, and no one of them has many varieties of enjoyment to communicate. What were even the highest pleasures brought us by the eye, or the ear, apart from that character which they derive from the moral or intellectual associations they awaken? Momentary excitements for the child, but

hardly the gratifications even of a moment to the man—as is abundantly evidenced by the case of many a one in whom the mere corporeal organ is as perfect as usual, but who, nevertheless, hardly receives from it any pleasure worth naming, owing to the uncultivated state of those mental faculties, which are truly the great creators and bestowers of human happiness. But when did we hear of any one who, having fairly commenced the pursuit of literature or science, ever became tired of it; or would not have gladly devoted his whole life to it, if he could? There may be other passions to which men will deliver themselves up, in the first instance, with greater precipitation and impetuosity; there is none, of a merely terrestrial nature, assuredly, which will detain them so long, or eventually absorb their being so entirely, as the passion for knowledge. We have numberless instances of persons, in every rank of life, who, for the sake of gratifying it, have contended with, and overcome, such difficulties and impediments of all sorts as certainly would have worn out the strength of almost any other impulse with which we are acquainted. But this is an impulse which, we may venture to affirm, when once truly awakened, no discouragements that the most unfavourable circumstances have interposed have ever been able effectually to subdue.

The late Professor HEYNE, of Göttingen, was one of the greatest classical scholars of his own or of any age, and during his latter days enjoyed a degree of distinction, both in his own country and throughout Europe, of which scarcely any contemporary name, in the same department of literature, could boast. Yet he had spent the first thirty-two or thirty-three years of his life, not only in obscurity, but in an almost incessant struggle with the most depressing poverty. He had been born amidst the miseries of the lowest indigence, his father being a poor weaver, with a large family, for whom his best exertions were often unable to provide bread. In an account which he has given of his early life, he himself says, “Want was the earliest companion of my childhood. I well remember the painful impressions made on my mind by witnessing the distress of my mother when without food for her children. How often have I seen her, on a Saturday evening, weeping and wringing her hands, as she returned home from an unsuccessful effort to sell the goods which the daily and nightly toil of my father had manufactured!” His parents managed, however, to send him to a children’s school in the suburbs of the small town of Chemnitz, in Saxony, where they lived; and he soon exhibited an uncommon desire of acquiring information. He made so rapid a progress in the humble branches of knowledge taught in the school, that, before he had completed his tenth year, he was paying a portion of his school fees by teaching a little girl, the daughter of a wealthy neighbour, to read and write. Having learned everything comprised in the usual course of the school, he felt a strong

desire to learn Latin. A son of the schoolmaster, who had studied at Leipsic, was willing to teach him at the rate of fourpence a week ; but the difficulty of paying so large a fee seemed quite insurmountable. One day he was sent to one of his godfathers, who was a baker in pretty good circumstances, for a loaf. As he went along, he pondered sorrowfully on this great object of his wishes, and entered the shop in tears. The good-tempered baker, on learning the cause of his grief, undertook to pay the required fee for him, at which, Heyne tells us, he was perfectly intoxicated with joy ; and as he ran, all ragged and barefoot, through the streets, tossing the loaf in the air, it slipped from his hands and rolled into the gutter. This accident, and a sharp reprimand from his parents, who could ill afford such a loss, brought him to his senses. He continued his attendance for about two years, when his teacher acknowledged that he had taught him all he himself knew. His father now pressed him to adopt some trade, but the boy felt an invincible desire to go on with his literary education ; and fortunately his mother, proud of the talents of her son, was not unwilling that, if it were possible, he should be allowed to gratify his own anxious desires, and continue his studies. He had another godfather, who was a clergyman in the neighbourhood ; and this person, upon receiving the most flattering accounts of Heyne from his last master, agreed to be at the expense of sending him to the principal seminary of his native town of Chemnitz. His new patron, however, although a well-endowed churchman, doled out his bounty with most scrupulous parsimony ; and Heyne, without the necessary books of his own, was often obliged to borrow those of his companions, and to copy them over for his own use. At last he obtained the situation of tutor to the son of one of the citizens ; and this for a short time rendered his condition more comfortable. But the period was come when, if he was to proceed in the career he had chosen, it was necessary for him to enter the university ; and he resolved to go to Leipsic. He arrived in that city accordingly, with only two florins (about four shillings) in his pocket, and nothing more to depend upon except the small assistance he might receive from his godfather, who had promised to continue his bounty. He had to wait so long, however, for his expected supplies from this source, which came accompanied with much grudging and reproach when they did make their appearance, that, destitute both of money and books, he would have been without bread too, had it not been for the compassion of the maid-servant of the house where he lodged. What sustained his courage in these circumstances (we use his own words) was neither ambition nor presumption, nor even the hope of one day taking his place among the learned. The stimulus that incessantly spurred him on was the feeling of the humiliation of his condition—the shame with which he shrank from the thought of that degradation which the want of a good education would impose

upon him—above all, the determined resolution of battling courageously with fortune. He was resolved to try, he says, whether, although she had thrown him among the dust, he should not be able to rise up by his own efforts. His ardour for study grew the stronger as his difficulties increased. For six months he only allowed himself two nights' sleep in the week; and yet all the while his surly and avaricious god-father scarcely ever wrote to him but to inveigh against his indolence—often addressing his letters on the outside, "*To Mr. Heyne, Idler, at Leipsic.*"

In the meantime, while his distress was every day becoming more intolerable, he was offered, by one of the professors, the situation of tutor in a family at Magdeburg. Desirable as the appointment would have been in every other respect, it would have removed him from the scene of his studies, and he declined it. He resolved rather to remain in the midst of all his miseries at Leipsic. He was, however, in a few weeks after, recompensed for this noble sacrifice, by procuring, through the recommendation of the same professor, a situation in the university town similar to the one he had refused. This, of course, relieved for a time his pecuniary wants; but still the ardour with which he pursued his studies continued so great, that it at last brought on a dangerous illness, which obliged him to resign his situation, and very soon completely exhausted his trifling resources, so that on his recovery he found himself as poor and destitute as ever. In this extremity, a copy of Latin verses which he had written having attracted the attention of one of the Saxon ministers, he was induced, by the advice of his friends, to set out for the court at Dresden, where it was expected this high patronage would make his fortune. But he was doomed only to fresh disappointments. After having borrowed money to pay the expenses of his journey, all he obtained from the courtier was a few vague promises, which ended in nothing. He was obliged eventually, after having sold his books, to accept the place of copyist in the library of the Count de Bruhl, at the miserable annual salary of one hundred crowns (about 17*l.* sterling)—a sum which, even in that cheap country, was scarcely sufficient to keep him from perishing of hunger. However, with his industrious habits, he found time, beside performing the duties of his situation, to do a little work for the booksellers. He first translated a French romance, for which he was paid twenty crowns. For a learned and excellent edition which he prepared of the Latin poet Tibullus, he received, in successive payments, one hundred crowns, with which he discharged the debts he had contracted at Leipsic. In this way he contrived to exist for a few years, all the while studying hard, and thinking himself amply compensated for the hardships of his lot by the opportunities he had of pursuing his favourite researches, in a city so rich in collections of books and antiquities as Dresden. After he had held his situation in the

library for above two years, his salary was doubled ; but before he derived any benefit from the augmentation, the Seven Years' War had commenced. Saxony was overrun by the forces of Frederick the Great, and Heyne's place, and the library itself to which it was attached, were swept away at the same time. He was obliged to fly from Dresden, and wandered about for a long time without any employment. At last he was received into a family at Wittenberg ; but in a short time the progress of the war drove him from this asylum also, and he returned to Dresden, where he still had a few articles of furniture, purchased with the little money he had saved while he held his place in the library. He arrived just in time to witness the bombardment of that capital, in the conflagration of which his furniture perished, as well as some property which he had brought with him from Wittenberg, belonging to a lady, one of the family in whose house he lived, for whom he had formed an attachment during his residence there.

Thus left, both of them, without a shilling, the young persons nevertheless determined to share each other's destiny ; civil convulsions nerve or harden people to the encountering of strange risks ; and they were accordingly united. By the exertions of some common friends, a retreat was procured for Heyne and his wife in the establishment of a M. de Leoben, where he spent some years, during which his time was chiefly occupied in the management of that gentleman's property. At last, at the general peace in 1763, he returned to Dresden ; and here ended his hard fortunes. Some time before his arrival in that city, the Professorship of Eloquence in the University of Göttingen had become vacant, by the death of the celebrated John Mathias Gesner. The chair had been offered, in the first instance, to David Ruhnken, one of the first scholars of the age, who declined, however, to leave the University of Leyden, where he had lately succeeded the eminent Hemsterhuys as Professor of Greek. But fortunately for Heyne, Ruhnken was one of the few to whom his edition of Tibullus, and another of the *Enchiridion* (or Philosophical Manual) of Epictetus, which he had published shortly after, had made his obscure name and great merits known ; and with a generous anxiety to befriend one whom he considered to be so deserving, he ventured, of his own accord, to recommend him to the Hanoverian minister, as the fittest person he could mention for the vacant office. Such a testimony from Ruhnken was at once the most honourable and the most efficient patronage Heyne could have had. He was immediately nominated to the Professorship ; although he had been as yet so little heard of, that it was with considerable difficulty he was found. He held this appointment for nearly fifty years ; in the course of which, as we have already remarked, he may be said, by his successive publications, and the attraction of his lectures, to have placed himself nearly at the head of the classical scholars of his age ; while he was at the

same time loved and venerated almost as a father, not only by his numerous pupils, but by all ranks of his fellow-citizens, who, on his death, in 1812, felt that their University and city had lost the man who had been for half a century its chief distinction.

CHAPTER III.

OBSCURÉ ORIGIN AND HUMBLE STATION:—EPICETUS; PROTAGORAS; CLEANTHES; HAÛY; WINCKELMAN; ARNIGIO; DUVAL; BANDINELLI; SCALIGER; PROTOGENES; BAUDOUIN; GELLI; METASTASIO; HAYDN; OPIE; PARINI; PRIDEAUX; INIGO JONES; CHIEF JUSTICE SAUNDERS; LINNÆUS; LOMONOSOFF; BEN JONSON; THE MILNERS; JOHN HUNTER.

HEYNE'S first disadvantage, of being born in a sphere of life unfavourable even to the awakening of the passion for knowledge, is one which aspiring minds have often overcome. Not to mention the cases of ÆSOP, PUBLIUS SYRUS, and TERENCE, all of whom were originally slaves, EPICETUS, the celebrated Stoic philosopher, was born in the same condition, and spent many years of his life in servitude. Having been at last fortunate enough to obtain his freedom, he retired to a small hut; and, when he was barely able to procure the necessaries of life, devoted himself to the study of philosophy. We have seen that the principal record of the doctrines of this philosopher was one of the works edited by Heyne, while at Dresden; and he used to relate that his fortitude, amid the difficulties that he had to struggle with at the time, was not a little strengthened and upheld by the precepts of severe virtue and determined endurance which he found in the system of the old Stoic. Epictetus's own conduct was strikingly in conformity with the lessons he taught, at least if we may believe one of the stories which are told of him. It is said, that before he had obtained his liberty, his master, a brutal man, chose one day to amuse himself by twisting the leg of the slave. "You will break it," remarked Epictetus; and the next moment snap it went. "I told you so," added the philosopher, with all the indifference in the world. He lived at Rome in a house without a door, and with no furniture, except a table, a small bedstead, and a wretched coverlet; and this even at a time when he enjoyed the greatest familiarity with the Emperor Adrian. One day he was extravagant enough to purchase for himself a lamp made of iron; but he was punished for this deviation from his usual habits, by a thief soon after finding his way into the house, and running off with it. "He shall be cheated," said Epictetus, "if he come back to-morrow,

for he shall find only an earthen one." PROTGORAS, the celebrated sophist, had been a common porter before he applied to study. He lived at Abdera, in Thrace, the same town in which resided the famous Democritus, commonly called the Laughing Philosopher, who one day met him carrying into the city a very heavy load of wood on his back, and was a good deal surprised on perceiving that the pieces were piled on one another exactly in the way best adapted to make the burden rest easily on the shoulders. In order to discover whether this geometrical arrangement was the effect of skill or chance, he requested the young man to unbind the load, and make it up again in the same manner: this Protagoras immediately did with great dexterity; upon which Democritus, convinced that his talents were of a superior order, admitted him forthwith among his disciples, and spared no pains in instructing him in the different branches both of natural and moral philosophy. And, to mention no more instances, CLEANTHES, another of the Stoics, was brought up to the profession of a pugilist, and used to exhibit himself in that character at the public games; till, longing to study philosophy, he betook himself for that purpose to Athens, where he arrived with only three drachms (about three shillings and sixpence) in his pocket. In these circumstances he was obliged, for his support, to employ himself in drawing water, carrying burdens, and other such humble and laborious occupations. He contrived, however, to proceed with his studies at the same time, bringing his fee of an obolus, or penny, every day to his master, Zeno, with great punctuality. On the death of Zeno, he succeeded him in his school, but still continued his menial labours as usual. "I draw water," he was wont to say, "and do any other sort of work which presents itself, that I may give myself up to philosophy without being a burden to any one." He was so poor, indeed, that, the wind having blown aside his mantle one day when he happened to be present at one of the public shows, his fellow-citizens perceived he had no tunic, or under garment, and gave him one. He was always treated, notwithstanding his poverty, with the greatest respect at Athens.

In modern times we have many examples, also, of persons whom the love of knowledge has found in the lowest obscurity, and who have possessed themselves of the highest acquirements in science or literature, in spite of every disadvantage of birth. Heyne, as we have mentioned, was the son of a poor weaver. So was the Abbé HAÜY, who died at Paris in 1822, celebrated for his writings and discoveries in *crystallography*—a science, indeed, of which he may be almost considered as the founder. It is the science which treats of those curious regular figures which so many solid bodies are found to possess in their natural state, or which they may be made to assume artificially, by dissolving or fusing them, and then allowing their particles to return to

a state of solidity, which latter process is called their crystallization. Now it happens that the same substance is not found to have always the same figure externally when in a crystallized state, but is susceptible of several different forms, some of which do not appear at first to have any resemblance to each other. All preceding inquirers had been very much perplexed by this circumstance, in their attempts to establish a theory of crystallized bodies; and various principles had been successively adopted and rejected as the foundations of a scientific arrangement of them. At length Haüy had his attention directed to the subject, by having accidentally picked up an uncommonly beautiful specimen of calcareous spar, which presented the figure of a six-sided prism, and had been detached from a group of similar crystals. By trying to split this specimen in various directions with the blade of a knife, and dividing it only where he found a natural joint, he at last reduced it to the form of a rhomboid, or oblongated cube, which it retained in spite of all subsequent sections. Now this is exactly the form in which another calcareous spar, called *Iceland Spar*, is commonly found; whence Haüy was led to suspect that, by the application of the process he had employed, all crystallized substances of the same species might be reduced to the same primitive form. This idea he pursued with exceeding ingenuity; till, by means not only of his unparalleled dexterity, in the dissection of crystals, but of a most masterly combination of algebraical and geometrical reasoning, he made it highly probable that the principle of his theory is of universal application, and that it is only necessary to strip them of their external coatings to discover the same radical figure in all crystals of the same species.

But, to proceed: the celebrated WINCKELMAN, the distinguished writer on classical antiquities and the fine arts, was the son of a shoemaker. His father, after vainly endeavouring for some time, at the expense of many sacrifices, to give him a learned education, was at last obliged, from age and ill-health, to retire to an hospital, where he was, in his turn, supported for several years in part by the hard labours of his son, who, aided by the kindness of his professors, contrived to keep himself at college chiefly by teaching some of his younger or less advanced fellow-students. BARTHOLOMEW ARNIGIO, an Italian poet of the sixteenth century, of considerable genius and learning, followed his father's trade of a blacksmith till he was eighteen years old, when he began of his own accord to apply to his studies; and by availing himself of the aid sometimes of one friend, and sometimes of another, prepared himself at last for entering the University of Padua. VALENTINE JAMERAY DUVAL, a very able antiquary of the last century, who at the time of his death held the office of keeper of the imperial medals at Vienna, as well as that of one of the preceptors to the prince, and after-

wards the Emperor Joseph II., was the son of a poor peasant of Champagne, and lost his father when he was ten years of age. He was then taken into the service of a farmer in the village; but, being soon after turned off for some petty fault, he resolved to leave his native place altogether, that he might not be a burden to his mother. So he set out on his travels, without knowing in what direction he was proceeding, in the beginning of a dreadful winter; and for some time begged in vain even for a crust of bread and shelter against the inclemency of the elements, till, worn out with hunger, fatigue, and a tormenting headache, he was at last taken in by a poor shepherd, who permitted him to lie down in the place where he shut up his sheep. Here he was attacked by small-pox, and lay ill nearly a month; but having at last recovered, chiefly through the kind attentions of the village clergyman, he proceeded on his wanderings a second time, thinking that by getting farther to the east he should be nearer the sun, and therefore suffer less from the cold. Having arrived in this way at the foot of the Vosges mountains, nearly a hundred and fifty miles from his native village, he remained there for two years in the service of a farmer, who gave him his flocks to keep. Chancing then to make his appearance at the hut of a hermit, the recluse was so much struck by the intelligence of his answers, that he proposed he should take up his abode with him, and share his labours; an offer which Duval gladly accepted. Here he had an opportunity of reading a few books, chiefly devotional. After some time he was sent with a letter of recommendation from his master to another hermitage, or religious house, near Lunéville, the inmates of which set him to take charge of their little herd of cattle, consisting only of five or six cows, while one of them took the trouble of teaching him to write. He had here also a few books at command, which he perused with great eagerness. He sometimes, too, procured a little money by the produce of his skill and activity in the chase, and this he always bestowed in the purchase of books. One day, while pursuing his occupation, he was lucky enough to find a gold seal, which had been dropped by an English traveller of the name of Forster. Upon this gentleman coming to claim his property, Duval jestingly told him that he should not have the seal, unless he could describe the armorial bearings on it in correct heraldic phrase. Surprised at any appearance of an acquaintance with such subjects in the poor cow-herd, Forster, who was a lawyer, entered into conversation with him, and was so much struck by his information and intelligence, that he both supplied him with a number of books and maps, and instructed him in the manner of studying them. Some time after this, he was found by another stranger sitting at the foot of a tree, and apparently absorbed in the contemplation of a map which lay before him. Upon being asked what he was about, he replied that he was studying geography. "And whereabouts in the study may you be at present?"

inquired the stranger. "I am seeking the way to Quebec," answered Duval. "To Quebec? What should you want there?" "I wish to go to continue my studies at the university of that city." The stranger belonged to the establishment of the young princes of Lorraine, who, returning from the chase, came up with their suite at the moment; and the result was, that, after putting a great many questions to Duval, they were so delighted with the vivacity of his replies, that they proposed to send him immediately to a Jesuits' college in the neighbourhood. Here he continued for some time, until he was at last taken by his patron, the Duke of Lorraine, afterwards the Emperor Francis I., to Paris, where he speedily distinguished himself, and eventually acquired a high place among the literary men of the day. He never forgot, however, either his early benefactors, or that simplicity of character and manners which the humble nature of his origin and first fortunes had given him. It is gratifying indeed to have to tell, that even after he had become a courtier, and was living in intimate familiarity with the emperor, he took a journey to his native village, purchased the cottage in which his father had lived, and erected on its site, at his own expense, a commodious dwelling-house for the parish schoolmaster. He always kept up a correspondence, too, with the good hermits at Lunéville; and, in particular, on paying a visit to Brother Marin, who had taught him writing, and not finding his hut so comfortable as he could have wished, left with him a sum of money to rebuild it. Duval died in 1775, at the age of eighty.

Men are proud, and it is very intelligible why they should be so, of an illustrious ancestry; but to those who have achieved their own advancement in the face of disadvantages such as the individuals we have named, and many others, have had to struggle with, the obscurity of their origin is their most honourable distinction. Nothing, therefore, can be weaker, or more absurd, than the vanity which has led even some distinguished men, of humble or at least not high birth, to attempt to conceal their real extraction from the world, by the most unfounded and sometimes ridiculous fictions. BANDINELLI, the Italian sculptor, was the son of a goldsmith, and the grandson of a common coalman; but having in the course of his life acquired great wealth, and having been created by the Emperor Charles V. a knight of the order of St. James, he is said to have repeatedly changed his name, in order to hide his parentage, and to have fixed at last upon that by which he is generally known, in order that he might appear to have sprung from the noble family of the Bandinelli of Sienna. A similiar anxiety to secure for himself the reputation of noble descent is also recorded to have been one of the foibles of the celebrated Spanish dramatist LOPE DE VEGA. But, perhaps, the most extravagant pretensions of this kind that were ever brought forward, were those advanced by the famous

JULIUS CÆSAR SCALIGER, one of the greatest scholars and critics of the sixteenth century. This eminent person actually took the trouble of composing an elaborate memoir of his own life, in which he pretended to be the last-surviving descendant of the princely house of La Scala of Verona, and consequently the lineal heir of that sovereignty, which, having been some time before conquered by the Venetians, had been incorporated by them with their own territory. In order to support this story, he went the length of inventing a series of adventures, which he said had befallen him, giving out that, having been preserved by his mother from the general persecution of his race, he had, after being carefully educated, been presented at the court of the Emperor Maximilian, who made him one of his pages. He added that he subsequently distinguished himself greatly; first in the wars of Italy, and then, in the service of France, in Piedmont: till, after passing through a succession of other fortunes, which we cannot afford space to relate, he was induced by the solicitations of La Rovère, Bishop of Agen, to accompany that prelate to his episcopal seat, and thus at last to terminate his vain endeavours to recover his lost principality. Now the truth is, as has been since abundantly proved, that Scaliger's real name was Bordoni; that he was in all probability the son of a miniature painter who resided at Padua; and that he never even assumed the name of Scaliger till he was pretty far advanced in life, having borne it only in conjunction with his own in his forty-fourth year, when he obtained letters of naturalization in France, which are still extant. Even at this time it would appear that the fable of his descent from the house of Verona, if it had entered his head at all, had certainly not been conceived in anything like the form which he afterwards gave it. It was, at least in all its wilder improbabilities, the romance of his old age. He persisted in it, however, as long as he lived, and left it as a legacy to his son, the learned Joseph Justus Scaliger, who, with an excess of filial observance, both maintained its truth as obstinately as his father had done, and augmented it by many additional fictions of his own invention.

It is a wiser and nobler spirit which, without despising such distinctions where they really exist, considers it more honourable to have achieved fame and eminence without the advantage of high birth than with their assistance; and does not disdain, therefore, where they have not been possessed, to find its best triumph in their absence. Such was the feeling in which the old Greek painter PROTOGENES acted, who, having passed the earlier years of his life in such obscurity and poverty, that he was obliged to spend the greater part of his time in merely painting the coarse ornaments on the prows of ships, was so far from showing himself ashamed of his humble origin, when he rose at last to fame and more honourable as well as lucrative employment, that he was wont to introduce representations of the different parts of ships round his

pictures, as symbols and memorials of his old occupation. BENEDICT BAUDOIN (or BALDUINUS), a learned Frenchman of the sixteenth century, went still farther than this. His father had been a shoemaker, and he had himself worked for some time at the same profession—circumstances which he was so little anxious to have forgotten, that, many years after, he wrote and published a very elaborate work on the Shoemaking of the Ancients, in which we find the history of that craft traced with a profusion of erudition, up to the time of Adam himself. But, perhaps, the most extraordinary example on record of indifference to such matters, is that afforded by the conduct of the Italian writer GIAMBATISTA GELLI, who, even after he had obtained so much distinction by his writings as to have been elected to the high dignity of Consul of the Florentine Academy, and appointed by the grand duke to deliver a course of lectures on Dante, still continued to work at his original profession of a tailor, which he had inherited from his father. He alludes to the circumstance, with much modesty and even dignity, in the introductory oration of his course delivered before the Academy, which has been published.

It would be easy to continue to a much greater length our enumeration of individuals who, smitten by the love of knowledge, have nobly surmounted the impediments thrown in the way of its acquisition by a humble birth or early indigence. Many of the most remarkable of these cases we shall have an opportunity of introducing under other heads of our subject; at present we shall merely mention a few of those which we may not afterwards find so convenient an occasion of noticing. The celebrated Italian poet METASTASIO was the son of a common mechanic, and used when a little boy to sing his extemporaneous verses about the streets. The father of HAYDN, the great musical composer, was a wheelwright, and filled also the humble occupation of sexton, while his mother was at the same time a servant in the establishment of a neighbouring nobleman. The father of our own painter, OPIE, was a working carpenter in Cornwall. The following is the account that Dr. Wolcot, better known by his assumed name of Peter Pindar, gives us, in his peculiar style, of the circumstances in which he discovered the uneducated artist:—"Being on a visit to a relation in Cornwall, I saw either the drawing or print of a farm-yard in the parlour, and, after looking at it slightly, remarked that it was a busy scene, but ill executed. This point was immediately contested by a she-cousin, who observed that it was greatly admired by many, and particularly by John Opie, a lad of great genius. Having learned the place of the artist's abode, I immediately sallied forth, and found him at the bottom of a sawpit, cutting wood by moving the lower part of an instrument which was regulated above by another person. Having inquired in the dialect of the country

if he could paint? ‘Can you *paint*?’—I was instantly answered from below in a similar accent and language, that he could ‘*paint* Queen Charlotte and Duke William’ (William Duke of Cumberland), ‘and Mrs. Somebody’s cat.’ A specimen was immediately shown me, which was rude, incorrect, and incomplete. But when I learned that he was such an enthusiast in his art, that he got up by three o’clock of a summer’s morning to draw with chalk and charcoal, I instantly conceived that he must possess all that zeal necessary for obtaining eminence. A gleam of hope then darted through my bosom; and I felt it possible to raise the price of his labours from eightpence or a shilling to a guinea a-day. Actuated by this motive, I instantly presented him with pencils, colours, and canvas, to which I added a few instructions.” After some time, the Doctor adds, his pupil became so celebrated in the neighbourhood, that he obtained as much employment as he could undertake in painting heads at half-a-guinea each, and at last resolved to raise his price to a guinea. He afterwards came to London, and attained great eminence as a portrait painter: upon which he was admitted as an Associate of the Royal Academy, and was eventually elected Professor of Painting in that institution. “Born in a rank of life in which the road to eminence is rendered infinitely difficult,” says another Academician, speaking of Opie, “unassisted by partial patronage, scorning with virtuous pride all slavery and dependence, he trusted alone for his reward to the force of his natural powers, and to well-directed and unremitting study. The toils and difficulties of his profession were by him considered as matter of honourable and delightful contest; and it might be said of him, that he did not so much paint to live, as live to paint.”

The parents of SEBASTIAN CASTALIO, the elegant Latin translator of the Bible, were poor peasants, who lived among the mountains in Dauphiny. The Abbé HAUTEFEUILLE, who distinguished himself in the seventeenth century by his inventions in clock and watch making, was the son of a baker. PARINI, the modern Italian satiric poet, was the son of a peasant, who died when he was in his boyhood, and left him to be the only support of his widowed mother; while, to add to his difficulties, he was attacked in his nineteenth year by a paralysis, which rendered him a cripple for life. The parents of Dr. JOHN PRIDEAUX, who afterwards rose to be Bishop of Worcester, were in such poor circumstances, that they were with difficulty able to keep him at school till he had learned to read and write; and he obtained the rest of his education by walking on foot to Oxford, and getting employed in the first instance as assistant in the kitchen of Exeter College, in which society he remained till he gradually made his way to a fellowship. The father of INIGO JONES, the great architect, who built the Banquet-

ing-House at Whitehall, and many other well-known edifices, was a cloth-worker; and he himself was also destined originally for a mecha-

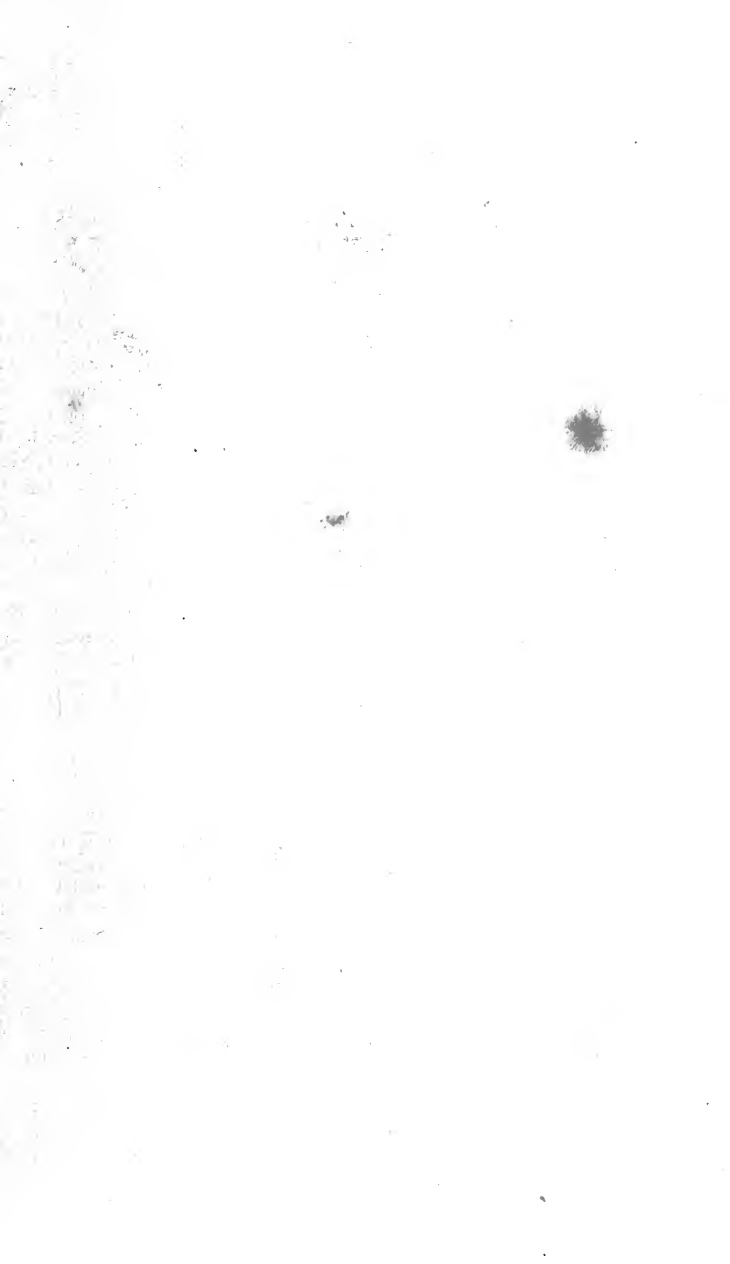


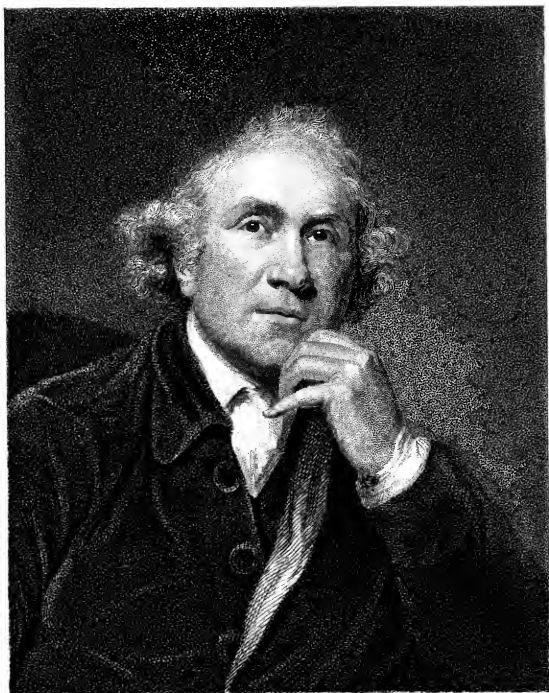
INIGO JONES.

nical employment. Sir EDMUND SAUNDERS, Chief Justice of the Court of King's Bench in the reign of Charles II., was in early life an errand-boy at the inns of Court, and gradually acquired the elements of his knowledge of the law by being employed to copy precedents. LINNÆUS, the founder of modern Botany, although the son of a Swedish clergyman, and himself originally intended for holy orders, was, from his neglect of his theological studies, about to be taken from school and apprenticed to a shoemaker, when he was rescued from his fate by accidentally meeting one day a physician named Rothman, who, having entered into conversation with him, was so much struck with his intelligence, that he sent him to the university. The father of MICHAEL LOMONOSOFF, one of the most celebrated Russian poets of the last century, who eventually attained the highest literary dignities in his own country, was only a simple fisherman. Young Lomonosoff had great difficulty in acquiring as much education as enabled him to read and write; and it was only by running away from his father's house, and taking refuge in a monastery at Moscow, that he found means to obtain an acquaintance with the higher branches of literature. The famous BEN JONSON worked for some time as a bricklayer or mason; "and let not them blush," says Fuller, speaking of this circumstance in his 'English Worthies,' with his usual amusing, but often also expressive, quaintness, "let not them blush that have, but those that have not, a lawful calling. He helped in the building of the new structure of Lincoln's Inn, when, having a trowel in his hand, he had a book in his pocket."

PETER RAMUS (or, in the original French form of the name, Pierre

de la Ramée), one of the most intrepid thinkers of the sixteenth century, and especially famous in the history of philosophy for the novelty and audacity of his logical speculations, began his life, which was afterwards so distinguished, in the humble capacity of a shepherd boy, and was only at last, after a succession of efforts and disappointments, enabled to become a student at the College of Navarre, in the University of Paris, by hiring himself at the same time as a valet. When he had spent his day, one of his biographers tells us, in attendance on his master, following somewhat the example of the old Greek philosopher Cleanthes, he made such good use of his oil and his lamp in the night that he very soon acquired as much of the light of learning as procured him his degree of Master of Arts. "I confess," he says himself in one of his tracts, "that I have been tossed all my life on waves of sorrow. Scarcely was I out of the cradle when I had to begin the struggle, assailed at once by two contending calamities" (he means, apparently, poverty and exile, or possibly, it may be, ill-health); "when I was become a young man, with fortune cross and fighting against me in every way, I resorted to Paris to obtain for myself a liberal education, and was twice compelled to leave by the violence of the time, twice returned when the tempest somewhat abated, and ever felt the love of learning burn the stronger within me the greater the opposition with which it had to contend." At last he fought his way so successfully through all obstacles that in the year 1551, while he was still in early manhood (for he was born in 1515), he was, by the favour of the Cardinal de Lorraine, appointed Professor of Eloquence and Philosophy in the College de France, a new royal chair established for his behoof. In a remarkable address which he delivered on entering upon this office, before a throng, it is said, of some two thousand eager listeners, he thus manfully referred to his early difficulties:—"It has been cast in my teeth that my father was a charcoal-vendor. True it is, that my grandfather—of one of the first families about Liège—was compelled to take refuge in the Vermandois, when Charles of Burgundy committed his native city to the flames, and that poverty drove him to deal in charcoal, and my father to stand behind the plough. I myself was in yet harder straits than either. And hence it is that some ill-conditioned Dives, whose father and fatherland nobody has ever heard of, has cast censure on the poverty of my highborn ancestry. To this I reply, that I am a Christian, and so have never considered poverty a reproach. . . . Through stress of fortune, I passed many years of my life in lowly servitude. Nevertheless, my mind was ever free, was never despondent or cast down. Therefore, O Lord God Almighty, who out of stones couldst raise up children unto Abraham, raise up, in this charcoal-vendor's grandson, this labourer's son, not great wealth or fortune—for these I need but little to get me the tools of my craft, pen, ink, and paper—but rather vouchsafe to him, unto his life's





Painted by Sir Joshua Reynolds, P.R.A.

Engraved by T. Wright.

JOHN HUNTER, F.R.S.

end, a right mind, and a diligent industry which shall never wax faint."

The celebrated Danish astronomer, LONGOMONTANUS, was the son of a labourer, and, while attending the academical lectures at Wyburg through the day, was obliged to work for his support during a part of the night. The elder DAVID PAREUS, the eminent German Protestant divine, who was afterwards Professor of Theology at Heidelberg, was placed in his youth as an apprentice, first with an apothecary, and then with a shoemaker. HANS (or *John*) SACHS, the most famous of the old German Meistersingers, or Burgher poets, of the sixteenth century, was the son of a tailor, and served an apprenticeship himself, first to a shoemaker, and afterwards to a weaver, at which last trade, indeed, he continued to work during the rest of his life. JOHN FOLCZ, another old German poet, was a barber. LUCAS CORNELISZ, a Dutch painter of the sixteenth century, who visited England during the reign of Henry VIII., and was patronised by that monarch, was obliged, while in his own country, in order to support his large family, to betake himself to the profession of a cook. Dr. ISAAC MADDOX, who, in the reign of George II., became bishop, first of St. Asaph, and then of Worcester, and who is well known by his work in defence of the doctrine and discipline of the Church of England, lost both his parents, who belonged to a very humble rank of life, at an early age, and was in the very first instance placed by his friends with a pastrycook. The late Dr. ISAAC MILNER, Dean of Carlisle, and President of Queens' College, and Lucasian Professor of Mathematics, at Cambridge, who held a distinguished place among the scientific men of his day, was bred a woollen-weaver; as was also his younger brother JOSEPH, well known for his "History of the Church." So was the late Dr. JOSEPH WHITE, Professor of Arabic at Oxford. CASSERIO, a well-known Italian anatomist, was initiated in the elements of medical science by a surgeon of Padua, with whom he had lived originally as a domestic servant. JOHN CHRISTIAN THEDEN, who rose to be chief surgeon to the Prussian army under Frederick II., had in his youth been apprenticed to a tailor.

The celebrated JOHN HUNTER, one of the greatest anatomists that ever lived, scarcely received any education whatever until he was twenty years old. He was born in the year 1728, in Lanarkshire; and being the youngest of a family of ten, and the child of his father's old age, was brought up with much foolish indulgence. When he was only ten years old his father died; and under the charge of his mother it is probable that he was left to act as he chose, with still less restraint than before. Such was his aversion at this time to anything like regular application, that it was with no small difficulty, we are told, he had been taught even the elements of reading and writing; while an attempt that was made to give him some knowledge of Latin—according to the

plan of education then almost universally followed in regard to the sons of even the smallest landed proprietors in Scotland—had, after a short space, to be abandoned altogether. Thus he grew up, spending his time merely in country amusements, and for many years without even thinking, as it would appear, of any profession by which he might earn a livelihood. It was, however, found necessary at last that something should be determined upon in regard to this point; for the family estate, such as it was, had gone to his eldest brother, and the father had made no provision for maintaining John any longer in idleness. So, destitute as he was of all literary acquirements, there was no other resource for him except some business that would give employment to his hands rather than his head; and, one of his sisters having married a cabinet-maker, or carpenter, in Glasgow, it was resolved to bind him apprentice to his brother-in-law. With this person, accordingly, he continued for some time, learning to make chairs and tables; and this probably might have been, for life, the employment of the genius that afterwards distinguished itself so greatly in one of the highest walks of scientific discovery, but for circumstances which, at the time when they occurred, were doubtless deemed unfortunate. His master failed, and John was left without any obvious means of pursuing even the humble line of life in which he had set out. He was at this time in the twentieth year of his age. His elder brother, William, afterwards the celebrated Dr. Hunter, had very recently settled as a medical practitioner in London; but had already begun to distinguish himself as a lecturer and anatomical demonstrator. To him John determined to address himself. The rumour of the one brother's success and growing reputation had probably, even before this time, awakened something of ambition in the other to escape from the obscure lot to which he seemed doomed. John now wrote to his brother, offering him his services as an assistant in his dissecting-room, and intimating, that if this proposal should not be accepted, he meant to enlist in the army. Fortunately for science, his letter brought a favourable answer. On his brother's invitation he set out for the metropolis in company with a friend of the family, the two pursuing their journey, as was then the custom, on horseback. He was now put to work in the manner in which he had requested to be employed. His brother, we are informed by Sir Everard Home, his earliest biographer, gave him an arm to dissect, so as to display the muscles, with directions how it should be done; and the performance of the pupil, even in this his commencing essay, greatly surprised his instructor. The doctor then put into his hands another arm, in which all the arteries were injected, and these, as well as the muscles, were to be exposed and preserved. So well satisfied was Dr. Hunter with his brother's performance of this task, that he did not hesitate to assure him he would in time become an excellent anatomist, and would not want

employment. Perhaps, although we do not find it so stated by any of his biographers, he may have felt an advantage, in making these preparations, in the habits of manual dexterity acquired during his apprenticeship to his first business.

So rapid, at all events, was the progress which he made in the study of anatomy, that he had not been a year in London when he was considered by his brother as qualified to teach others, and was attended accordingly by a class of his own. His talents, and the patronage of his brother together, brought him now every day more and more into notice. It does not belong to our purpose to trace the progress of his success after this point. We may merely remark, that long before his death he had placed himself, by universal acknowledgment, at the head of living anatomists; and was regarded, indeed, as having done more for surgery and physiology than any other investigator of these branches of science that had ever existed.

The important discoveries, and peculiar and most original views, by which John Hunter succeeded in throwing so much new light upon the subject of the functions of animal life, were derived, as is well known, principally from the extraordinary zeal, patience, and ingenuity, with which he pursued the study of comparative anatomy, or the examination of the structure of the inferior animals as compared with that of man. To this study he devoted his time, his labour, and it may be said, his fortune; for nearly every shilling that he could save from his professional gains was expended in collecting those foreign animals and other rare specimens, by means of which he prosecuted his inquiries. When his income was yet far from being a large one, he purchased a piece of ground at Earl's Court, near the village of Brompton, and built a house on it, to serve as a place of deposit for his collections. The space around it was laid out as a zoological garden for such of his strange animals as he kept alive. Even when most extensively engaged in practice, he used to spend every morning, from sunrise till eight o'clock, in his museum. Yet, in addition to his private practice, and a very long course of lectures which he delivered every winter, he had for many years to perform the laborious duties of surgeon to St. George's Hospital, and deputy surgeon-general to the army—superintending, at this time also, a school of practical anatomy at his own house. Still he found leisure, in the midst of all these avocations, not only for his experiments upon the animal economy, but for the composition of various works of importance, and for taking an active part both in the deliberations of the Royal Society, of which he had been early elected a Fellow, and in other schemes for the promotion and diffusion of natural knowledge. He was the originator, in particular, of the *Lyceum Medicum Londinense*—a medical society, comprising many eminent individuals, which met at his lecture rooms, and rose to great reputation. That he might have

time for these multiplied objects of attention, he used to allow himself to sleep only four hours in the night, and an hour after dinner.

One plan which he adopted to procure subjects for his researches in comparative anatomy, was to arrange with the keeper of the wild beasts in the Tower, and the proprietors of the other menageries in town, to have the bodies of such of their animals as died, for which he used to give them other rare animals to exhibit, on condition of also receiving their remains at their death. His friends and former pupils, too, were wont to send him subjects for his favourite investigations from every part of the world. "In this retreat [at Brompton], he had collected," says Sir Everard Home, "many kinds of animals and birds; and it was to him a favourite amusement in his walks to attend to their actions and their habits, and to make them familiar with him. The fiercer animals were those to which he was most partial, and he had several of the bull kind from different parts of the world. Among these was a beautiful small bull he had received from the Queen, with which he used to wrestle in play, and entertain himself with its exertions in its own defence. In one of these conflicts the bull overpowered him and got him down; and had not one of the servants accidentally come by, and frightened the animal away, this frolic would probably have cost him his life." On another occasion, "two leopards," says the same biographer, "that were kept chained in an out-house, had broken from confinement, and got into the yard among some dogs, which they immediately attacked. The howling thus produced alarmed the whole neighbourhood. Mr. Hunter ran into the yard to see what was the matter, and found one of them getting up the wall to make his escape, the other surrounded by the dogs. He immediately laid hold of them both, and carried them back to their den; but as soon as they were secured, and he had time to reflect upon the risk of his own situation, he was so much affected that he was in danger of fainting."

Mr. Hunter died, in the sixty-sixth year of his age, in 1793. After his death, his museum was purchased by Parliament for the sum of fifteen thousand pounds; and it is now deposited in the hall belonging to the Royal College of Surgeons, in Lincoln's Inn Fields. Large additions have since been made to the collection; but, as left by Hunter, it contained above ten thousand preparations, arranged so as (in the language of Sir Everard Home) "to expose to view the gradations of nature, from the most simple state in which life is found to exist, up to the most perfect and most complex of the animal creation—man himself." The extreme beauty of these preparations is striking even to an unlearned eye; and their scientific value is unrivalled. The whole forms certainly one of the most splendid monuments of labour, skill, and munificence, ever raised by an individual.

It is important to remark, that, with all his powers, this wonderful

man never entirely overcame the disadvantages entailed upon him by the neglect in which he had been allowed to spend his early years. He used to dwell, we are told, on the advantage which is gained in regard to clearness of conception by the committing of one's ideas to writing—comparing the process to the taking of stock by a tradesman, without which he cannot know with certainty either what he has or what he wants. Yet he himself continued to the end of his life an awkward, though by no means an unpractised, writer. After coming to London, he entered himself of St. Mary's Hall, Oxford, probably with the view of being able to maintain at least some pretension to scholarship, but it does not appear that he carried his assumption of the academical character much further. He attained little acquaintance with the literature even of his own profession; and it not unfrequently happened, indeed, we are told, that upon communicating a supposed discovery of his own to some one of his more erudite friends, he had to suffer the disappointment of learning that the same thing had been already found out by some other well-known anatomist. But he felt his literary deficiencies chiefly as a lecturer, the capacity in which his more regularly-educated brother so greatly excelled. It is asserted by Dr. Adams, who has written a life of John Hunter, that he always used to swallow thirty drops of laudanum before going to lecture. If these were heavy penalties, however, which he had to pay for what was not so much his fault as that of others, the eminence to which he attained in spite of them is only the more demonstrative of his extraordinary natural powers, and his determined perseverance.

We do not quote these names as those of individuals, the single or chief peculiarity in whose history is, that they commenced life in a low station, and ended it in a high, or a higher one. If it were our object to exemplify either the freaks of fortune in lifting humbly-born men to the upper places of society, or that particular sort of talent or dexterity in men themselves which fits them to battle with, or to overreach, fortune, and in either way to elevate themselves to conspicuous stations, as it were in spite and mockery of all her endeavours to keep them down—it would be easy to bring together an assemblage of far more extraordinary and surprising instances than any we have yet noticed, of such good luck or persevering and triumphant ambition. But our business is not either with mere luck, or mere ambition—at least in the worldly acceptation of that term. If some of the individuals we have mentioned have risen to great wealth or high civil dignities, it is not for this that we have mentioned them. We bring them forward to show that neither knowledge, nor any of the advantages which naturally flow from it, are the exclusive inheritance of those who have been enabled to devote themselves entirely to its acquisition from their youth upwards. We shall have occasion to show this still more strikingly, when we come to trace the

history of some of those powerful minds, whose very education has been actually their own work—who, without even the assistance of a master, anyhow obtained, are recorded to have made themselves learned scholars, or able philosophers, or accomplished artists. For all, or nearly all, of the individuals we have hitherto enumerated, many as may have been the difficulties they have had to contend with in the endeavour to procure instruction, have nevertheless obtained and enjoyed at last the advantages of a regular education. Still the love of knowledge, at least, must have sprung up in many of them long before the opportunity of acquiring it had been found; and their merit, and the praise due to them, is, that surrounded as they were by all manner of difficulties and discouragements, they rested not until they had fought their way to the instruction for which they longed. Their example also shows that many of those impediments, which, in ordinary cases, altogether prevent the pursuit of knowledge, are impediments only to the indolent or unambitious, who make, in truth, their poverty or their low station bear the blame which ought properly to be laid upon their own irresolution or indifference. It was not wealth or ease which these noble enthusiasts sought; it was the bondage and degradation of ignorance alone from which they panted to emancipate themselves. All they wanted was an opportunity of acquiring that knowledge which *might* lift them to a higher station in society, but would certainly elevate their moral and intellectual being, and bring them an inexhaustible multitude of gratifications, such as no wealth, no station, no worldly circumstances whatever, could confer. Some of them, as we have remarked, even continued to work at their original employments long after they had obtained that superior education which might have entitled them to aspire to a higher place; and we shall have to quote numerous other instances, in the sequel, of persons who, although possessed of the highest mental cultivation, have not permitted that circumstance to withdraw them even from occupations that are generally supposed to be very uncongenial to literary tastes and habits.

Looking back upon these examples, we may safely affirm that no man was ever induced to engage with any degree of eagerness in the pursuit of knowledge by the mere hope of thereby bettering his worldly circumstances. That may have sometimes been temptation enough to allure an individual to procure for himself a few lessons in arithmetic, or navigation, or any of those kindred branches of education the utility of which is equally obvious; but it demands a much stronger and more deep-seated excitement to sustain the mind in that long and earnest pursuit of knowledge, which alone can ever lead to intellectual acquirements of any lofty order. Such a pursuit will never be entered upon, or at least very far proceeded in, by any one, except him who loves knowledge entirely or chiefly for her own sake. It is to such a person only that we

hold up the examples of Heyne, and Winckelman, and the other illustrious conquerors of fortune whom we have named, as guides and encouragements. To none besides are they fitted to be either the one or the other. With regard to the great mass of mankind, any counsel or exhortation which would attempt to raise them above the rank in which they have been born and reared must, from the nature of things, be totally inoperative. But it is right that the individual who, although poor, and unknown, and uneducated, longs for education as his chief earthly good, and feels within himself the strength and resolution to undergo all things for the sake of obtaining it, should be shown, by the example of those who, under the same impulse, have surmounted difficulties as formidable as his own, that no difficulties, however great, are any reason for despair.

CHAPTER IV.

ARTISTS RISING FROM THE LOWER TO THE HIGHER BRANCHES:—

B. CELLINI ; Q. MATSYS ; IBBETSON ; KENT ; TOWNE ; KIRBY ; SCHIAVONI ; HOGARTH ; SHARP ; THEW ; CASLON.—LATE LEARNERS:—CROMWELL ; SIR W. JONES ; CATO THE CENSOR ; ALFRED ; MOLIERE ; VALERIANUS ; VONDEL ; PITOT ; PAUCTON ; OGILBY.

THERE is one mode in which ingenious and aspiring workmen have sometimes raised themselves above the trade they were bred up to, which does not imply any violent abandonment of their original occupation, but on the contrary arises naturally out of pursuits into which it has led them. We allude to cases of the mere working mechanic elevating himself into an artist, in a department kindred to that of his first exertions ; and of the artist himself making his way from a lower to a higher department of his art. Thus, in Italy especially, it has not been uncommon for working goldsmiths, or those of them at least who have been employed in copying designs in the metal, to carry the study of their profession so far as to attain more or less proficiency in the art of design itself ; and some individuals, thus educated, have become eminent painters or sculptors. BENVENUTO CELLINI is one instance, who, while serving an apprenticeship to a goldsmith, acquired a knowledge not only of chasing, but also of drawing, engraving, and statuary ; and afterwards became one of the greatest sculptors of his age ; and several others might be mentioned.—Workers in gold and silver, however, are not the only sort of smiths who have in this way attained to a proficiency in the fine arts. The old Dutch painter, QUINTIN MATSYS, was originally a blacksmith and farrier, on which account he is often called

the Blacksmith of Antwerp, the town where he pursued this humble vocation. Having, when a young man, been attacked by a disorder which left him too much debilitated to return to the heavier work of his trade, which was his only means of support for himself and a widowed mother, he was forced to turn his attention to the fabrication of such light and ornamental articles as it was then fashionable to construct of wrought iron; and he obtained considerable reputation, in particular, by an enclosure and covering of this description, which he made for a well in the neighbourhood of the great church at Antwerp. He began, however, at length, to find even such work as this too laborious; and was in great difficulties as to what he should do, when the thought occurred to him, or rather to one of his friends, that, as he had shown considerable talent for the art of design in many of the ornamental articles he had been in the habit of making, it might be worth his while to try what he could accomplish in a simple style of drawing; for example, in painting a few of those small pictures of saints which were wont to be distributed by the religious orders of the city to the people, on occasion of certain of their solemn processions. The idea was adopted, and Matsys succeeded in his new attempt to the admiration of everybody. From that time painting became his profession, and he devoted himself to it with so much zeal and success, as not only to acquire a great deal of reputation in his own day, but to leave several works which are still held in considerable estimation. Among them is one at Windsor, "The Misers," which has been often engraved, and it deserves its popularity better, perhaps, than it does its name. It consists of two figures eagerly employed in counting money. The extreme satisfaction in the countenances of each of these persons is most happily expressed; but the expression indicates a more genial feeling than belongs to the character of the "Miser." The probability is, that the picture represents two bankers, or usurers, of Antwerp, who derive that "sunshine of the breast" from a contemplation of their riches—their gold, their bills, and their bonds—of which even virtue itself is hardly more productive than the secure possession of wealth with our ordinary human nature. The accessories of the picture—the candlestick, the rolls of paper, the parrot—are delineated with a fidelity rarely excelled. At any rate the work has excellence enough to be considered the *chef-d'œuvre* of the artist, and such as might fairly have won him the hand of his mistress—who is said to have accepted the "painter," after having rejected the "blacksmith."

The late JULIUS CÆSAR IBBETSON was originally a ship-painter; but by the cultivation of his talents he became so eminent a painter of landscapes, that Mr. West used to compare him to the Dutch Berghem, one of the greatest artists his country has produced in that department. WILLIAM KENT, another English artist of the earlier part of the last

century, who practised both history and portrait painting, but is better known for his architectural designs, and the graceful and picturesque style of ornamental gardening which he was the first to introduce among us, had acquired the rudiments of his art while serving his apprenticeship to a coach-painter. FRANCIS TOWNE, a landscape painter of great taste and unrivalled industry, who acquired a handsome fortune in the exercise of that art, and as a teacher of drawing, commenced his career under similar auspices. JOHN JOSHUA KIRBY, who, about the middle of the last century, distinguished himself by a series of drawings of the monumental and other antiquities of the county of Suffolk, and was elected a member both of the Royal and Antiquarian Societies, was originally a house painter. So was the celebrated Italian painter, SCHIAVONI, whose parents were so poor, that, although he early showed a propensity for the art in which he afterwards so eminently excelled, they were unable to afford him any better initiation into it; but who, even in this humble situation, cultivated his talents with so much success, that he recommended himself by his performances to the notice of the great Titian, and was employed by him to paint the ceilings of the Library of St. Mark. The famous HOGARTH acquired his knowledge



WILLIAM HOGARTH.

of drawing while serving his apprenticeship to an engraving silversmith, and commenced his professional career by engraving coats-of-arms and shop-bills. The late WILLIAM SHARP, whose eccentricities are so well known, but who was certainly also one of the ablest engravers England ever produced, was educated only to the subordinate branch of the profession called bright engraving, or that which is occupied with such articles as dog-collars, and door-plates. From this he raised himself chiefly by the print of Reynolds's picture of John Hunter, which thus well repaid the year of hard work he bestowed upon it. ROBERT THEW, another English engraver of eminence, originally employed himself merely on visiting-cards and shop-bills. Finally, to omit other instances for the present, WILLIAM CASLON, the celebrated type-founder, began life

only as an engraver of the ornaments on gun-barrels ; from which he proceeded, in the first instance, to attempt cutting letters for the bookbinders. Some of his performances in this line having been accidentally seen by Mr. Bowyer, the printer, that gentleman sought him out ; and after forming an acquaintance with him, took him one day to a foundry in Bartholomew Close, where, after having shown him something of the nature of the business, he asked him if he could now undertake to cut types himself. Caslon requested a day to consider the matter ; and then answered that he thought he could. Upon this, Mr. Bowyer and two of his friends advanced him a small capital ; and with no other preparation he set up in his new business. In this he speedily acquired such reputation, that instead of the English printers importing their types any longer from Holland, as had before that time been the custom to a considerable extent, those cast by him were frequently exported to the Continent.

A chief disadvantage which had to be surmounted by some of the individuals we have just mentioned, and others similarly situated, was the time they had lost before commencing the pursuit to which they eventually dedicated themselves. This circumstance involved the necessity of acquiring an acquaintance sometimes even with the most elementary principles of their art at a period of life when their habits were already formed, and a certain degree of aversion contracted for what we may call the discipline of apprenticeship in the rudiments of any art or profession. Considerable as this disadvantage must have been, we see how completely it was overcome by their perseverance and honourable ambition. So, in another field of enterprise, OLIVER CROMWELL, who never fought a battle that he did not win, was forty-two years old before he entered the army ; and his contemporary (born, indeed, the same year with himself), the immortal BLAKE, who not only stands in the very front rank of our naval heroes, but may be considered as the founder of the modern system of naval tactics, and who was the first of our commanders that ventured to attack a battery with ships, was in his fiftieth year when he first went to sea. In the pursuit, too, of literature and science, we have many instances of persons who, in the same manner, have become schoolboys, as it were, in their manhood or old age ; and, undismayed by the reflection that their spring, and sometimes their summer likewise, of life was already spent and gone, have given themselves with as much alacrity of heart to the work of that education of which circumstances, or their own heedlessness, had prevented the earlier commencement, as if they had been yet as much children in years as they were in learning. Life is short, certainly ; and a youth lost in idleness makes a fearful subtraction from its scanty sum ; but this is the true way, if there be any way, to repair that loss, and to make our few years many.

We do not comprehend, however, among those who have distinguished

themselves by acquisitions made late in life, all such as may have merely familiarized themselves with a new branch of knowledge after the regular period of education was over. The history of any devotee of learning is



MEDAL OF OLIVER CROMWELL.

the history of a series of acquisitions, which terminates only with his life itself, and which will very often embrace much that may, in one sense, be termed elementary study, even in its latest stages. Thus, the student of languages, for example, if he proposes to survey any considerable portion of his mighty subject, must lay his account with being obliged to learn vocabularies and grammar rules to the end of his days. Our countryman, Sir WILLIAM JONES, who, in addition to great acquisitions in various other departments of knowledge, had made himself acquainted with no fewer than twenty-eight different languages, was studying the grammars of several of the oriental dialects up to within a week of his death in 1794, at the age of forty-eight. At an earlier period of his life, when he was in his thirty-third year, he had resolved, as appears from a scheme of study found among his papers, "to learn no more *rudiments* of any kind; but to *perfect* himself in, first, twelve languages, as the *means* of acquiring accurate knowledge of history, arts, and sciences." These were the Greek, Latin, Italian, French, Spanish, Portuguese, Hebrew, Arabic, Persian, Turkish, German, and English. When he was afterwards induced, however, from the situation he held

in India, to devote himself more especially to oriental learning, he extended his researches a great way even beyond these ample limits. In addition to the tongues already enumerated, he made himself not only master of Sanscrit, as well as less completely of Hindostanee and Bengalee, but to a considerable extent also of the other Indian dialects, called the Tibetan, the Pâli, the Phalavi, and the Deri; to which are to be added, among the languages which he describes himself to have studied least perfectly, the Chinese, Russian, Runic, Syriac, Ethiopic, Coptic, Dutch, Swedish, and Welsh.

It is only when an individual commences the study of foreign languages in his maturer years, that we are entitled to quote him as an example of the peculiar sort of perseverance and intrepidity we are at present considering. Thus the old Roman, CATO the Censor, in all respects an extraordinary man, showed his force of character very strikingly, by setting himself to learn Greek in his old age. The study of that language was as yet very rare at Rome; and this makes the determination of Cato, and his success, the more remarkable. In so far as his native literature was concerned, Cato was before this one of the most learned of his countrymen; but he certainly had never experienced what it was to study a foreign language till now. Our own ALFRED THE GREAT—one of the most perfect characters in history—affords us a still more illustrious example of what may be done by those who are not only advanced in life before they have an opportunity of acquiring what is commonly called learning, but even by those whose most elementary education has been begun comparatively late. An interesting anecdote is told of Alfred's first acquaintance with books. His mother, it is said, had shown him and his brothers a small volume of Saxon poetry, illuminated or adorned in different places with coloured letters, and other such embellishments, as was then the fashion. Seeing it excite the admiration of the children, she promised she would give it to him who should first learn the verses by heart. Alfred, although the youngest, was the only one of the four, perhaps, who had spirit even to attempt getting possession of the prize on such conditions—at least, it was he who actually won it; for he immediately, we are told, went and procured a teacher, that is, apparently, some one to read the poetry to him till he had learned it, and in this way, in a very short time, he was enabled to perform the task set him by his mother, and to claim the promised reward. At this time he cannot have been more than four years old; for at that early age he lost his mother. It was not till long afterwards that he found it possible to extend his acquirements beyond the mere elements of book knowledge. The miseries to which his kingdom was for so many years exposed from the invasion of the Danes, and the incessant labours and privations to which he was in consequence compelled to submit, left him no leisure, till he had passed at least the twentieth

year of his age, to improve his acquaintance with books ; and even after he had regained his throne, and re-established his country in peace and independence, he had nearly as many impediments to contend with from the extreme difficulty of procuring the necessary instructors. Nearly all those possessed of any degree of learning had disappeared, or been destroyed, during the late confusions. He himself states, that when he came to the throne, he knew but few priests in the northern part of the kingdom, and not one to the south of the Thames, who could translate the Latin prayers of the Church service. By searching about, however, in all directions, and sending to foreign countries for what his own could not supply, he at last collected at his court some of the ablest men whom that dark age afforded ; and he set himself immediately to profit by their instructions, with a docility and zeal that can never be enough admired. In spite of all his public duties and cares, and a tormenting disease, which scarcely ever left him a moment of rest, it was his custom, we are told, day and night, to employ his whole leisure time either in reading books himself or in having them read to him by others. Still, however, although he used to have such Latin books as he could procure interpreted to him by his learned friends, his native language was long the only one he knew. According to the interesting biography attributed to Bishop Asser, one of his instructors, he had reached his thirty-ninth year before he began to attempt translating anything from the Latin tongue himself. He and Asser, we are informed, were one day conversing together as usual, when, the latter taking occasion to introduce a quotation from a particular author, the king was so much struck with the passage, that he desired it might be immediately inscribed on one of the blank leaves of a small religious manual, which he was wont to carry about with him in his bosom. This became the commencement of a collection of favourite sentences from the Latin writers, which Alfred, ever aspiring after excellence, soon became ambitious to be able to peruse himself : and so proceeded at once to the acquirement of the language in which they were written. In no long time he attained to a great proficiency in his new study, as several translations from Latin authors which he has left behind him sufficiently testify. Among these are a version of Boethius's " *Consolations of Philosophy*," which he has rendered exceedingly interesting, by the introduction into the original work of many new ideas and illustrations of his own ; another of Bede's " *Ecclesiastical History of the English* ;" and another of Orosius's " *Ancient History and Geography*," in which he inserts a very curious account of a voyage made in that age towards the North Pole by two Norwegians, which he expressly states he had heard from the lips of the navigators themselves.

The celebrated French dramatist, MOLIERE, could only read and write very indifferently when he was fourteen years of age. It had been in-

tended that he should follow the profession of his father, who was an upholsterer; but upon being taken on one occasion, about the time we have mentioned, by his uncle to the theatre, his passion for literature was so much excited, that he would hear of nothing but going to college, to which he was accordingly soon after sent. Another well-known French writer, *SAINTE PALAYE*, the author of the "History of the Troubadours," had, from the delicacy of his health, been so much indulged by his mother, that he had been allowed to pass his fifteenth year before beginning either Greek or Latin; but his progress afterwards was so rapid, that he abundantly made up for the time he had lost. *Dr. CARTER*, the father of the celebrated Miss Carter, had been originally intended for a grazier, and only began his studies at the age of nineteen or twenty. He eventually, however, became a distinguished scholar; and he was so enthusiastically attached to literature, that he gave his daughters too a learned education. *Valeriano Bolzani*, who lived in the earlier part of the sixteenth century, and is better known by the Latinized name of *JOANNES PIERIUS VALERIANUS* (the epithet *Pierius* having been given him by one of his masters, in allusion to the Greek term *Pierides*, one of the names of the Muses), was fifteen years old before he began to learn to read; his parents, indeed, having been so poor, that he was obliged to commence life as a domestic servant. He afterwards became one of the most learned and elegant scholars of his time, and wrote many books, several of which are still well known and esteemed, particularly a curious treatise on the misfortunes of literary men, which has been often reprinted; the last edition having been brought out at Geneva, in 1821, under the care of our countryman, *Sir Egerton Brydges*. *Valerianus* merits particular commemoration in literary history on another account—for his disinterestedness, namely, in twice refusing a bishopric, when pressed upon his acceptance by his patron, *Pope Clement VII.*, in order that he might devote himself entirely to literature. The famous Dutch poet, *JOOST VAN DEN VONDEL*, whose works fill nine quarto volumes, commenced learning Latin only in his twenty-sixth year, and Greek not till some years afterwards. *Vondel*, like many of the other literary men of Holland, had begun life as a commercial man, and originally kept a hosier's shop at Amsterdam; but he gave up the management of his business to his wife when he commenced his career as an author. He died in extreme old age in 1679, having occupied, during a great part of his life, the very highest place in the literature of his country. The French mathematician, *HENRY PITOT*, the author of several ingenious works, and particularly of a treatise on the management of vessels at sea, which was long adopted by the French Government as the text-book for the instruction of the navy, and, being translated into English, procured the writer the honour of admission into the Royal Society, had

reached his twentieth year before he began to pay attention to learning. About this period of his life, when he used to spend his time only in idleness and dissipation, he chanced one day, upon going into a bookseller's shop, to open a volume on geometry, the figures in which attracted his attention, and excited his curiosity so much, that he determined to study the work. This was the beginning of his fondness both for mathematics and for reading; and he soon grew so much attached to his new occupation, that he abandoned his old habits entirely, and now spent every hour in study, or in watching the stars, by means of instruments of his own invention, from the top of an old tower in his father's house. This mode of employing his time obtained for him, at first, it is related, among his ignorant and astonished neighbours, the reputation of being a magician. He was afterwards sent by his father to complete his studies at Paris, where he was introduced to Réaumur, the celebrated naturalist (whose work on insects is still one of the most philosophical guides to the student of entomology), and the inventor of the thermometer known by his name; and he soon became, under Réaumur's guidance, an adept in the different departments of his favourite science. It is a curious circumstance, however, and shows at once his ardour in the pursuit of knowledge, and the penalty he was long afterwards obliged to pay for his early negligence, that he actually submitted, when more than fifty years old, to take his first lessons in Latin from his son's tutor, in order to be able to read some mathematical works written in that language, which he wished to consult.

Another French mathematician, the ingenious PAUCTON, whose "Metrology," or treatises on weights and measures, although first published more than half a century ago, is still considered one of the most valuable extant, had, owing to the poverty of his parents, scarcely received any education at all, till after he had reached his eighteenth year. He was at last noticed by a charitable ecclesiastic, who gave him lessons for about two years; after which he completed his studies at Nantes. Paucton eventually obtained the professorship of mathematics at Strasburg; but his labours here must have been but indifferently recompensed, for when the city was threatened with a blockade by the Austrians, and the magistrates had issued orders that every inhabitant who could not supply himself beforehand with a sufficient store of provisions for the siege, should quit the place, Paucton, being too poor to afford the necessary outlay, was obliged to take his departure with his wife and three children. He was afterwards, however, patronised by the French Government; and had the prospect of passing his latter days in comfortable circumstances, when he died, in 1768, at the age of sixty-two.

We shall at present mention only another example. JOHN OGILBY, the well-known translator of Homer, was originally a dancing-master. He had apprenticed himself to that profession on finding himself re-

duced to depend upon his own resources, by the imprisonment of his father for debt in the King's Bench. Having succeeded in this pursuit, he was very soon able to release his father, which he did, very much to his credit, with the first money he procured. An accident, however, put an end to his dancing, and he was left again without any permanent means of subsistence. In these circumstances, the first thing he did was to open a small theatre in Dublin; but just when he had fairly established it, and had reason to hope that it would succeed, the rebellion of 1641 broke out, and not only swept away all his little property, but repeatedly put even his life in jeopardy. He at last found his way back to London, in a state of complete destitution: but, although he had never received any regular education, he had before this made a few attempts at verse-making, and in his extremity he bethought him of turning his talent in this way, which certainly was not great, to some account. He immediately commenced his studies, which he was enabled to pursue chiefly, it is said, through the liberal assistance of some members of the university of Cambridge; and although then considerably above forty years of age, he made such progress in Latin that he was soon considered in a condition to undertake a poetical translation of Virgil. This work was published in the year 1650. In a very few years a second edition of it was brought out with great pomp of typography and embellishments. Such was its success that the industrious and enterprising translator actually proceeded, although now in his fifty-fourth year, to commence the study of Greek, in order that he might match his version of the *Æneid* by others of the *Iliad* and the *Odyssey*. In due time both appeared; and Ogilby, who had in the meanwhile established himself a second time in Dublin in the management of a new theatre, was in the enjoyment of greater prosperity than ever, when, having unfortunately disposed of his Irish property, and returned to take up his residence in London, just before the great fire of 1666, he was left by that dreadful event once more entirely destitute. With unconquerable courage and perseverance, however, he set to work afresh with his translations and other literary enterprises; and was again so successful as to be eventually enabled to rebuild his house, which had been burned down, and to establish a printing-press; in the employment of which he took every opportunity of indulging that taste for splendid typography to which his first works had owed so much of their success. He was now also appointed cosmographer and geographic printer to Charles II.; and at last, at the age of seventy-six, terminated a life remarkable for its vicissitudes, and not uninstrucive as an evidence both of the respectable proficiency in literature which may be acquired by those who begin their education late in life, and also of what may be done by a stout heart and indefatigable activity in repairing the worst injuries of fortune. Ogilby was no great poet, although his translations were very

popular when they first appeared ; but his Homer, we ought to mention, had the honour of being one of the first books that kindled the young imagination of Pope, who, however, in the preface to his own translation of the Iliad, describes the poetry of his predecessor and early favourite as "too mean for criticism."

CHAPTER V.

EARLY AGE AT WHICH GREATNESS HAS BEEN ACHIEVED : — NEWTON ; JAMES GREGORY ; TORRICELLI ; PASCAL ; SIDNEY ; OTWAY ; COLLINS ; &c. ; MOZART ; RAPHAEL ; CORREGGIO ; POLITIAN ; MIRANDOLA.

CONSIDERABLE as are the disadvantages which those persons have to contend with who begin their acquaintance with books only late in life, it ought not to be forgotten, on the other hand, that all the chances of the race are not against them. The thought of the time they have lost and are anxious to redeem, is itself a stimulus that will make up for many disadvantages. Then, although they have not yet learned much from books, they have nevertheless learned of necessity a great deal from other sources ; and they come to their studies, too, with faculties which, if not quite so pliant as those of childhood, have much more vigour and comprehension. And, as for the comparative shortness of the space which they may reasonably count upon as being still left to them for their new pursuit, after the years they have already spent, as it were in sleep, that, in a right view of the matter, is really of no consequence at all. Between the ultimate point of discovery, and the place we now occupy on the ascent towards it, the steps are so inconceivably many, that, with regard to us, they may be most truly described as interminable. So far as we have experience, or can conceive, of knowledge, it is an expanse ever widening before us and around us : its horizon seems not only always as distant as ever, but always becoming more distant the more we strive to approach it. For every one discovery is merely the opening of a road to other discoveries ; and the lifting of us at the same time to a new eminence, from which we see a broader domain than before, both of the known and of the unknown. It is the attainment of a comparatively small portion of knowledge only that even the longest life can compass ; and the shortest is sufficient for the attainment of some portion. In other words, the pleasure belonging to the acquisition of knowledge is one which all may enjoy who choose, let the time of life at which they commence the pursuit of it be what it may. In so far, therefore, as we are to be allured by this temptation, it matters not, as we have said, whether we find ourselves in the morning or in the even-

ing of our days, when we would yield ourselves up to its influence. If we were even certain that we had but a few years longer to live, it would still offer, for what leisure we could spare from other duties, the most delightful as well as the most ennobling of all occupations.

This is a consideration for all whose attention may not have been attracted to literature till late in life. But even to him who feels within himself the ambition, and something of the power, of high achievement in the arena of intellect, and only regrets that so many of his years have been lost in other pursuits before he has had any opportunity of turning to this, we would say that the field in which he longs to distinguish himself is still open for his admission, and its best prizes waiting to be won by him, if only his ardour and courage do not fail. Where there is a real superiority of faculty, it is wonderful how much has often been accomplished even in a very few years devotedly given to the pursuit of eminence. Some of the greatest men that ever lived have either died early, or might have done so for their fame. NEWTON himself—but he may be said, here at least, to be only a prodigy for our admiration—had completed many of his grand discoveries, and laid the foundation of all of them, before he had reached his twenty-fifth year; and, although he lived to become very old, he may be said to have finished all that was brilliant in his career at the early age of forty-five. After this, it has been remarked, he wrote nothing, except some further explanations and developments of what he had previously published. JAMES GREGORY, the celebrated inventor of the reflecting telescope, was suddenly struck blind in his thirty-seventh year while observing the satellites of Jupiter, and died a few days after. TORRICELLI, whose famous discovery of the barometer we have already mentioned, and who had deservedly acquired the reputation of being in every respect one of the greatest natural philosophers of his time after the world had lost the illustrious Galileo, died at the age of thirty-nine. PASCAL, who first showed the true use and value of Torricelli's discovery, and who has ever been accounted, for his eminence both in science and literature, one of the chief glories of France, as he would have been of any country in which he had appeared, was cut off at the same early age. Nay, in his case, the wonder is greater still; for he passed the last eight years of his life, as is well known, in almost uninterrupted abstinence from his wonted intellectual pursuits; which, under the influence of certain religious views, operating upon a delicate and excitable temperament, and a frame exhausted by long ill-health and hard study, he conceived to be little better than an abuse of his time and faculties—as if it were criminal in man to employ those powers which his Creator has given him in a way so well fitted to purify and elevate his nature, and to fill him with sublimer conceptions, both of the wonderful universe around him, and of the Infinite Mind that formed it. It ought not be forgotten, however, that it was during

this period of depression and seclusion that he wrote and published his celebrated "Provincial Letters," an attack upon the casuistry of the Jesuits, which, strange to say, is a work not only distinguished by all that is admirable in style and reasoning, but abounding in the most exquisite wit and humour, which the splendid enthusiast intermingles with his dexterous and often eloquent argumentation, apparently with as much light-heartedness, and as natural an ease, as if the flow of his spirits had scarcely yet known what it was to be disturbed either by fear or sorrow. So false a thing, often, is the show of gaiety—or rather so mighty is the power of intellectual occupation to make the heart forget for the time its most prevailing griefs, and to change its deepest gloom to sunshine. Thus, too, it was that our own COWPER owed to his literary efforts almost the only moments of exemption he enjoyed from a depression of spirits very similar, both in its origin and effects, to that under which Pascal laboured; and while the composition of his great poem, "The Task," and his translations of the Iliad and Odyssey, suspended even for months and years the attacks of the disease, his inimitable "John Gilpin," for a shorter interval, absolutely transformed his melancholy into riotous merriment. Cowper affords us also another example of how much may be done in literature, and in the acquirement of a high name in one of its highest departments, even by the dedication



SIR PHILIP SIDNEY.

to it of only a comparatively small portion of a lifetime. He had received a regular education, but, after leaving school, threw away the next twenty or thirty years of his life almost in doing nothing. When the first volume of his poems appeared, the author was above fifty years

old ; and it was after this that all his more celebrated pieces were written—and that, too, although the eighteen years that intervened before his death were, in regard to both his body and mind, little better than “ a long disease.” Many of our other poets likewise, whose names are imperishable, have had but a brief term of life allowed them in which to achieve their fame. Sir THOMAS WYATT and Lord SURREY, the great refiners of our language in the reign of Henry VIII., and the first English poets after Chaucer whose works can be said still to survive, died, the former at the age of thirty-eight, and the latter on the scaffold, the last victim of Henry’s despotism, at that of thirty-one. The gallant Sir PHILIP SIDNEY, the author of various works in prose and verse, but best known by his celebrated pastoral romance, “ The Arcadia,” fell at the battle of Zutphen, in the Netherlands, in his thirty-second year. FRANCIS BEAUMONT, the dramatic poet, whose works, written in conjunction with Fletcher, form, indeed, the second glory of the English drama, died in the thirtieth year of his age. OTWAY had written his “ Orphan ” and his “ Venice Preserved,” as well as nearly all his other pieces, before he had reached the age of thirty-one ; and he died in extreme penury, the consequence, in a great measure, of his irregular and dissolute habits, at thirty-four. COLLINS first published his Odes, many of which



LORD BYRON.

are among the most exquisite in the language, when only twenty-six, and was but ten years older when he died. Finally, BURNS died at the age of thirty-seven, and BYRON at that of thirty-six ; KEATS at twenty-five, and SHELLEY at twenty-nine. Yet these are all names that will never die.

The great musical composer, MOZART, a wonderful instance of precocity, as well as of surpassing genius, died at the early age of thirty-five, after a career of unrivalled splendour, and the production of a succession of works which have left him almost, if not altogether, without an equal among either his predecessors or those who have come after him. He may be accounted, perhaps, in every way too much of a miracle to be fitly quoted as an object of imitation in any respect to other men. Yet Mozart's devotion to his art, and the indefatigable industry with which, notwithstanding his extraordinary powers, he gave himself to its cultivation, may read an instructive lesson, even to far inferior minds, in illustration of the true and only method for the attainment of excellence. From his childhood, to the last moment of his life, Mozart was wholly a musician. Even in his earliest years no pastime had ever any interest for him in which music was not introduced. His voluminous productions, to enumerate even the titles of which would occupy no little space, are the best attestation of the unceasing diligence of his maturer years. He used, indeed, to compose with surprising rapidity; but he had none of the carelessness of a rapid composer; for so delicate was his sense of the beautiful, that he was never satisfied with any one of his productions until it had received all the perfection he could give it by the most minute and elaborate correction. Ever striving after higher and higher degrees of excellence, and existing only for his art, he scarcely suffered even the visible approach of death to withdraw him for a moment from his beloved studies. "During the last months of his life," says an anonymous writer (in Gorton's "Biographical Dictionary"), "though weak in body, he was 'full of the God;' and his application, though indefatigable, could not keep pace with his invention. 'Il Flauto Magico,' 'La Clemenza di Tito,' and a requiem, which he had scarcely time to finish, were among his last efforts. The composition of the requiem, in the decline of his bodily powers, and under great mental excitement, hastened his dissolution; he was seized with repeated fainting fits, brought on by his extreme assiduity in writing, in one of which he expired. As he drew near his end, the grandeur of his ideas became still more obvious; the music of the requiem is truly funereal, a mixture of sublimity and heartfelt entreaty; and it was the excitement produced by the crowd of images which came unsought before his mind that hastened his death. A few hours before that event took place, he is reported to have said, 'Now I begin to see what might be done in music.'"

In the sister art of painting, the great RAPHAEL, whose works astonish not more by their excellence than by their number, lived only till he was thirty-seven, dying, like our own Shakespeare, on the anniversary of his birth. His distinguished contemporary, CORREGGIO, was only two or three years older, when, having completed his great work,

the "Assumption of the Virgin Mary," which is painted on the ceiling of the dome of the Cathedral at Parma, he suddenly met with his death, under circumstances never to be remembered without sorrow and indignation. So ignorantly, we are told, was his masterly performance appreciated by the canons, his employers, that they not only refused the unfortunate artist the price that had been agreed upon, but, the more to show their contempt for it, paid him the five hundred crowns, which was all they would allow, in copper. Correggio was carrying home this money to his family, who were living in great poverty in a neighbouring village, when, overcome by the heat of the weather and the weight of his load, he was unfortunately tempted to slake his thirst at a spring by the wayside, and the consequence was an inflammatory attack, which soon proved fatal. The destiny of the picture itself had nearly been the same with that of the artist. It is said that the canons were just about to efface it, when the illustrious Titian, happening to pass through Parma, expressed himself with regard to it in terms of such high admiration, as to induce them to forego their intention. "If I were not Titian," said that great painter, imitating Alexander's exclamation to Diogenes, "I should wish to be Correggio." It is Correggio of whom it is told, that, upon seeing one of the works of Raphael, he could only express his feelings by exclaiming, with a noble pride in their common art, "And I also am a painter!"

In the same country, and nearly at the same period with Raphael and Correggio, lived Angelo Politian, and Giovanni Pico, Prince of Mirandola, two of the most learned men of an age abounding in great scholars; the former of whom died at forty, and the latter at thirty-two. POLITIAN, in particular, has scarcely been excelled, by any scholar of later times, in that combination of profound erudition and elegant taste in which he so conspicuously surpassed all his contemporaries. We may imagine how actively his short life must have been spent, when we reflect on his extensive literary labours, and the variety and amazing exactness of his acquirements. The works he has left us are not so voluminous as those of some other writers; but it would be unfair and absurd to measure the industry of such a mind as his by the mere bulk of its productions. The works, however, which he wrote and published, constitute but a small part of the services he rendered to literature. In that age, the recovery of the lost works of the ancients was, in reality, by far the most important occupation to which a scholar could devote himself; and, fortunately, it was also looked upon as the most honourable. It occupied, accordingly, a large portion of the time of Politian and all his distinguished contemporaries. The celebrated Lorenzo de' Medici, the wealthy and munificent patron of all the liberal arts, and himself a scholar and writer of no mean order, was one of the most ardent among the collectors of ancient manuscripts; and Politian

was often despatched by him to different parts of Italy, to search for those fast-perishing treasures, and to purchase them for his library. "I wish," said Lorenzo to his friend, as he was proceeding on one of his expeditions for this purpose, "that the diligence of Picus and yourself would afford me such opportunities of purchasing books, that I should be obliged even to pledge my furniture to possess them." It was in the collating and correcting of these manuscripts that the literary labours of Politian principally consisted. His studies were extended to all the various departments of ancient literature. As a clergyman (for he held the office of a canon in the Metropolitan Church of Florence), he had made himself conversant with Divinity, Hebrew, and the Canon Law; and Civil Jurisprudence is known to have occupied a large share of his attention. He had acquired so perfect a familiarity with the two classic languages, that he wrote both in Latin and Greek almost with the facility of one using his native tongue; and with a purity and elegance that would have done no dishonour, it has been thought, to the most learned of the ancients themselves. The few compositions he has left us, too, in his native Italian, still rank with the most exquisite in that beautiful language. It was, long after the revival of letters, the reproach of some of the greatest scholars of Europe, that they neglected their mother-tongue to such a degree as to be incapable of expressing themselves in it with ordinary gracefulness, or even perspicuity. This was certainly less the case with the learned of Italy than of other countries, owing principally to the mighty influence which had been exerted some time before the era we are speaking of, in refining, fixing, and giving celebrity to the Italian language by the great Dante, and his successors, Petrarch and Boccaccio; and partly, perhaps, to that resemblance to its parent, Latin, which would naturally give to this language a peculiarly classic character in the estimation of the students of ancient learning, and incline them to favour and cherish it accordingly. But in France, more than a century after this, the greatest ignorance of their native language was often exhibited, even by those scholars who wrote most elegantly in that of the Greeks or Romans. Thus, the celebrated Sebastian Castalio, whose Latin version of the Bible has been already mentioned as remarkable for its purity, and whose other works in the same language are all eminently deserving of the same praise, in afterwards translating the Scriptures into French, expressed himself in so vulgar and barbarous a manner, that his style has been described as no better than the jargon used by the beggars. In Germany, so late as even a century after the time of Castalio, the illustrious Leibnitz composed almost all his works either in Latin or French, the little which he wrote in German being very ill written; and although, in the variety of his schemes, he proposes one for the improvement of that language, he only shows, by the remarks he makes on it, his ignorance of its true character and resources.

Our own noble tongue was, even up to a very recent period, scarcely recognised, by many of our most learned scholars, as a suitable vehicle either for elegant literature or philosophy; and that, too, strangely enough, long after it had been adorned by some of the greatest works, both in verse and prose, that any nation has yet had to boast of. The



CHAUCER.

English tongue was both a refined and copious one so early as the time of CHAUCER, who lived in the fourteenth century, and was the contemporary of Petrarch and Boccaccio. In the earlier part of the sixteenth century, as may be seen from the poems of Surrey and Wyatt, it had attained, in regard to both its words and its idioms, very nearly the form it still has; and the latter part of that century, and the beginning of the following, was the time of its greatest richness and glory, being that in which flourished Spenser, and Bacon, and Shakespeare, and many others whom even the supereminent lustre of their names has not obscured, and in which Jeremy Taylor and Milton were born and educated. Yet, after all these writers had produced their immortal works, we find not only some of our most distinguished scholars continuing to write their native tongue with an awkwardness and inaccuracy that, in a Latin composition, would have been considered disgraceful, but our most polite and popular authors themselves affecting almost universally to despise their mother English as an unformed and barbarous dialect, scarcely to be used except in works of the most ephemeral description, or in addressing the vulgar who understand no other. Thus, to omit many similar evidences of the general state of feeling,

Waller, the poet, who died the year before the Revolution, tells us that

Poets, that lasting marble seek,
Must carve in Latin or in Greek.

It is delightful to contrast with this discreditable insensibility the enthusiastic admiration which some of our older writers express for this golden growth of our island soil, and best representative and picture of our national manners, intellect, heart, and history. The works of Chaucer, who, Waller informs us

His sense can only boast,
The glory of his numbers lost,

are, in Spenser's estimation, the "well of English undefiled;" and Spenser was one of the most learned men, as well as greatest poets, that ever adorned the literature of any country. So, GEORGE CHAPMAN, one of the poets of the age of Elizabeth and James, who produced, in the



GEORGE CHAPMAN.

beginning of the seventeenth century, a translation of the Iliad and Odyssey, abounding in passages of great splendour and beauty (and which Pope acknowledges to be animated by "a daring fiery spirit, something," he is pleased to add, "like what one might imagine Homer

himself would have writ before he arrived at years of discretion”), exclaims, with exquisite fervour and sweetness of expression, in some verses which he has prefixed to that work :—

And for our tongue, that still is so impaired [*i.e.*, *disparaged*]
 By travelling linguists, I can prove it clear
 That no tongue hath the Muse's utterance heired
 For verse, and that sweet music to the ear
 Struck out of rhyme, so naturally as this.

And then he goes on to contrast its variety and sinewy strength with what he deems the comparatively feeble and inexpressive monotony of both the French and Italian. Thus too, Milton, although accomplished in all the learning of Greece and Rome, and, as a writer of Latin, scarcely inferior to any other of his time, had very early the wisdom to discern that, whatever of lasting glory he might achieve must be derived from the works he should produce in what he calls the “mother dialect”—to the cultivation of which his thoughts appear to have been first turned by the example of the success that had attended the like enterprise as pursued by the modern writers of Italy. In a prose tract, which he entitles “Reasons against Prelaty,” written many years before he had begun the composition of his *Paradise Lost*, he announces to us that he had already formed with himself “that resolution which Ariosto followed, against the persuasions of Bembo, to fix all the industry and art he could unite to the adorning of his native tongue;” “that what the greatest and choicest wits,” he adds, “of Athens, Rome, or modern Italy, and those Hebrews of old, did for their country, I, in my proportion, with this over and above of being a Christian, might do for mine; not caring to be once named abroad, though perhaps I could attain to that, but content with these British Islands as my world.” The preference given upon the revival of literature to the Latin language, however, was in part a natural consequence of the paucity of readers in any particular country, and of the extensive diffusion of a language rendered general amongst the reading classes in Western Europe by various causes, among others by its employment everywhere in the services of the church.

We have little written in his native tongue by the PRINCE OF MIRANDOLA; nor, indeed, is it from his published works that we must judge of the extent of those literary labours which he found means to crowd into the compass of his short life. Yet, if ever there was a heart given up to the love of literature, it was that of *Mirandola*. He was born in the year 1463; and, if we may trust to the accounts handed down to us by some of his contemporaries, was, even in early youth, such a prodigy of learning as the world has not often seen. It has been affirmed that, by the time he had reached his eighteenth year, he had made himself familiar with no fewer than twenty-two different languages—a story in

which, as well as the similar one which certain ancient authors tell us of the famous Mithridates, King of Pontus, who is said to have spoken twenty-four languages fluently, there must be, we can hardly doubt, a very liberal allowance of the fabulous. At the university of Bologna, of which he was entered at the early age of fourteen, *Mirandola* greatly distinguished himself not only by his uncommon powers of intellect and memory, but by an industry and application almost equally extraordinary. His future ardour and success in the pursuit of literature, up to the period of his death, was altogether in accordance with this early promise:—"I have, by assiduous and intense application," he writes to one of his friends in his twenty-third year, "attained to the knowledge of the Hebrew and Chaldaic languages, and am at present struggling with the difficulties of the Arabic. Such are the achievements which I have ever thought, and still think, worthy the ambition of a nobleman." In a subsequent letter to another correspondent, he says, in reference to the same subject:—"After having studied the Hebrew language day and night for a month, I have directed my whole attention to the Arabic and Chaldee, not doubting that in these I shall make as much progress as I have done in the Hebrew, in which I am already able to compose an epistle, not certainly so as to merit praise, but yet without committing any decided fault. See what can be done by determination of mind—by mere labour and diligence, even when the strength is but inconsiderable." *Mirandola's* letters, which, unfortunately, form but a very small collection, are the most interesting productions of his pen we now possess. They breathe in every page both a literary enthusiasm that is quite inspiring, and a serenity and cheerfulness of heart, than which, adorned as it is by all the graces of a fervent devotion, and a very high-toned morality, nothing can be more delightful. So precious were they wont to be esteemed, that in some of the earlier editions they are entitled, "The Golden Epistles of the most learned, most noble, and most eloquent of Mortals"—an inscription which, seeming as it does to a modern taste to partake somewhat of the pompous and extravagant, speaks at least the reverence and affection with which his own contemporaries regarded their admirable author.

In the remaining part of the letter we have last quoted, *Mirandola* goes on to inform his friend that the circumstance which had excited in him all this zeal to acquire an acquaintance with the Oriental tongues was the having obtained the loan for a short time of certain Chaldee or Hebrew books—"if," says he, "they are not rather treasures than books,"—which he had every reason to believe were the genuine productions of the Jewish *Ezra*. The following is another letter relating to this matter, addressed about the same time to his nephew, which forcibly illustrates the literary enthusiasm and devotedness of the writer. "This was the reason," he begins, "why I have not yet answered your

letter. Certain Hebrew books have fallen into my hands, on which I have spent the whole week, day and night, with such diligence, that they have almost made me blind. For the person who brought them to me, a Jew, from Sicily, is to leave this in twenty days. Wherefore, until I shall have extricated myself from these manuscripts, do not expect a line from me; for I cannot leave them for a moment, lest they leave me before I shall have thoroughly perused them. When I shall have made my escape from this engagement, I will overwhelm you with letters, although you know that my mind is exceedingly occupied. But if ever you are to do anything for my sake, endeavour as far as you can to prevent the Prince of Bar from desiring my coming to him; for I should in that case be obliged to interrupt all my studies, to which *you* know how much I am devoted, although I care for nothing beside. But I do not know whether it would vex me most to displease him or myself. Farewell. Fear God, and think of yourself every day as destined to die." We need scarcely add that Mirandola had been, in this instance, deceived by his Hebrew friend, or by his own sanguine temperament; and that the writings in question were, in reality, the production of a much later age than that of their pretended author. The many laborious hours he spent in deciphering them, however, were not probably altogether thrown away; nor was his ardour the less honourable to him, that it met with somewhat less than its expected reward.

It was by such zeal and industry as this, that, cut off as he was in the early summer of his days, Mirandola nevertheless had obtained for himself the universal reputation of being (to borrow the words of one of his contemporaries) not only a most able linguist, but master of all the liberal arts, an admirable poet, and the most learned philosopher and skilful disputant of his age. Even Politian describes him as the Phoenix among all the great geniuses of his time. Most of his printed works (but he left many others in manuscript) relate to theological subjects, and are strongly marked by what would now be called a spirit of mysticism; but they are extolled by those who have studied them as evidencing also abounding erudition and genius. Among them is a Treatise, in twelve books, in refutation of astrology, which ranks its author as one of the earliest assailants in modern times of the pretensions of that visionary science, which may be said to have retained, for many ages after, nearly the universal faith of Europe.

CHAPTER VI.

SELF-EDUCATED MEN :—T. SIMPSON ; EDMUND STONE ; JEROME STONE.

MANY of the persons who have most remarkably distinguished themselves by their ardour and success in the pursuit of knowledge under adverse circumstances, have had no master to instruct them beyond perhaps the mere elements of reading ; and have taught themselves, therefore, whatever else they had acquired by their own unaided efforts. To have done this indicates, undoubtedly, a decidedly superior mind ; but it is more honourable perhaps to an individual's force of character, and zeal for intellectual improvement, than even to his strength of native talent. For a teacher is really not so indispensable to the work of education as is often supposed. Every branch of human knowledge has in fact been acquired without the assistance of an instructor, if by no one else, at least by him who first found it out. But this sort of self-instruction, demanding, as it does, the application of original and inventive genius, indicates a much more extraordinary degree of mental capacity than is required merely to gain an acquaintance by solitary study with any department of science, or other species of learning, which is to be found already expounded in books. A good elementary book upon any subject is itself a teacher which, to a person of ordinary intelligence, will in many cases render any other unnecessary. In the present age, especially, when such works abound, persons so circumstanced as not to be able easily to obtain the lessons of a living master, will find comparatively but little difficulty in teaching themselves any of the common branches of education, if they will but make the attempt with a true desire and determination to succeed in it, and are not devoid of those powers of attention and perseverance without which there can be no success in anything. The truth is, that even those who enjoy to the greatest extent the advantages of what is called a regular education must be their own instructors as to the greater portion of what they acquire, if they are ever to advance beyond the elements of learning. What they learn at schools and colleges is comparatively of small value, unless their own after-reading and study improve those advantages. Still, however, it must be admitted that it is a great matter for the young student to have the first steps of his progress encouraged and facilitated by being thus led on, as it were, by another holding him by the hand. Compared with him who educates himself from the beginning, such a student may be regarded as entering upon a new country under the conduct of a guide, instead of endeavouring to find his way through it by the aid simply of the road-book. Or rather, he is in the

situation of the man who begins the world with a fortuné, which, though small, is yet sufficient to set him up in business ; while others have to earn even their first shilling by their own ingenuity and industry. Undoubtedly the person thus circumstanced has a somewhat gentler ascent to climb, in the first instance, than his competitors. Still all must owe what they eventually arrive at principally to their own efforts. And, if this be, generally speaking, true of worldly prosperity, it is still more strictly so of the acquisition of intellectual riches ; for, in this latter case, what is called good fortune can be of no avail to anyone. But the examples which we are going to bring forward will show how much every man has it in his own power to do for himself, when he has no other to help him.

The first case we shall detail is that of the well-known mathematician, THOMAS SIMPSON. He was born in the town of Market Bosworth, in Leicestershire, in the year 1710. His father was a working stuff-weaver, and was either so poor, or so insensible to the importance of education, that, after keeping his son at school only so long as to enable him to make a very slight progress in reading, he took him home with the view of bringing him up to his own trade. Thomas, however, had already acquired a passionate love of books, and was resolved at all hazards to make himself a scholar. So, beside contriving to teach himself writing, he read with the greatest eagerness every volume that came in his way, or that he could by any means procure ; and spent in this manner not only all his leisure, but even occasionally a portion of the time which his father thought he ought to have employed at his work. Instead of giving any encouragement, indeed, to his son's fondness for study, his father did all in his power to cure him of what he deemed so idle and pernicious a propensity ; and at last, it is said, after many reprimands, forbade him even to open a book, and insisted upon his confining himself to his loom the whole day. This severity, however, defeated its own object. The young man's repeated attempts to evade the harsh injunction that had been laid upon him led to perpetual quarrels between himself and his father, till he was one day ordered by the latter to leave the house altogether, and to go and seek his fortune where and in whatever way he chose. In this extremity he took refuge in the house of a tailor's widow, who let lodgings in the neighbouring village of Nuneaton, and with whose son, two years older than himself, he had been previously acquainted. Here he contrived to maintain himself for a while by working at his business ; and he had a little time to spare besides for his favourite enjoyment of reading, when he could anywhere borrow a book. It chanced, however, that, among other humble travellers who sometimes took up their abode with the widow, was a pedlar, who followed the profession of an astrologer and fortune-teller, as well as that of an itinerant merchant, and was accounted a man of no

little learning by the rustics of those parts. Young Simpson's curiosity had been, some time before this, greatly excited by a remarkable eclipse of the sun, which happened on the 11th of May, 1724; but, if this was the incident that gave his mind its first bias towards the studies in which he afterwards attained so high a distinction, it was to his casual connection with the astrologer that he owed the rudiments of his scientific knowledge. This personage, with whom he had become very intimate, had, it appears, a few books relating to the mystery he professed, and to the branches of real learning with which it assumed to be connected. Among these was Cocker's "Arithmetic," which had, fortunately, a treatise on Algebra bound up with it—as well as the less useful addition of a work written by Partridge, the famous almanac-maker, on the calculation of nativities. This volume, the pedlar, on setting out upon a tour to Bristol, left in the hands of his young friend. The works of which it was made up were the first of a scientific character that Simpson had had an opportunity of perusing, and they interested him exceedingly—even the treatise on nativities, notwithstanding the absurdities it was filled with, probably not a little exciting his wonder and curiosity, both by its mysterious speculations on the prophetic language of the stars, and such scattered intimations as it afforded in regard to the sublime realities of astronomy. He studied his manuals with such ardour and assiduity, that the pedlar, upon returning from his excursion, was quite confounded at his progress; and looked upon him as so marvellous a genius, that he proceeded forthwith to draw his horoscope (to speak in the language of the art), or, in other words, to calculate the position of the planets on the day he was born, in order that he might ascertain the exact destiny in store for him. He predicted, that in two years more his miraculous pupil would actually turn out a greater philosopher than himself. After this, it cannot surprise us that our young aspirant should give himself to his occult studies with greater devotion than ever; and he very soon, in fact, commenced business as fortune-teller on his own account, and rapidly rose in reputation in that capacity until he became the oracle of the whole neighbourhood. He now gave up working as a weaver; but, to occupy his leisure, he added to his principal profession that of a schoolmaster: so that, his gains being now considerable, he looked upon himself as in the secure high-road to prosperity, and accordingly took to himself a wife in the person of his landlady, the tailor's widow. This was an extraordinary match; for, if the account commonly given of the lady be correct, which makes her die in the year 1782 at the age of one hundred and two, she must have been at the time of this her second marriage about three times as old as her boy-bridegroom. Indeed, as we have already observed, she had (beside a daughter) a son by her former husband some years older than her new one. Nevertheless it is recorded that she presented the latter with two

successive additions to the family circle—the juvenile portion of which (excluding the father) now consisted, therefore, of four individuals.

It is necessary to mention these circumstances, in order to give a true picture of Simpson's situation at this period of his life, and of the multiplied difficulties through which he must have fought his way to the eminence he eventually attained. No starting-point for a literary career, one should think, could well be more awkward and hopeless than that of a man who, beside many other disadvantages, had already a family to maintain before he had almost commenced his education, and no other means of doing so except a profession which necessarily excluded him from any association with the literary world in general, much more effectually than if he had eaten the bread of the humblest or most menial industry. It was quite necessary, indeed, that, if he was ever to give himself a chance either of advancement or respectability, he should exchange his trade of a fortune-teller and conjuror for some more reputable vocation, even although it should be, at the same time, a more laborious and less lucrative one. This desirable result, in fact, was at last brought about by one of those accidents which so often in human life bring with them a temporary inconvenience only to turn a man into some path of permanent prosperity, which, but for this compulsion, he would have overlooked or never entered. Among the credulous persons who applied to Simpson to resolve, by his art, their doubts and misgivings touching the distant or the future, was a young girl, whose sweetheart, a sailor, was at the time at sea, and who wished to learn what he was about, either by having him presented to her in a vision, or by a conference with a spirit who might be able to give her the requisite information. It was resolved, therefore, to raise a spirit; and, for this purpose, a confederate of the conjuror was attired in certain terrific habiliments, and concealed among a quantity of straw in the corner of a hay-loft, that he might step forth on due invocation. The sublime, however, had been carried a little too far in the decoration of this figure; for so passing hideous was the apparition, that it actually drove the poor girl almost out of her senses, and sent her off in such a state of illness and distraction that for some time her life was despaired of. The popular feeling was so strongly excited against Simpson by this misadventure, that he was obliged to leave that part of the country altogether; upon which he fled to the town of Derby, about thirty miles distant, determined to have nothing more to do with conjuring. Here he wisely returned to his original occupation of a weaver; and, joining to his labours at the loom during the day the teaching of a school at night, contrived for some time, though with much difficulty, to earn in this way a scanty subsistence for himself and his family.

It was during his residence at Derby, amid the fatigues of hard and unceasing labour, and the cares and vexations of poverty, that this re-

markable man made his most important advances in scientific knowledge. His principal source of information was the "Ladies' Diary," of which he was a regular and attentive reader. It was in this publication that he found the first notices he had met with of that branch of mathematical learning called Fluxions, or the Differential Calculus, the recent discovery of Sir Isaac Newton and Leibnitz; although they scarcely informed him of more than its name, and its immense importance in all the higher investigations of mathematics. But this was enough for such a mind as his. He determined to make himself master of the subject, and could not rest until he had possessed himself of the means of commencing the study of it. The only treatise on fluxions which had at that time appeared in English was a work by an author of the name of Hayes; but it was a dear and somewhat scarce book, so that he found it impossible to procure a copy of it. Fortunately, however, in the year 1730 appeared Edmund Stone's translation of the Marquis de l'Hôpital's French work on the subject. This Simpson borrowed from a friend; and, immediately setting about the study of it with his characteristic ardour, prosecuted it with so much success that he not only made himself in a short time familiar with the new science, but qualified himself to compose a work of his own upon it, which, when published a few years after, turned out to be much more complete and valuable than either that of Hayes or that of Stone. When he had finished this performance, he set out for London, leaving his wife and family in the mean time at Derby. He reached the capital without even a letter of introduction, and with scarcely anything except his manuscript in his pocket. He was at this time in his twenty-fifth or twenty-sixth year. Having established himself in humble lodgings in the neighbourhood of Spitalfields, he maintained himself in the first instance, as he had been wont to do in the country, by working at his trade during the day, while he employed his evenings in teaching mathematics. His engaging method of instruction, and admirable talent for explaining and simplifying the difficulties of his subject, in a short time procured him notice and friends; and his success was at last so considerable, that he was enabled to bring his family to town. He now also ventured to announce the publication of his "Treatise of Fluxions," by subscription; and it accordingly appeared, in a quarto volume, in the year 1737. From this era, his fortunes and his celebrity went on steadily advancing. But the most remarkable and honourable part of his history is that which recounts his unwearied exertions as a writer on his favourite subjects, after he had acquired a station and a regular income, as well as a degree of distinction, which would have satisfied the ambition and relaxed the industry of many others whose early struggles had been so severe as his. We will just note the dates of his different publications. In 1737, as we have already observed, appeared his

“New Treatise of Fluxions.” In 1740 he produced two other works also in quarto: the first entitled “A Treatise on the Nature and Laws of Chance;” the second, “Essays on several curious and interesting Subjects in Speculative and Mixed Mathematics.” In 1742 appeared his “Doctrine of Annuities and Reversion.” In 1743, he was, principally through the interest of Mr. Jones, father of the celebrated Sir William Jones, and himself an able mathematician, appointed Professor of Mathematics at Woolwich: and the same year he gave to the world a large volume, entitled “Mathematical Dissertations.” In 1745 he was admitted a fellow of the Royal Society, on a recommendation signed by four of the most eminent mathematicians in England; and about the same time he published his “Treatise on Algebra,” one of the most valuable and best known of his productions. His “Elements of Geometry,” another very able work, which has gone through many editions, appeared in 1747; his “Trigonometry, Plane and Spherical,” in 1748; a new work on the differential calculus called “The Doctrine and Application of Fluxions,” in 1750; in 1752, his “Select Exercises for Young Proficients in Mathematics,” another excellent and most useful performance; and finally, in 1757, his “Miscellaneous Tracts.” To all these labours are to be added the papers he published in the Philosophical Transactions, and his contributions to the “Ladies’ Diary,” of which he was for several years the editor. He died in 1761, in his fifty-first year.

Here, then, is an inspiring example, showing how a man may triumph over almost any outward circumstances. Nor let it be said that such victories are reserved only for persons of extraordinary intellectual powers. We repeat that it is not genius, but resolution and perseverance, that are wanted. Simpson was not a man of much original or inventive talent; nor did he possess any quality of mind which would have made him one of the wonders of his time, if he had set out in life with the ordinary advantages. His writings are all able, generally useful, and sometimes ingenious; but he is not to be enumerated among those who have carried science forward, or materially assisted in any of its great conquests. Not that he was, in point of even of mental capacity, by any means an ordinary man; but there is an immeasurable interval between such men as Simpson and those whose writings and discoveries are destined to influence and mould their own and all succeeding ages. His chief talent was great clearness and quickness of apprehension; and very much of this he owed to the eagerness and devotion with which he gave himself up to the study of whatever he wished to make himself master of, and the unrelaxed attention which he was consequently enabled to apply to it. This, indeed, is rather a habit of mind which may be acquired, than a talent that one must be born with; or at least it depends much more than many other sorts of talent on those moral qualities which may be excited and strengthened by the proper

discipline in every man. It was here that Simpson's superiority principally lay—in that passionate love of knowledge which prompted him to seek it in defiance of all impediments, and in that courage and perseverance with which he encountered and overcame, in this pursuit, a succession of difficulties which many would scarcely have had nerve enough to look in the face. Among those born in the same rank of life to which he originally belonged, there are, undoubtedly, at all times, numbers who occasionally feel something of the ambition that animated him, and would at least be very glad if, without much trouble, they could secure for themselves the profit and power and enjoyment attendant upon intellectual cultivation. But the desire dies away in them, and ends in nothing, because they have not fortitude enough to set earnestly and resolutely about combating the obstacles which oppose its gratification. These obstacles appear, to their indolence and timidity, far more formidable than they really are. There are few cases in which they can be actually combined in greater force than they were in that of him whose history we have just sketched. It may be hoped that it does not often happen, in the present day, that a parent shall either deny his child an education which it is in his power to procure for him, or obstinately oppose his most praiseworthy efforts in the work of self-improvement. Instruction in the elements of learning, in reading, writing, and the rudiments of arithmetic, may be said to be, in our own country, within the reach of all; so that even the son of the poorest artisan or labourer has scarcely now, in any case, to begin life unprovided with what we may call the great pass-keys to all literary and scientific knowledge. Thus accoutred, his future progress depends upon himself; and any degree of proficiency is within his reach. Let those who doubt this reflect on what Thomas Simpson accomplished, in circumstances almost as unfavourable as can well be imagined. His first acquaintance with books was formed during moments stolen from almost incessant labour, and cost him his domestic peace, the favour of his friends, and finally, the shelter of his father's roof. He never had afterwards either any master to instruct him, or any friend to assist him in providing for the necessities of the passing day; but, on the contrary, when he wished to make himself acquainted with any new subject, he could with difficulty find a book out of which to study it, and had a family to support at an age when many have scarcely begun even to maintain themselves. Yet, with both his days and his evenings employed in toiling for a subsistence, he found time for intellectual acquisitions, such as to a less industrious and ardent student would have sufficed for the occupation of a whole life. Here is a striking proof how independent we really are, if we choose, of those external circumstances which seem to make so vast a difference of situation between man and man; and how possible it is for us, in any situation, at least to enrich our

minds, if fortune refuse us all other riches. It is the general ignorance of this great truth, or indifference to it, that prevents it from being oftener exemplified; and it would be rendering a high service to the human species, if we could awaken men's minds to a sufficiently lively trust in it, and a steady sense of its importance.

To this history we may append that of EDMUND STONE, from whose translation of the Marquis de l'Hôpital's French treatise it was, as we have seen, that Simpson acquired his first knowledge of fluxions. Stone affords us another instance of a self-educated mathematician. Neither the place nor the time of his birth is exactly known; but he was probably a native of Argyllshire, and born a few years before the close of the seventeenth century. He is spoken of as having reached an advanced age in 1760, and he died in 1768. The only account we have of his early life is contained in a letter, which is to be found prefixed to a French translation of one of his works, from his contemporary, the Chevalier Ramsay, who knew him. His father, Ramsay tells us, was gardener to the Duke of Argyll, who, walking one day in his garden, observed a Latin copy of Newton's "Principia" lying on the grass, and thinking it had been brought from his own library, called some one to carry it back to its place. "Upon this," (the narrative proceeds), "Stone, who was then in his eighteenth year, claimed the book as his. 'Yours!' replied the Duke. 'Do you understand Geometry, Latin, and Newton?' 'I know a little of them,' replied the young man. The Duke was surprised; and having a taste for the sciences he entered into conversation with the young mathematician. He asked him several questions; and was astonished at the force, the accuracy, and the candour of his answers. 'But how,' said the Duke, 'came you by the knowledge of all these things?' Stone replied, 'A servant taught me, ten years since, to read. Does one need to know anything more than the twenty-four letters in order to learn everything else that one wishes?' The Duke's curiosity redoubled: he sat down on a bank, and requested a detail of the whole process by which he had become so learned.

"'I first learned to read,' said Stone; 'the masons were then at work upon your house. I approached them one day, and observed that the architect used a rule and compasses, and that he made calculations. I inquired what might be the meaning and use of these things, and I was informed that there was a science called arithmetic. I purchased a book of arithmetic, and I learned it. I was told there was another science called geometry; I bought the necessary books, and I learned geometry. By reading, I found that there were good books in these two sciences in Latin; I bought a dictionary, and I learned Latin. I understood, also, that there were good books of the same kind in French; I bought a dictionary, and I learned French. And this, my lord, is what I have

done ; it seems to me that we may learn everything when we know the twenty-four letters of the alphabet.' ”

Under the patronage of the Duke of Argyll, Stone, some years after this, made his appearance in London, where, in 1723, he published his first work—a “Treatise on Mathematical Instruments,” principally translated from the French. In 1725 he was chosen a Fellow of the Royal Society. Next year appeared his *Mathematical Dictionary*, which was followed by other occasional productions down to the year of his death. Of his private history, however, after he took up his residence in the metropolis, little or nothing is known. It is to be feared that he spent his latter days in neglect and poverty. He had contributed several papers to the *Transactions of the Royal Society* ; but we find his name omitted in the list of members, after the year 1742, probably in consequence of his inability to pay the small annual contribution which, we may remark by-the-by, was a few years after remitted to Simpson, and which Sir Isaac Newton had, on his own petition, been excused from paying. He is spoken of, by a writer in the *Critical Review* for 1760, as of unblemished reputation ; and yet, notwithstanding his universally acknowledged abilities, and his uncontested services to the public, “living, at an advanced age, unrewarded, except by a mean employment that reflects dishonour on the donors.” Ramsay, in the letter already quoted, speaks in the strongest terms of Stone’s simple, ingenuous, and upright character, and of his ardent and disinterested attachment to science. He was, however, by no means a man of the same powers of mind with Simpson. Even in those departments of learning in which he chiefly excelled, his knowledge appears to have been somewhat superficial ; and his principal works have been characterized as abounding in errors. He seems, upon the whole, to have had rather a quick and active, than either a very profound or a very acute understanding ; and some of his speculations are singularly unphilosophical, especially that contained in the last work he gave to the world, in which he attempts to expose the insufficiency of the proofs on which the spherical form of the earth has been assumed, arguing, with incredible absurdity, that it is just as likely to be an angular figure—as if the waters of the sea, for example, could anywhere maintain themselves in a position like that of the rafters of a house. We may, perhaps, trace something of all this to the entirely unassisted and solitary efforts to which he owed his first acquaintance with science and literature. A want of depth and solidity is by no means the necessary or uniform characteristic of the attainments of the self-educated scholar ; who, on the contrary, is apt to be distinguished for a more than usually perfect acquaintance with the subjects which he has probably studied with more than usual effort and application. But a mind gifted in a remarkable degree with the capacity of rapid apprehension is the kind of mind that is likely to suffer most from being left to be altogether

its own instructor; and especially when placed in circumstances which shut it out from that most salutary and strengthening of all intellectual exercises, communication and encounter with other intellects. This was Stone's case. He had not only no master, but no companion in his studies—no one even to put his knowledge to the proof, or with whom, by trying it, as it were, in conflict, he might discover either its strength or its weakness. Then, his facility in possessing himself of the outlines of a subject deceived and betrayed him: he skimmed its surface with so much ease and expedition, that he had no time to think what was beneath, or that anything was beneath; and thus he acquired a habit of precipitate procedure, and vague and unphilosophic thinking, in all his speculations. If he had had a few associates in his early pursuits, he probably would have escaped all this, as well as some other deficiencies and inaptitudes under which he laboured during his life.

Nothing can be more barbarous than the ambitious rhetoric of the self-taught mathematician's English style. He is talking, in the second edition of his book on *Mathematical Instruments*, published in 1760, of a newly-invented mariner's compass; and the following are the terms in which, at the close of his description, he expresses what must be understood, we presume, to be his unfavourable opinion of the contrivance: "The plants and trees of the gardens of the arts and sciences, cultivated by the *dung* of ambition, and nourished with the *waters* of interest, are very subject to be blasted by the *winds* of error, and sometimes stunted by the *weeds* of imposition." The metaphors of genuine eloquence start forth finished and glowing from the imagination; this is to construct them, as a mason does the wall of a house, with a plummet and a trowel.

Edmund Stone must not be confounded with his countryman and contemporary, JEROME STONE, who was also, in great part, a self-educated man. The only notice we have of his life is in Sir John Sinclair's *Statistical Account of Scotland*, where we are told that he was born, in 1727, in the parish of Scoonie, in Fife, and that his father was a seaman, who died abroad when Jerome was only three years old, leaving his widow to maintain herself and her young family in the best way she could by her own exertions. Elementary education in Scotland, however, has long been so cheap as to be within the reach of the poorest; and Jerome was accordingly taught reading, writing, and a little arithmetic, at the parish school. But in his mother's narrow circumstances it was necessary that he should, as soon as possible, do something for his own support; and therefore, while yet hardly more than a boy, he commenced travelling the country as a chapman or pedlar, with a miscellaneous assortment of trinkets, tapes, and other portable wares. He soon, however, found this occupation intolerably unintellectual; and converted his stock into books, with which he used to attend at fairs, in

those days the great marts of all kinds of popular commerce in Scotland. Profiting by the opportunities of his new vocation, he now proceeded to make himself a scholar; and either from a predilection for theological learning, natural to the Scottish peasantry in general, or from an idea that he was in this way beginning at the beginning, he commenced his studies with the Hebrew language. In this, unassisted by any instructor, he attained such proficiency, as to be able to read the Old Testament with ease. Encouraged by this success, he next applied himself to Greek; and in a short time made himself as familiar with the original of the New Testament as he was with that of the Old. All this time he knew nothing of Latin; but finding that all the best books even on the Greek and Hebrew were written in that language, he determined to acquire it also. It is probable, though it is not so stated, that he had obtained much of his knowledge of the two sacred tongues through the medium of the common translation of the Bible: no dictionary of either, with the words interpreted in English, was, we believe, as yet in existence. Possibly, when he proposed to make himself master of Latin, he might not be aware that the same resource was still open to him; nor, indeed, was it open in the same degree, as the English Bible does not correspond so exactly to any Latin version of the Scriptures as it does to the Greek and Hebrew originals. At all events he thought it necessary, we are told, to apply on this occasion to the parish schoolmaster. Under this master's guidance his Latin studies proceeded so prosperously, that he soon became known in the neighbourhood as a prodigy of learning. Fortunately, among the heritors, or landed proprietors, of the parish was the Rev. Dr. Tullidolph, Principal of the United College in the University of St. Andrew's, and a gentleman of distinguished erudition and talent. Struck with the remarkable abilities and acquirements of young Stone, he proposed his removal to the university, where he undertook that such provision should be made, in order to enable him to pursue his studies, as his circumstances required. Stone accordingly proceeded to St. Andrew's, where he soon more than fulfilled the expectations his early attainments had excited, both by his rapid progress in every branch of study, and by a display of talent out of the class-room, which still more contributed to make him the pride of the university and the idol of his fellow-students. Unhappily, the remainder of his history is too soon told. When he had been about three years at college, he was appointed, on the recommendation of the professors, assistant in the grammar-school of Dunkeld; and in two or three years after he was elected head master. It does not appear how long he held this situation; but he was in the midst of his literary pursuits, and giving every promise of a distinguished career, when he was suddenly cut off by fever, in 1757, in the thirtieth year of his age. At this time, none of his productions had been given to the world, except some humorous pieces in verse, which had

appeared in the Scots Magazine, when he was at college. Since his death, an allegory, which he left in manuscript, entitled "The Immortality of Authors," has been frequently printed. The work, however, which had principally engaged the last years of his short life, was "An Inquiry into the Origin of the Nation and Language of the Ancient Scots, with Conjectures about the Primitive State of the Celtic and other European Nations." This, although unfinished, is said to have displayed extraordinary ingenuity and learning. It has never, we believe, been printed; although, if the manuscript be still in existence, its publication might not be unacceptable to the students of history and philology, with whom the subject to which it relates has long been one of high interest. Stone's views, in so far as they are stated, seem to have been in conformity with those supported by the most learned and enlightened of later inquirers.

CHAPTER VII.

PURSUIT OF KNOWLEDGE UNITED WITH THAT OF BUSINESS: CICERO;
 SIR WILLIAM JONES; JULIUS CÆSAR; FREDERICK THE GREAT; SULLY;
 DE THOU; BACON; CLARENDON; SELDEN; HALE; GROTIUS.

IN general, even with those who have had the ordinary advantage of education in their earlier years, only a very limited portion of time can be given to the pursuit of knowledge in after life. Yet it is wonderful how much has been sometimes done in this way by those whose leisure has been the scantiest. The cultivation of science and literature has



CICERO.—FROM AN ANTIQUE BUST.

often been united with the most active and successful pursuit of business, and with the duties of the most laborious professions. It has been said of CICERO, that "no man whose life had been wholly spent in study,

ever left more numerous or more valuable fruits of his learning in every branch of science and the polite arts—in oratory, poetry, philosophy, law, history, criticism, politics, ethics; in each of which he equalled the greatest masters of his time; in some of them excelled all men of all times. His remaining works, as voluminous as they appear, are but a small part of what he really published. His industry was incredible, beyond the example or even conception of our days: this was the secret by which he performed such wonders, and reconciled perpetual study with perpetual affairs. He suffered no part of his leisure to be idle, or the least interval of it to be lost." These are the words of his learned and eloquent biographer, Dr. Middleton. He says himself in one of his orations:—"What others give to their own affairs, to the public shows and other entertainments, to festivity, to amusement, nay, even to mental and bodily rest, I give to study and philosophy." He tells us, too, in his Letters, that on days of business, when he had anything particular to compose, he had no other time for meditating but when he was taking a few turns in his walks, where he used to dictate his thoughts to his amanuenses, or scribes, who attended him. His Letters afford us, indeed, in every way, the most remarkable evidence of the active habits of his life. Those that have come down to us are all written after he was forty years old; and, although many of course are lost, they amount in number to about a thousand. "We find many of them," says Middleton, "dated before daylight; some from the senate; others from his meals, and the crowd of his morning levee." "For me," he himself exclaims, addressing one of his friends, "*ne otium quidem unquam otiosum*—even my every moment of leisure has its occupation."

In modern times the celebrated SIR WILLIAM JONES afforded the world, in this respect, the example of almost another Cicero. We have already mentioned his wonderful attainments in languages. All his philosophical and literary studies were carried on among the duties of a toilsome profession, which he was, nevertheless, so far from neglecting, that his attention to all its demands upon his time and faculties constitutes one of the most remarkable of his claims to our admiration. But he was from his boyhood a miracle of industry, and showed, even in his earliest years, how intensely his soul glowed with the love of knowledge. He used to relate that, when he was only three or four years of age, if he applied to his mother, a woman of uncommon intelligence and acquirements, for information upon any subject, her constant answer to him was, "Read, and you will know." He thus acquired a passion for books, which only grew in strength with increasing years. Even at school his voluntary exertions vied in amount with his prescribed tasks; and Dr. Thackeray, one of his masters, was wont to say of him, that he was a boy of so active a mind, that if he were left naked and friendless on Salisbury Plain, he would, nevertheless, find the road to fame and

riches. At this time he was frequently in the habit of devoting whole nights to study, when he would generally take coffee or tea, to keep off sleep. He had, even already, merely to divert his leisure, commenced his study of the law; and it is related that he would often amuse and surprise his mother's legal acquaintances by putting cases to them from an abridgment of Coke's Institutes, which he had read and mastered. In after-life his maxim was never to neglect any opportunity of improvement which presented itself. In conformity with this rule, while making the most wonderful exertions in the study of Greek, Latin, and the Oriental languages, at Oxford, he took advantage of the vacations to learn riding and fencing, and to read all the best authors in Italian, Spanish, Portuguese, and French; thus, to transcribe an observation of his own, "with the fortune of a peasant, giving himself the education of a prince." In the same spirit, while tutor, some time after this, in the family of Lord Spencer, he embraced an opportunity of accomplishing himself in dancing and the use of the broadsword, and of learning the German language, music, and the art of playing on the Welsh harp, the instrument of his country. It was while residing in the Temple, and busily engaged in the study of the law, that, besides continuing his Oriental studies with great zeal, he found time to compose, and prepare for the press, a translation of the speeches of the Greek orator Isæus, and a volume of poems. Yet he was, at this very time, both reading and writing elaborately on subjects of law and jurisprudence—an evidence of his proficiency in which he gave to the world, a few years after, in his learned Treatise on the Law of Bailments. He found leisure, too, in the midst of all these professional and literary occupations, to attend Dr. William Hunter's Lectures on Anatomy, and to prosecute the study of mathematics so far as to be able to read Newton's Principia.

In India, where he filled the office of Judge in the Supreme Court of Bengal, and where his professional duties were of the most laborious nature, he contrived to do nearly as much as ever in the study of general literature and philosophy. He had scarcely arrived in the country when he exerted himself to establish a society in Calcutta, on the model of the Royal Society of London, of which he officiated as president as long as he lived, enriching its Transactions every year with the most elaborate and valuable disquisitions on some one department or another of Oriental philology and antiquities. Almost his only time for study now was during the vacation of the courts; and here is the account, as found among his papers, of how he was accustomed to spend his day during the long vacation in 1785. In the morning, after writing one letter, he read ten chapters of the Bible, and then studied Sanscrit grammar, and Hindoo law; the afternoon was given to the geography of India, and the evening to Roman history; when the day was closed by a few games at chess, and the reading of a portion of

Ariosto. Already, however, his health was beginning to break down under the climate; and his eyes had become so weak, that he had been obliged to discontinue writing by candle-light. But nothing could prevent him from pursuing the studies he loved, while any strength remained to him. Even while confined by illness to his couch, he taught himself botany; and it was during a tour he was advised to take for the recovery of his health, that he wrote his learned "Treatise on the Gods of Greece, Italy and India"—as if he had actually so disciplined his mind, that it adopted labour like this for relaxation. His health, after a time, was partially restored; and we find him again devoting himself both to his professional duties and his private studies with more zeal and assiduity than ever. When business required his attendance daily in Calcutta, he resided at a country house on the banks of the Ganges, about five miles from the city. "To this spot," says his amiable and intelligent biographer, Lord Teignmouth, "he returned every evening after sunset, and in the morning rose so early as to reach his apartments in town, by walking, at the first appearance of dawn. The intervening period of each morning, until the opening of court, was regularly allotted and applied to distinct studies." At this time his hour of rising used to be between three and four. During the vacation of the court he was equally occupied. Writing from Crishna, his vacation residence, in 1787, he says, "We are in love with this pastoral cottage; but though these three months are called a vacation, yet I have no vacant hours. It rarely happens that favourite studies are closely connected with the strict discharge of our duties, as mine happily are: even in this cottage I am assisting the court by studying Arabic and Sanscrit, and have now rendered it an impossibility for the Mahometan or Hindoo lawyers to impose upon us with erroneous opinions." It was these constant exertions, in truth, that gave its chief enjoyment to his life. "I never was happy," he says in this very letter, "till I was settled in India."

This eminent and admirable man, however, at last fell a sacrifice to his zeal in the discharge of his duty; and, if it has been accounted a befitting fate for a great captain to die in the field of battle, surely his is to be deemed no unenviable lot who, after a life, whether of many or of few years, in which he has done enough for his fame, sinks to his rest in the full brightness of a career made glorious by many peaceful triumphs. The greatest literary achievement of Sir William Jones was his last—the digest he undertook to superintend of a complete body of Hindoo and Mahometan jurisprudence. To this work, considered by him as of the very highest importance to the right administration of law in India, but encompassed, from a variety of causes, with difficulties of the most formidable description, he resolved, after long consideration, to devote himself, even under increasing weakness of sight, and probably a

general decay of constitution, which a fervid and unwearied spirit did not permit him to perceive. In the midst of his labours, it was found necessary that Lady Jones should proceed to England for the sake of her health; and this separation he felt severely: but he determined, notwithstanding, to remain in the country himself until he should have finished at least a certain portion of the task on the accomplishment of which he had set his heart. He had been divided, however, but a few months from the companion of his life, and of many of his studies, when he was suddenly attacked by an inflammation of the liver, which carried him off, after seven days' illness, at the early age of forty-seven.

It was by a persevering observance of a few simple maxims, that Sir William Jones was principally enabled to accomplish what he did. One of these, as we have already mentioned, was never to neglect an opportunity of improvement: another was, that whatever had been attained was attainable by him, and that, therefore, the real or supposed difficulties of any pursuit formed no reason why he should not engage in it, and with perfect confidence of success. "It was also," Lord Teignmouth tells us, "a fixed principle with him, from which he never voluntarily deviated, not to be deterred, by any difficulties which were surmountable, from prosecuting to a successful termination what he had once deliberately undertaken." "But what appears to me," adds his lordship, "more particularly to have enabled him to employ his talents so much to his own and the public advantage, was the regular allotment of his time to particular occupations, and a scrupulous adherence to the distribution which he had fixed: hence all his studies were pursued without interruption or confusion. Nor can I omit remarking the candour and complacency with which he gave his attention to all persons, of whatever quality, talents, or education; he justly concluded that curious or important information might be gained even from the illiterate; and, wherever it was to be obtained, he sought and seized it." By these methods it was that he accumulated that vast mass of knowledge, and enabled himself to accomplish those profound and extended labours, which remain, even now that he is dead, for the benefit of us who yet live, and of those who are to come after us. This is truly to make a short life long—to exist, in spite of death, for unnumbered generations.

Biography abounds, in truth, with examples of the union of the pursuits of literature and science with those of every department of active life. The most elegant of the writers of ancient Rome was also the most renowned of her warriors. It was amid the hurry and toils of his campaigns that JULIUS CÆSAR must have written those *Commentaries*, or *Memoirs* of his military exploits, which have immortalized his name more than all his victories, and thus amply justified the anxiety he is recorded to have shown to preserve the work, when, being obliged to

throw himself from his ship in the bay of Alexandria, and swim for his life, he made his way to the shore with his arms in one hand, and holding his Commentaries with his teeth. Cæsar distinguished himself also as a writer on grammar, astronomy, history, and a variety of other subjects; and he was universally accounted one of the most learned scholars, as



JULIUS CÆSAR. FROM A COIN.

well as greatest orators, of his age. Yet his life was spent either in the field, or among political convulsions at home, almost from his boyhood. If he found time and tranquillity for the cultivation of letters, who is there that might not? Like our own Alfred, too—another illustrious instance of the hero, statesman, and scholar, all in one—Cæsar had to struggle all his life with the weakness and depression of bodily disease. “But though he was a spare man,” says Plutarch, “and had a white and soft skin, somewhat distempered in his head, and subject to the falling sickness (which, they say, first seized him at Corduba, in Spain), yet he did not make his indisposition of body a pretext for effeminacy, but made his wayfaring a medicine for his infirmity, whilst, by indefatigable journeying, thin diet, and lying out in the fields, he struggled and waged war, as it were, even with his disease, and kept his body so guarded by this means, that it was very hard for any ill to attack him. He slept most commonly in his chariot or his litter, but employed the very hours of rest in the designs of action. In the daytime he was carried about to castles, cities, or fortifications, with one servant along with him in the chariot, who, among other things, used to write down what he dictated, and a soldier behind the vehicle to carry his sword. Thus would he travel so swiftly, that, having set out from Rome, he would arrive at the river Rhone in eight days. Now, he rode well from his childhood, for he had accustomed himself to sit with his hands behind him, and to put the horse to the full speed. But, during his wars in Gaul, he improved himself so as to dictate letters from on horse-

back as fast as two amanuenses, or, as Oppius affirms, more than two, could take down his words."

The elder and younger Scipio Africanus, and Polybius, the friend of the latter, of whose *Universal History*, written in Greek in forty books, only five have come down to us, are other names that might be quoted from ancient times in illustration of how possible it is to combine the habits of a military life with the love and the pursuit of literature. One of the most remarkable examples of this combination which modern history supplies is to be found in FREDERICK II., of Prussia, best known as Frederick the Great. The principal part of the life of this monarch was spent in the camp, in a constant struggle with a host of enemies. Yet, even then, when the busy day scarcely afforded a vacant moment, that moment, if it came, was sure to be given to study. Frederick had very early formed an attachment to reading, which neither the opposition of his father, who thought that the scholar would spoil the soldier, nor the schemes of ambition and conquest which



FREDERICK II. OF PRUSSIA.

occupied him so much in after life, were able to destroy or weaken. When at last, therefore, he found himself at liberty, or compelled, to sheathe the sword, he gave himself up to the cultivation and patronage of literature, and the arts of peace, as eagerly as he had ever done to the pursuit of military renown. His life, from his earliest years, had

been one of great and regular activity. Even before his accession to the throne, and while yet but a young man, he had established in his residence, at Rheinsberg, nearly the same system of studious application, and economy in the management of his time, to which he ever afterwards continued to adhere. His relaxations, even then, were almost entirely of an intellectual character; and he had collected around him a circle of literary associates, with whom it was his highest enjoyment to spend his hours in philosophic conversation, or in amusements not unfitted to adorn a life of philosophy. In a letter written at this time to one of those friends, he says: "I become every day more covetous of my time; I render an account of it to myself; and I lose none of it but with great regret. My mind is entirely turned toward philosophy; it has rendered me admirable services, and I am greatly indebted to it. I find myself happy, abundantly more tranquil than formerly; my soul is less subject to violent agitations; and I do nothing till I have fully considered what course of action I ought to adopt." In another letter to the same correspondent, speaking of the employments of himself and the literary friends residing with him, he says: "We have divided our occupations into two classes, of which the one comprehends those that are useful, and the other those that are agreeable. I reckon, in the number of those that are useful, the study of philosophy, of history, and of languages: the agreeable are music, and the tragedies and comedies that we exhibit here. Our serious occupations have, however, always the privilege of preceding the others; and I dare venture to affirm to you, that we make only a reasonable use of those pleasures; engaging in them for no other purpose but to relax our minds, and to temper that moroseness and extreme philosophic gravity, which does not easily suffer its countenance to be enlivened by the Graces." A more complete notion, however, will be obtained of the management by which he contrived to make so much use of his time, from the following interesting account of his daily occupations, which Dr. Towers, who has written a history of his reign, has collected from a variety of authorities:—

"It was his general custom to rise at five o'clock in the morning, and sometimes earlier. He commonly dressed his hair himself, and seldom employed more than two minutes for that purpose. His boots were put on at his bedside, for he scarcely ever wore shoes. After he was dressed, the adjutant of the first battalion of his guards brought him a list of all the persons that were arrived at Potsdam, or departed from thence, and an account of whatever had occurred in the garrison. When he had delivered his orders to this officer, he retired into an inner cabinet, where he employed himself in private till seven o'clock. He then went into another apartment, where he drank coffee or chocolate; and here he found upon the table all the letters addressed to him from Potsdam,

Berlin, or any other parts of his dominions. Foreign letters were placed upon a separate table. After reading all these letters, he wrote hints or notes in the margin of those which his secretaries were to answer; and then returning into the inner cabinet, carried with him such as he meant to write or dictate an answer to himself. Here he employed himself till nine o'clock with one of his private secretaries. He then returned back again into his former apartment, where he was attended by three secretaries, each of whom gave him an account of what he had done; after which the king delivered his orders to them, with the letters they were to answer. None of these answers, however, were sent off till they had been read, and many of them signed by the king. At ten o'clock the generals who were about his person, whom he was accustomed to send for in their turn, attended him to his closet, where he conversed with them on the news of the day, politics, tactics, and other subjects; and at this time he also gave audience to such persons as had received previous notice to attend. At eleven o'clock he mounted his horse, and rode to the parade, where he reviewed and exercised his regiment of guards; and 'at the same hour,' says Voltaire, 'all the colonels did the same throughout the provinces.' He afterwards walked for some time in the garden, with his generals and the rest of the company whom he had invited to dine with him. At one o'clock, he sat down to dinner, and his company generally consisted of the princes his brothers, some of his general officers, some of the officers of his regiment of guards, and one or two of his chamberlains. He had no carver, but did the honours of the table himself, like a private gentleman. His table generally consisted of twenty-four covers; and his dinner-time did not much exceed an hour. After dinner he generally conversed with some of his guests for about a quarter of an hour, walking about the room. He then retired into his private apartment, making low bows to his company. He remained in private till five o'clock, when his reader waited on him. His reading lasted about two hours, and this was succeeded by a concert, in which he himself was a performer upon the flute, and which lasted till nine. When the concert was over he was attended by Voltaire, Algarotti, Maupertuis, or some other wits or favourites whom he had invited. With these he supped at half an hour after nine, and his company seldom consisted of more than eight persons, the king himself included. At twelve the king went to bed."

The literary works of Frederick will be at least allowed to show some industry, when it is stated that they extend, in the most complete edition, to no fewer than twenty-five octavo volumes—quite a wonderful amount of authorship, certainly, for one who led so busy a life, and strikingly illustrative of what may be done by the economical employment even of the merest odds and ends of time: for, compared to the leisure which many a student enjoys, such must be considered the very

few hours every day, which were the utmost that Frederick could by possibility have given to study. But these works by no means require any apology for their quality on the score of their quantity. They consist of historical, poetical, and philosophical compositions—all of respectable ability, and several of considerable merit. His poem, entitled “The Art of War,” his “History of his own Times,” that of “The Seven Years’ War,” and his “Memoirs of the House of Brandenburg,” may be especially mentioned as works received into European literature.

It would be easy to select from the catalogue of those who have made the greatest stir in the world, either as conquerors or legislators, or borne the most active and conspicuous parts in any other way in the conduct of human affairs, many other names equally famous in the annals of literature, as in those of war or politics. In former times, indeed, a taste for science or general literature, and a familiarity with it, was more common among European statesmen, and professional men of all descriptions, than it now is. There is no greater name among those of the statesmen of France than that



BACON.

of the celebrated Duke of SULLY, the writer of the well-known Memoirs, as well as a variety of other works; and equally distinguished as a soldier, a financier, and an author. This great man used to find time for the multiplied avocations of every day by the most undeviating

economy in the distribution of his hours. He rose all the year round at four o'clock in the morning, and was always ready to appear at the council by seven. His hour of dining was at noon, after which he gave audience to all without distinction who sought to be admitted to him. The business of the day was always finished in this way before supper, and at ten he regularly retired to bed. Sully's illustrious countryman and contemporary, the President DE THOU (in Latin THUANUS), affords us another instance of the same sort. During the greater part of his life, De Thou was actively employed, in one capacity or another in the management of affairs of state; and yet he found time to write one of the greatest and most elaborate historical works in existence, his celebrated "History of his own Times," extending to one hundred and thirty-eight books, in Latin, besides various poetical pieces in the same language. In our own country, none were ever more mixed up with the political transactions of their times, or led busier lives from their earliest years than Sir THOMAS MORE, the great BACON, and Lord CLARENDON. And yet these are three of our most voluminous as well as most eminent writers. Other names that might be added are those of JOHN SELDEN and Sir MATTHEW HALE. Both were public men, and much



LORD CLARENDON.



SIR MATTHEW HALE.

involved in the ceaseless political convulsions of one of the stormiest periods of English history; yet they were two of the most distinguished luminaries both of the law and the literature of their day. Selden's works, which are partly in English, partly in Latin, and embrace many subjects of law, history, political controversy, and sacred, classical, and English antiquities, have been collected in six volumes folio. Those of Sir Matthew Hale are also very numerous; and relate to history, divinity, mathematics, and natural philosophy, as well as to several of the most important departments of the learning of his profession. He is said, during many years of his life, to have studied sixteen hours every day.

Selden is called *the glory of England* by his contemporary the celebrated Dutch scholar GROTIUS (or Groot), who was himself one of the

most remarkable instances on record of the success with which the cultivation of general literature may be carried on, in combination with legal and political studies, and even amid the toils and distractions of a public life of unusual bustle and vicissitude. From his sixteenth year, when he first appeared at the bar, till that of his death, at the age of sixty-two, Grotius was scarcely ever released from the burden of political employment, except while he lay in prison, or, altogether exiled from his country, wandered about from one foreign land to another in search of a temporary home. Yet, even in these seemingly most unpropitious circumstances, he produced a succession of works, the very titles of



SELDEN.

which it would require several pages to enumerate, all displaying profound erudition, and not a few of them ranking to this day with the very best, or as the very best, that have been written on the subjects to which they relate. He occupies a respectable place in the poetry of his native language, and a high one among modern Greek and Latin poets. His critical labours in reference to the classical authors of antiquity are immense. In history, besides several other works, he has written one entitled "The Annals of Belgium," in eighteen books. Of a variety of theological productions we may mention only his celebrated "Treatise on the Truth of Christianity," one of the most popular books ever written, and which has been translated, not only into almost every language of modern Europe, but even into Greek, Arabic, Persian, and several of the tongues of India. Finally, not to mention his other works in the same department, by his famous treatise on international law, entitled "On the Law of War and of Peace," he has established for himself an

immortal reputation in jurisprudence, not in his own country merely, but over all Europe, in every part of which the work was received, on its first appearance, with universal admiration, translated, commented upon, and employed as a text-book by all lecturers on the subject of which it treats. This work was written while Grotius resided in France, after making his escape from the castle of Loevenstein by a memorable stratagem. Having, in the religious disputes which then agitated Holland, taken the side of the Arminians in opposition to the Calvinists, when the latter obtained the ascendancy, he was put on his trial, convicted of treason, and sentenced to the confiscation of all his property, and imprisonment for life. As some mitigation, however, of so hard a doom, it was permitted that his wife should share his fate; and that excellent and heroic woman accordingly took up her abode with her husband in the fortress we have named, where they remained together for nearly two years. At last, however, Grotius resolved to brave the hazards of a plan of escape, which had been some time before suggested by his wife. He had been in the habit of borrowing books from some of his friends in the neighbouring town of Gorcum, and these were always brought to him in a large chest, which was in like manner employed to convey them back when he had read or consulted them. This chest had at first been regularly searched, as it was carried into and brought back from the apartment of the prisoner; but, after some time, its appearance on its customary service became so familiar to the guards, that their suspicions were lulled, and it was allowed to pass without notice. A day, therefore, having been chosen when it was known that the commandant was to be absent, Madame Grotius informed the commandant's wife, who was left in charge of the place, that she meant to send away all her husband's books, to prevent him from injuring his health by study, and requested that two soldiers might be allowed her to remove the load. In the meantime Grotius had taken his place in the chest, in the top of which small holes had been made for the admission of air. Upon lifting it from the ground, one of the soldiers, struck with its weight, jestingly remarked, that there must be an Arminian in it. "There are Arminian books in it," replied the wife of Grotius, with great presence of mind; and without saying anything more, they took it on their shoulders, and carried it down a ladder, which led from the apartment. It would appear, however, that their suspicions had been again awakened; for it is said, that before they had proceeded much further, the men resolved to mention the circumstance of its uncommon weight to the commandant's wife; but she, misled by what had been told her, ordered them to carry it away. It had been contrived to have a trusty female servant in waiting to accompany the chest to its place of destination, and under her care it was safely deposited in the house of a friend at Gorcum, when the illustrious prisoner was, of course, speedily

released from durance. A good deal of management, however, was still necessary to enable him to effect his escape from the town. It is gratifying to have to add, that his wife, who, as soon as she understood that her husband was safe, confessed what she had done, although at first detained in close custody, was liberated, on petitioning the States-General, about a fortnight after. It was on the 21st of March, 1621, that Grotius obtained his liberty; and he arrived in Paris on the 12th of April. His wife rejoined him about the end of December. It was after this, while he lived in retirement in France, under the protection of Louis XIII., that he prepared his great work on International Law, which was published in 1624. He survived till 1645.

Our distinguished living countryman, Mr. GROTE, the historian of Greece, though English not only by birth but by a descent of some generations, is originally of foreign extraction, and the family name is, we believe, the same with that of the great Dutch scholar. He is another illustrious example of how a life of study may be combined with one of business and of action. In addition to the affairs of the banking-house in which he is a partner, much of Mr. Grote's time and attention was taken up for some years by his duties as an active member of Parliament, representing one of the largest and most important constituencies in the kingdom; and yet, while still in the vigour of manhood, he has already completed what is certainly the most learned historical work that has been produced since that of Gibbon, and what may perhaps be accounted, upon the whole, the greatest achievement in prose literature that our age has seen.

CHAPTER VIII.

LITERARY SOLDIERS:—DESCARTES; BEN JONSON; BUCHANAN; CERVANTES.—SAILORS:—DAMPIER; DAVIS; DRURY; FALCONER; GIORDANI; FRANSHAM; OSWALD; COLUMBUS; COOK; VANCOUVER; COLLINGWOOD.

If the distractions of business or of professional duty are to be deemed an insurmountable bar to the cultivation of science or literature, what annoyances or interruptions of this description shall seem more unfavourable for such an attempt, than those which beset the rude and unsettled life of a seaman or a soldier! Yet it has been in the midst of these that some of the persons whose names are most distinguished in the annals of literature and philosophy have begun their career. The great French mathematician and metaphysician DESCARTES, who was a person of rank, entered the army in obedience to the wishes of his family, at the age of twenty, and served first with the troops of the

Prince of Orange, and afterwards with those of Maximilian of Bavaria. With the latter prince he was present at the battle of Prague, in 1620, when Maximilian, acting in concert with the Emperor, Ferdinand II., obtained a signal victory over the Elector Palatine, Frederick. During his military life, however, Descartes never neglected his philosophical studies, of which he gave a striking proof on one occasion while he was in the service of the Prince of Orange. He happened to be in garrison with his regiment at the town of Breda, in the Netherlands, when, walking out one morning, he observed a crowd of people assembled round a placard or advertisement which was stuck up on the wall. Finding that it was written in the Dutch language, which he did not understand, he inquired of a person whom he saw reading it, what it meant. The individual to whom he addressed his inquiries happened to be the Principal of the university of Dort, a man of distinguished mathematical attainments; and it was with something of a sneer that he informed the young officer that the paper contained the announcement of a difficult geometrical problem, of which the proposer challenged the most able men of the city to attempt the solution. Not repulsed by the tone and manner of the learned professor, Descartes requested to be favoured with a translation of the placard, which he had no sooner received than he calmly remarked that he thought he should be able to answer the challenge. Accordingly, next day he presented himself again before Beckmann (that was the name of the professor) with a complete solution of the problem, greatly to the astonishment of that individual, who had probably never before dreamed of the possibility of so much learning being found beyond the walls of a university.

It was at this period of his life, indeed, that this illustrious person laid the foundation of most of those mathematical discoveries which subsequently obtained for him so much celebrity. He wrote a Latin treatise on music, and projected several of his other works, during the time he was stationed at Breda.

Our celebrated countryman, BEN JONSON, whose employment in early life as a common mason or bricklayer has been already mentioned, could find no way of escaping from that laborious occupation, to which he had been doomed on his mother's second marriage, except by enlisting as a private soldier. Accordingly he served for some time against the Spaniards in the Netherlands, and gained a high reputation for personal prowess, of which he was in after life not a little vain. This was also the fate of the famous GEORGE BUCHANAN, one of the most elegant scholars and writers that modern times have produced—another illustrious evidence of how little it is in the power of the most unquiet and disjointed times, or the most adverse fortunes, to interrupt the intellectual pursuits of a mind really in love with knowledge. Scarcely any part of Buchanan's long life was passed either in leisure or tranquillity. He

was born in the county of Stirling in 1506. Although his family was good, his father was in straitened circumstances, and he was indebted for his education to the kindness of an uncle, who sent him to the university of Paris. The death of this uncle, after some time, left him in such a state of destitution, that, in order to get back to his native country, he was obliged to enter himself as a private in a corps which was leaving France to serve in Scotland as auxiliaries to the Duke of Albany. It would detain us too long to attempt any sketch of the remainder of



BEN JONSON.

a life of whose many troubles this was only the first commencement. Although, in point of learning and genius, confessedly without a rival among his countrymen, and even acknowledged by all Europe as the chief of the poets and eloquent writers of his day, it is melancholy to think, that, amid the civil discords of those unhappy times, his portion was little else than poverty, persecution, imprisonment, and exile. But his own mind, to borrow the expression of one of our old poets, was to him "a kingdom," of which the world's unkindness could not deprive him, and which he found, doubtless, under all he had to suffer, his sufficient consolation. He took refuge in literary labour from the cruel fortunes that pursued him. It was in a Portuguese dungeon that he composed his celebrated Latin version of the Psalms. He had just carried through the press his great work, "The History of Scotland," when, after a life of almost incessant trouble, he died at the age of seventy-six, being at the time in such a state of indigence, that when he felt his end approaching, having inquired of his servant how much money he had remaining, and finding that there was not enough for the expenses of his funeral, he ordered the whole to be given to the poor. He was accordingly buried at the cost of the city of Edinburgh.

Still more crowded with disasters is the history of the renowned

*Spanish writer CERVANTES, whose admirable Don Quixote ranks so high among the glories of modern literature. Cervantes, too, commenced life as a soldier. He lost his left hand fighting against the Turks at the battle of Lepanto, in 1571. Soon after this he was taken at sea by the Algerines, by whom he was detained in captivity for five years. Even after he had recovered his liberty, and had returned to his native country, he was again in a short time thrown into confinement by an unjust decision of the courts, in a cause in which he was implicated; and it was while he lay in prison that the first part of Don Quixote was written. He was, soon after the publication of this work, once more restored to freedom; but, although he afterwards produced various other literary performances, he never succeeded in raising himself above the necessitous circumstances in which his early misfortunes had involved him. The dedication of the last work he gave to the world is dated only four days before his death, and in it he mentions, with great calmness, his approaching dissolution. Cervantes died at the age of sixty-nine, on the 23rd of April, 1616. On the same day, nominally, but ten days later in reality (for in England we still reckoned by the old style), our own Shakespeare passed away from the earth at the age of fifty-two.

There are many cases on record of individuals who, even with scarcely any other education than what they contrived to give themselves while serving in subordinate and laborious situations in the camp or on ship-board, have attained to great familiarity with books, and sometimes risen to considerable literary or scientific distinction. The celebrated English navigator, DAMPIER, although he had been some time at school before he left his native country, yet went to sea at so early an age that, considering what a vagabond and lawless life he for a long time led, he must have very soon forgotten everything he had been taught, if he had not, in the midst of all his wild adventures, taken great pains both to retain and to extend his knowledge. That he must have done so is evident from the accounts of his different voyages which he afterwards published. We have few works of the kind more vigorously or graphically written than these volumes; and they contain abundant evidences of a scientific and philosophical knowledge of no ordinary extent and exactness. Along with Dampier's, may be mentioned an older name, that of JOHN DAVIS, the discoverer of the well-known Strait leading into Baffin's Bay. Davis also went to sea when quite a boy, and must have acquired all his knowledge both of science and of the art of composition while engaged among the duties of his profession. Yet we have from his pen not only accounts of several of his voyages, but also a treatise on the general hydrography of the earth. He was the inventor, besides, of a quadrant for taking the sun's altitude at sea. ROBERT DRURY, too, whose account of the island of Madagascar, and of his

strange adventures there, is now (from having been lately republished) a well-known book, deserves to be remembered when we are speaking of authors bred at sea. Drury was only fourteen when he set out on his first voyage in a vessel proceeding to India, and he was shipwrecked in returning home on the island of Madagascar, where he remained in a species of captivity for fifteen years; so that, when he at last contrived to make his escape, he had almost forgotten his native language. He afterwards, however, set about drawing up an account of his life—a task which he accomplished while serving in the humble capacity of a porter at the India House. The work is written in a plain but sensible style, and contains many interesting details respecting the manners of the natives of Madagascar. It is perhaps the better for having been compressed by a friend, Drury's original manuscript, it is said, having extended to eight hundred large folio pages.

FALCONER, the author of "The Shipwreck," as is generally known, spent his life, from childhood, at sea. He was probably born in one of the small towns in the county of Fife which border the Frith of Forth. His parents appear to have been poor; and all his brothers and sisters, who were numerous, are said to have been deaf and dumb. No account has been given of how he acquired the elements of education, with the exception of a report that he found an instructor in a person of the name of Campbell, a man of some literary taste and acquirements, who happened to be purser in one of the vessels in which young Falconer sailed. However this may be, Falconer appeared as an author at a very early age, having been only, it is said, in his twenty-first year when, in 1751, he gave to the world his first production, a poem on the death of Frederick, Prince of Wales. He was ten or twelve years older when he published his "Shipwreck," which is said to be founded in a great measure on the personal adventures of the author. Falconer did not permit the success of his poetical efforts to withdraw him from his profession, in which, having now transferred himself from the merchant service to the navy, he continued to rise steadily till he was appointed purser of a man-of-war. Some time after attaining this promotion, he published the other work by which he is chiefly known, his "Universal Marine Dictionary," which was very favourably received, and is still a standard work. He had previously to this written several other poetical pieces on temporary subjects, which have long been forgotten. Shortly after the publication of his Dictionary, he sailed for Bengal as purser of the frigate Aurora. The vessel, however, was never heard of after she passed the Cape of Good Hope.

The able Italian engineer and mathematician, GIORDANI, was originally a common soldier in one of the Pope's galleys. In this situation his capacity and good conduct attracted the attention of his admiral; and as a reward he was promoted to the post of purser of one of the

vessels. It was his appointment to this situation which first formed his mind to study. Having accounts to keep, he soon found how necessary it was that he should know something of arithmetic, of which he was till then quite ignorant; and he determined therefore to teach himself the science, which it is said he did without assistance. From this commencement he extended his studies to other branches both of science and literature; and he was appointed at last to a professorship in the Sapienza College, at Rome. Giordani published several able works in Latin on mathematical and physical subjects, and died in the year 1711.

The late Mr. JOHN FRANSHAM, who died at Norwich in 1810, was altogether one of the most eccentric characters to be found in the list of self-educated persons. His name suggests itself to us here from the circumstance of his having passed part of his early life as a common soldier. He had been originally apprenticed to a cooper, with whom he remained for about two years, and it was in this situation that he taught himself mathematics. But, although he afterwards obtained the situation of clerk to an attorney, his restless disposition would not allow him to remain at his desk; and, after wandering for some time about the country, he enlisted in the army, where, however, they did not keep him long, finding him quite unfit for service. Indeed, it was by this time become pretty evident that his mind was not a little deranged—a matter which he shortly after put beyond doubt by renouncing Christianity, and making a formal profession of paganism. Although he published several works, however, in support of his peculiar theology, and in other respects conducted himself with great eccentricity, he contrived to maintain himself by teaching mathematics, in which occupation he is said to have displayed very considerable ability. He resided and took pupils for some years in London. Somewhat similar to Fransham's history is that of Mr. JOHN OSWALD, who is said to have taught himself Greek, Latin, and Arabic, while holding a lieutenant's commission in an infantry regiment in India. He afterwards returned to England, where he published a succession of poetical and political pamphlets, making himself remarkable at the same time by various singularities of behaviour and opinion, and especially by a rigid abstinence from animal food, and a professed predilection for the religious doctrines of the Brahmins. When the revolution of 1789 broke out in France, Oswald went over to that country, and entered the service of the republic, in which he obtained the rank of colonel. He was at length killed in battle.

COLUMBUS himself, one of the greatest men that ever lived, if it be a grand idea grandly realized that constitutes greatness, not only, while leading the life of a seaman, pursued assiduously the studies more particularly relating to his profession, rendering himself the most accomplished geographer and astronomer of his time, but kept up that

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Painted by N. Dance.

Engraved by T. Wright.

CAPT. JAMES COOK, F. R. S.

acquaintance which he had begun at school with the different branches of elegant literature. We are told that he was even wont to amuse himself by the composition of Latin verses. It was at sea, too, that our own Cook acquired for himself those high scientific, and we may even add literary accomplishments, of which he showed himself to be possessed. This celebrated navigator was born in Yorkshire in 1728. His parents were poor peasants, and all the school education he ever had



CAPTAIN JAMES COOK.

was a little reading, writing and arithmetic, for which he was indebted to the liberality of a gentleman in the neighbourhood. He was apprenticed, at the age of thirteen, to a shopkeeper in the small town of Snaith, near Newcastle, and it was while in this situation that he was first seized with a passion for the sea. After some time, he prevailed upon his master to give up his indentures, and entered as one of the crew of a coasting-vessel engaged in the coal trade. He continued in this service till he reached his twenty-seventh year, when he exchanged it for that of the navy, in which he soon distinguished himself so greatly that he

was, three or four years after, appointed master of the *Mercury*, which belonged to a squadron then proceeding to attack Quebec. Here he first showed the proficiency he had already made in the scientific part of his profession, by an admirable chart which he constructed and published of the River St. Lawrence. He felt, however, the disadvantages of his ignorance of mathematics; and, while still assisting in the hostile operations carrying on against the French on the coast of North America, he applied himself to the study of Euclid's *Elements*, which he soon mastered, and then began that of astronomy. A year or two after this, while again stationed in the same quarter, he communicated to the Royal Society an account of a solar eclipse which took place on the 5th of August, 1766, deducing from it, with great exactness and skill, the longitude of the place of observation; and his paper was printed in the *Philosophical Transactions*. He had now completely established his reputation as an able and scientific seaman; and it having been determined by Government, at the request of the Royal Society, to send out qualified persons to the South Sea to observe the approaching transit of the planet Venus over the sun's disc—a phenomenon which promised several interesting results to astronomy—Cook was appointed to the command of the *Endeavour*, the vessel fitted out for that purpose. He conducted this expedition, which, in addition to the accomplishment of its principal purpose, was productive of a large accession of important geographical discoveries, with the most consummate skill and ability; and was, the year after he returned home, appointed to the command of a second vessel destined for the same regions, but having in view more particularly the determination of the question as to the existence of a southern polar continent. He was nearly three years absent upon this voyage; but so admirable were the methods he adopted for preserving the health of his seamen, that he reached home with only the loss of one man from his whole crew. Having addressed a paper to the Royal Society upon this subject, he was not only chosen a member of that learned body, but was further rewarded by having the Copley gold medal voted to him for his experiments. Of this second voyage he drew up the account himself, and it has been universally esteemed a model in that species of writing.

All our readers know the termination of Cook's distinguished career. His third voyage, undertaken for the discovery of a passage from the Pacific to the Atlantic along the north coast of America, although unsuccessful in reference to that object, was fertile in geographical discoveries, and equally creditable with those by which it had been preceded, to the sagacity, good management, and scientific skill of its unfortunate commander. The death of Captain Cook took place at Owyhee (now more usually written Hawaii,) the principal island of the Sandwich group, in a sudden tumult of the natives, on the 14th of Feb-

ruary, 1779. The news of the event was received with general lamentation, not only in our own country, but throughout Europe. Pensions were bestowed upon his widow and three sons by the Government; the Royal Society ordered a medal to be struck in commemoration of him; his eulogy was pronounced in the Florentine Academy; and various other honours were paid to his memory, both by public bodies and individuals. Thus, by his own persevering efforts, did this great man raise himself from the lowest obscurity to a reputation wide as the world itself, and certain to last as long as the age in which he flourished shall be remembered by history. But better still than even all this fame—than either the honours which he received while living, or those which, when he was no more, his country and mankind bestowed upon his memory—he had exalted himself in the scale of moral and intellectual being; had won for himself, by his unwearied striving, a new and nobler nature, and taken a high place among the instructors and best benefactors of mankind. This alone is true happiness—the one worthy end of human exertion or ambition—the only satisfying reward of all labour, and study, and virtuous activity or endurance. Among the shipmates with whom Cook mixed when he first went to sea, there was, perhaps, no one who ever either raised himself above the condition to which he then belonged, in point of outward circumstances, or enlarged in any considerable degree the knowledge or mental resources he then possessed. And some will, perhaps, say that this was little to be regretted, at least on their own account; that the many who spent their lives in their original sphere were probably as happy as the one who succeeded in rising above it. But this is to cast but a hasty glance on human nature, and the scene of things in which we are placed. That man was never truly happy—happy upon reflection and while looking to the past or the future—who could not say to himself that he had made something of the faculties God had given him, and had not lived altogether without progression, like one of the inferior animals. We do not speak of mere wealth or station:—these are comparatively nothing; are as often missed as attained, even by those who best merit them; and do not of themselves constitute happiness when they are attained. But there must be some consciousness of an intellectual or moral progress, or there can be no satisfaction—no self-congratulation on reviewing what of life may be already gone—no hope in the prospect of what is yet to come. All men feel this, and feel it strongly; and, if they could secure for themselves the source of happiness in question by a wish, they would avail themselves of the privilege with sufficient alacrity. Nobody would pass his life in ignorance, if knowledge might be had by merely looking up to the clouds for it: it is the labour necessary for its acquirement that scares them. Yet it is, in truth, from the exertion by which it must be obtained, that knowledge derives at least half its value; for to

this entirely we owe the sense of merit in ourselves which the acquisition brings along with it, and hence no little of the happiness of which we have just described its possession to be the source. Besides that the labour itself soon becomes an enjoyment.

To the example of Cook, if it were necessary, we might add those of others of his countrymen, who, since his time, have shown, in like manner, the possibility of uniting the cultivation of literature and science to the most zealous performance of the duties of the same laborious profession. For instance, VANCOUVER was a sailor formed under Cook; and to him we owe an interesting and ably written account of the voyage which he made round the world in 1790 and the four following years. Lieutenant FLINDERS commanded the expedition sent out in 1801 to survey the coast of New Holland, and afterwards published an account of his voyage, accompanied by a volume of charts, which are considered as placing the author in the highest rank of modern hydrographers. In particular, we ought not here to forget the late Lord COLLINGWOOD, second in command to Nelson at Trafalgar, and in all respects a man of first-rate merit, who, although he never sent any production to the press, has been proved by his correspondence, published since his death, to have been in reality one of the best of writers. Yet he was only thirteen when he first entered the navy, and during the remainder of his life he was scarcely ever ashore—circumstances which used to make his acquaintances wonder not a little where he got his style. He had always, however, been fond of reading and the study of elegant literature; and he found that even a life at sea afforded him many opportunities of indulging his taste for these enjoyments.

Lord Collingwood may be said to have been, in all respects, a perfect illustration of Wordsworth's fine lines on the character of "The Happy Warrior:"—

"Whose powers shed round him in the common strife,
Or mild concerns of ordinary life,
A constant influence—a peculiar grace:
But who, if he be called upon to face
Some awful moment, to which Heaven has joined
Great issues, good or bad, for human kind,
Is happy as a lover, and attired
With sudden brightness, like a man inspired;
And, through the heat of conflict, keeps the law
In calmness made, and sees what he foresaw;
Or if an unexpected call succeed,
Come when it will, is equal to the need.

He who though thus endued as with a sense
And faculty for storm and turbulence,
Is yet a soul whose master-bias leans
To home-felt pleasures and to gentle scenes;—
Sweet images! which, whereso'er he be,
Are at his heart; and such fidelity
It is his darling passion to approve;—
More brave for this, that he hath much to love."

Many names of officers, both in the sea and the land service, still living or only recently deceased, who have distinguished themselves at once as skilful commanders, and as ardent cultivators of science and learning, will occur to the memory of every reader.

CHAPTER IX.

LITERARY PURSUITS OF MERCHANTS :—SOLON ; GUYS ; DUDLEY NORTH ;
RICARDO.

WE will now return to civil life, from the higher walks of which we have already quoted several examples of an attachment to literary and scientific pursuits in the midst of much occupation, and the attainment of eminence at the same time in the world of letters and in that of politics. We shall find that the cares of ordinary business have also left time to many to earn distinction by their learning and their writings, as well as the toils and anxieties of state affairs.

Perhaps the earliest literary merchant we have on record is the celebrated Athenian lawgiver, SOLON. Although descended from one of the most distinguished families in Athens, Solon found himself obliged, on setting out in life, to attempt the re-establishment of the decayed fortunes of his house by engaging in foreign commerce. After the manner customary in those days, he proceeded in person to distant countries along with the goods which he had to dispose of. To a mind such as his, however, the opportunities of an occupation of this kind were invaluable. He returned to his native country not only enriched by the success of his speculations, but fraught with all the learning and philosophy of the countries in which civilization had then made the greatest progress ; and fitted to inform and control his fellow-citizens by the lessons of a new wisdom, made attractive by the charms of eloquence and poetry. He had sought, in the course of his travels, still more anxiously for knowledge than for wealth, and he had found both in abundance. When he reappeared in his native country, his fame had preceded him, and he was welcomed by all ranks as the fittest person to assume the government and regulation of the state. He accepted the call, and distinguished himself, as all our readers know, by the wise laws which he established, and the admirable ability and rectitude of his administration. But his love of literature and philosophic speculation still clung to him ; and after the usurpation of Pisistratus had overturned the system of good government which he had reared, and the folly and ingratitude of his fellow-citizens compelled him to withdraw

from Athens, we are told that he employed his old age in giving the last finish to some of his poetical compositions, especially his great work, entitled *Atlantis*, which unfortunately has not come down to us. Solon's fame, however, both as a poet and an orator, long survived among his countrymen, and some fragments of his poetry are still extant.

A French merchant, M. GUYS, has, in modern times, distinguished himself by his learned researches touching the geography and history of the country of Solon. Guys had spent the early part of his commercial life in Turkey, and it was while residing there that he conceived the idea of availing himself of the many opportunities his situation afforded him, to compare the existing condition of Greece, and the manners of its inhabitants, with the accounts handed down to us by the classic authors of its ancient state. His object was to ascertain what traces of the old times were still to be found, either in the character and habits of the people, or in the natural aspect and architectural monuments of the country. For this purpose, he repeatedly travelled over both the Morea and the islands of the Archipelago, with Homer and Pausanias in his hand, everywhere comparing what he observed with their descriptions, and those of other ancient authorities. Not satisfied with this anxious investigation of his subject, he did not venture to commence the preparation of his projected work until he had, by long practice, obtained so much skill in the art of composition as gave him reason to hope that he should be able to make it, in all respects, worthy of the acceptance of the public. Keeping his materials by him for some years, he embraced several opportunities of exercising his pen upon lighter topics, producing, among other pieces, a discourse on the "Utility of Literary and Scientific Accomplishments to a Commercial Man," which he read before the Academy of Marseilles, where he now carried on business. At last he published, in 1772, his principal work, under the title of "Literary Travels in Greece," which immediately procured for him a distinguished reputation as a man of letters. The Greeks themselves, in particular, were so much flattered by the learning and talent which he had brought to the illustration of their usages and antiquities, that they sent him a diploma creating him a citizen of Athens. After this, Guys produced various other performances, both in prose and verse, all of respectable merit, and left at his death a considerable number of manuscripts ready for publication; but he is principally remembered for his *Literary Travels*, of which he was preparing for the press a fourth and a greatly enlarged edition, when he died in 1799, in his seventy-ninth year. He was an associate of the Institute of France, as well as member of various other literary institutions.

Our countryman Sir DUDLEY NORTH also began the world as a Turkey merchant. He was the third son of the fourth Lord North, who was a studious man, and the author of several literary works. In

the characteristic and interesting memoir of Dudley which has been given us by Roger, the youngest of the family, and the biographer also of two others of his brothers, we are told that, having been placed at Bury to learn Latin, "he made but an indifferent scholar," which is imputed partly to the brutal severity of his master, who used to "correct him at all turns, with or without a fault, till he was driven within an ace of despair and making away with himself," and partly to the circumstance of his having "too much spirit, which would not be suppressed by conning his book, but must be rather employed in perpetual action." It was "this backwardness at school," the author thinks, that probably determined his destination. "But the young man himself," he adds, "had a strange bent to traffic, and, while he was at school, drove a subtle trade among the boys for buying and selling. In short, it was considered that he had learning enough for a merchant, but not phlegm enough for any sedentary profession."

Accordingly, after having been sent for some time to a writing and arithmetic school, he was bound by his father to a Turkey merchant, upon the agreement which was then usual, that, after having been initiated in the business at home, he should be sent out to the Levant. "This merchant's business," however, adds his brother, "was not enough to keep a man employed, and, having left off rambling, much of his time lay upon his hands. He could not endure to be out of action or idle; therefore, to fill up his intervals, he fell to work at the packing press [the person with whom he boarded was a packer], and other business of that trade, by which he made himself a complete master of the mystery of that trade. This was not any loss of time; for that is one of the chief trades which the Levant merchants are concerned with, for the skilful packing their cloths sent into Turkey. The young gentleman took also a fancy to the binding of books, and, having procured a stitching-board, press, and cutter, fell to work, and bound up books of account for himself, and divers for his friends, in a very decent manner. He had a distinguishing genius towards all sorts of mechanic exercises."

After some time, he was sent out by his master as supercargo with an adventure to Archangel, where he was to ship another cargo for Smyrna, and then to take up his residence in the latter place as factor. "It was a hard case," says his biographer, "for a raw youth to embark in such a voyage, without company, or so much as a face in the ship that he ever saw before, and bound almost as far northward as Zembla, and to reside amongst and traffic with barbarous people, and then to return through all the bad weather the skies can afford. But he went not only willingly, but ambitiously, and formalized upon nothing that led towards the end he most earnestly desired, which was to be settled as a factor in Turkey. His resolution was inexpugnable; and not only

in this, but in many other instances of his life, he considered well what was best for him to do ; and after that point once determined, he had no thought of difficulties ; he was now master of his fortunes, and resolved, at all adventures, to advance them ; and therein to use the utmost of his industry and understanding, leaving the rest to Providence."

This account sufficiently shows us the character of the young adventurer ; and we find the same determination, activity, and alacrity to seize and make use of every opportunity of improvement, in all his subsequent proceedings. Even in the course of this trading voyage, he has an eye for everything worth observing that comes in his way ; and keeps a regular journal of all that he saw and that befell him, which he transmits to London, in the form of letters, to his elder brother, Francis, afterwards the Lord Keeper Guildford. He even attempted, it would appear from what he states in one of these letters, to acquire some acquaintance, while in the ship, with practical seamanship. "I had thought," he writes, "to employ myself aboard by keeping an account of the ship's way, but am disappointed ; for the master and mates, on whom that charge lies, are a sort of people who do all by mechanic rule, and understand nothing, or very little, of the nature and reason of the instruments they use. And where that little happens, they are very shy of it ; and, if at any time one speaks to them, they think they have a blockhead to deal with, who understands nothing ; and they will hear no objection to their dictates. As for reasons and causes, they lie beyond their capacity ; all that is not set down at large in their books, they account no better than damnable doctrine and heresy ; their quotations are irrefragable, and not to be disputed." What he principally complains of, indeed, throughout the voyage, is the idleness in which he was obliged to pass his time. Having, on his return from Archangel, been detained for some time at Leghorn, he determined to visit Florence, about fifty-five miles off ; upon which occasion he remarks, "Perhaps my friends may think this visiting of places no sign of good husbandry ; but let it be considered that an idle person is subject to expense wherever he lieth ; and the well-employment of time, and experience to be gained this way, may countervail some increase of charge." The long and minute detail he gives us of what he saw on this visit is highly curious, and shows satisfactorily enough that his "increase of charge" was not thrown away. He made use, too, he tells us, of the time he spent here and at Leghorn, to acquire some knowledge of Italian. "The language," he remarks, "is not difficult ; and I find the little Latin I have to be an extraordinary help in attaining it."

He began business at Smyrna with a capital of not quite four hundred pounds, on the profits of which he lived thriftily, and "passed his time," says his brother, "for divers years, with a meagre income, and not promising much increase." Having afterwards, however, transferred his

residence to Constantinople, he succeeded at last in reaping the fruits of his industry and perseverance, and found himself gradually becoming a wealthy man. Here he showed, on every occasion, the same inquisitiveness and love of knowledge, the same activity and capacity of overcoming difficulties, which had characterized him from his boyhood. He not only made himself completely master of the political constitution and statistics of the country, but even acquired such a skill in the Turkish law, that, in common cases, he could both "advise himself," we are told, "and assist his friends." "I have heard our merchant say," writes his biographer, "that he had tried in the Turkish courts above five hundred causes; and, for the most part, used no dragomen, or interpreters, as foreigners commonly do, but, in the language of the country, spoke for himself." "For these," he continues, "and other purposes of his negotiation, he had laboured to gain, and had thereby acquired, a ready use of the Turkish language, and could speak it fluently. I have heard him say, that for scolding and railing it was more apt than any other language; and he had used it so much in that way, that afterwards, when he was in England, and much provoked, his tongue would run into Turkish of itself; as if to such purposes it were his mother-speech. He told us he once composed a Turkish Dictionary, and showed the ordinary idioms and analogies of that language. He not only spoke, but wrote, Turkish very well." The Italian language, too, we are told, in another place, the merchant had acquired to perfection, and expressed himself as naturally and as fluently in it, as if it had been his mother-tongue; "and it hath been observed, that no Frank ever spoke the vulgar Italian idiom so correct and perfect as he did." We have a proof, indeed, of his familiarity with this language, in a long and amusing letter, written by him to an Italian friend, which his brother has printed.

A passage, which occurs afterwards, presents us with another evidence of the zeal with which every opportunity of obtaining useful information was taken advantage of by this intelligent and enterprising person. "Our merchant had then residing with him a virtuoso, who was a good mathematician and draughtsman; and they together concerted a design of making an exact plan of the city of Constantinople, and carried it on till it came very near being completed. They took the liberty of measuring in the street a distance between two stations, which were two of their mosque towers, from which their priests cry to prayers; and with a theodolite they took certain angles at the corners of streets. And, in order to find the position and distances of all the towers and remarkable places, they went up the two towers which they had chose, and made their stations; and there, with the same instrument, marked the angles of each view by the bearings of every one of those places, and set off the same, upon a large paper, by lines: and then the proper

intersections gave the true position of them all, in just proportion, according as the practice of such method is commonly directed. And then they fell to mapping the streets, partly by the guidance of those views, and partly by other observations."

So much (although more might be added) for what he contrived to learn while in Turkey, by means of what his brother calls his "furious curiosity, not without some penetration and aptitude to discern and apply what fell in his way, losing nothing that might be instructive to him." In returning to England, the vessel in which he sailed having touched at Alicant, on the east coast of Spain, he and some of his friends resolved to travel overland to Cadiz, rather than sail round by Gibraltar. "Our merchant," says his biographer, "was not ill qualified to travel in this country, and to converse in the great trading towns; for he spoke Giffoot very fluently, which is a corrupt Spanish. But, because the Jews write it in Hebrew characters (which he also could do) it is called Giffoot, or the language which the Jews speak; so, having this dialect at command, he was his own interpreter." During the remainder of the voyage, with his characteristic activity, he amused himself by letting down bottles tightly corked into the sea, to try at what depth the cork would be driven in, or the bottle broken, by the increased pressure of the water.

Shortly after coming home he settled as a merchant in London, and was, in course of time, appointed, first a Commissioner of the Customs, and then a Lord of the Treasury. Having become also a member of parliament, "although he was bred," says his brother, "in business abroad, and had little experience in the affairs of England, and in parliament none at all, yet he took the place of manager for the crown in all matters of revenue stirring in the House of Commons; and what he undertook he carried through, against all opposition, with as much assurance and dexterity as if he had been an old battered parliament man." Before this, we are told, he had set about learning algebra under the direction of a Mr. Dickenson, one of his brother Commissioners of the Customs. As his quaint biographer expresses it, "When they had leisure, they two were busy at *plus* and *minus*, convolution and evolution; and Sir Dudley was extremely pleased with this new kind of arithmetic, which he had never heard of before."

He had committed his thoughts to writing at considerable length upon different subjects, both during his residence in Turkey and since his return to England; but it was in 1691 that he first appeared before the world as an author, by the publication of a work entitled "Discourses upon Trade, principally directed to the cases of Interest, Coinage, Clipping, and Increase of Money." These discourses have been considered as placing Sir Dudley North at the head of the economical writers of the seventeenth century. They contain, according to Mr. M'Culloch, a

much more able statement of the true principles of commerce than any that had then appeared, and maintain all the great principles of commercial freedom, with an intelligence and consistency that have not been surpassed in any work of succeeding times. "Unluckily," Mr. M'Culloch adds, "this admirable tract never obtained any considerable circulation. There is good reason, indeed, for supposing that it was designedly suppressed. At all events, it speedily became excessively scarce; and I am not aware that it has ever been referred to by any subsequent writer on commerce." It was, indeed, entirely unknown until Mr. M'Culloch some years ago chanced to recover a copy of it, from which he printed a small impression.

This eminent person, having taken a strong part on the side of the court in the reign of James II., lost both his seat in parliament and his place under the crown at the Revolution; "in consequence of which," says his brother, "hating idleness, he fell again to buying of cloth," which he had discontinued while he held his high employments. After a short time, however, he once more retired from business; but continued to employ himself in another way as actively as ever. He had always, we are told, "delighted much in natural observations, and what tended to explain mechanic powers; and particularly that wherein his own concern lay, beams and scales, the place of the centres, the form of the centre-pins, what share the fulcrum, and what the force, or the weight, bore with respect to each other; and, that he might not be deceived, had made proofs by himself of all the forms of scales that he could imagine could be put in practice for deceiving." "He was so great a lover of building, too," it is afterwards stated, "that St. Paul's, then well advanced, was his ordinary walk; there was scarce a course of stones laid, while we lived together, over which we did not walk. And he would always climb up to the uppermost heights. Much time have we spent there in talking of the engines, tackle, &c. He showed me the power of friction in engines; for when a capstan was at work, he did but gripe the ropes between the weight and the fulcrum in his hand, and all was fast; and double the number of men at the capstan could not have prevailed against that impediment to have raised the stone till he let go. We usually went there on Saturdays, which were Sir Christopher Wren's days, who was the surveyor; and we commonly got a snatch of discourse with him; who, like a true philosopher, was always obliging and communicative, and in every matter we inquired about gave short but satisfactory answers." To this subject, indeed, Sir Dudley seems to have applied himself for some time with a zeal that hardly allowed him to think of anything else. "We had conversed so much with new houses," says Roger, on concluding a long detail of his brother's architectural investigations, "that we were almost turned rope-dancers, and walked as familiarly upon joists in garrets, having a view through all the

floors down to the cellar, as if it had been plain ground." When in the country, they in like manner used to occupy themselves in trigonometrical surveys, observing which, the country people sagaciously took them for conjurors, "pretending to survey a ground by views at two stations, without measuring a side or any part, but from one station to another."

All this while, although he had retired from commercial life, he still retained the punctual habits of a man of business, and even gave a considerable part of his time to occupations connected with his former calling. He had several laborious trusts, in particular, to superintend as executor, in the management of which he was as scrupulously exact and painstaking as ever he had been in keeping his own mercantile books. For these purposes he had one apartment in his house fitted up as a counting-room, where he reckoned with his tradesmen, paid and received money, and kept a servant or clerk, who was constantly employed, chiefly in copying, while he used another above it, as his brother expresses it, "to wilder in his accounts; and his wife used to wonder how it could be that he had so much to do there." At one time, we are told, when the Custom-house books, having got into disorder, were brought there for him to arrange, "he wallowed so much in them, and with so much application, that his wife was afraid he would have run mad." "There also," adds his gossiping but lively and graphic biographer, "he read such books as pleased him; and (though he was a kind of a dunce at school) in his manhood he recovered so much Latin as to make him take pleasure in the best classics; especially in Tully's *Philosophics*, which I recommended to him."

We cannot afford, however, to accompany our active merchant through the long catalogue of his employments and amusements; his vinegar-making, and his other "operations and natural experiments;" his travelling through the country on a "grave pad" of his brother's, with his predilection for the "very sure and easy, but slow," pace of that "sage animal;" his "hewing and framing of wood works;" his ingenious construction of a pair of bellows, for a smithy, out of a leather skin and a few pieces of elder; and his toils at the anvil, which he "followed so constantly and close," that, when his wife "came to call him to dinner, she found him as black as a tinker," and "he," says his brother, "coming out sometimes with a red short waistcoat, red cap, and black face, the country people began to talk as if we used some unlawful trades there, clipping at least; and, it might be, coining of money—upon which we were forced to call in the blacksmith and some of the neighbours, that it might be known there was neither damage nor danger to the state by our operations." For a full account of all these matters, as well as of the "turning and planing," which formed the more refined afternoon's employment of the two brothers, and for which they "sequestered a low closet," and a description of the "way-wiser,"

or road-measurer, which Roger invented, we must refer the reader to the latter's own faithful and amusing pages. We must find room, however, for the concluding sentences of the narrative, conveying as they do a forcible lesson to vulgar ambition, and an illustration of how easily happiness may be found even in the narrowest sphere, and at the humblest employment, if it be but sought for in a right spirit. "In our laboratories," Roger remarks, "it was not a little strange to see with what earnestness and pains we worked, sweating most immoderately, and scarce allowing ourselves time to eat. At the lighter works in the afternoon, he hath sat, perhaps, scraping a stick or turning a piece of wood, and this for many afternoons together, all the while singing like a cobbler, incomparably better pleased than he had been in all the stages of his life before. And it is a mortifying speculation, that of the different characters of this man's enjoyments, separated one from the other, and exposed to an indifferent choice, there is scarce any one but this I have here described really worth taking up. And yet the slavery of our nature is such, that this must be despised, and all the rest, with the attendant evils of vexation, disappointments, dangers, loss of health, disgraces, envy, and what not of torment, be admired. It was well said of the philosopher to Pyrrhus: 'What follows after all your victories? To sit down and make merry. And cannot you do so now?'" This is a little rhetorically, perhaps, and somewhat too strongly spoken to be taken literally; and, certainly, to spend life in nothing but trivial employments would not be to spend it either happily or worthily; but if it be understood as merely expressing and inculcating the real superiority of an active and healthy exercise of mind and body, in individual or domestic industry, the pursuit of knowledge, and such simple, and generally accessible enjoyments as we have been contemplating, over the hot and exhausting chase after wealth or power in which it is usual for men to waste their strength, it will not be far from a correct appreciation of the constituents of human happiness.

We have dwelt the longer on the life and character of Sir Dudley North, both because he affords us one of the very best examples to which we can refer, of the successful pursuit, by the same individual, of business and of philosophy, and because, fortunately, his history and habits have been transmitted to us with unusual fidelity and fulness. To his name might be added those of many others of his countrymen, eminent like him at once in the walks both of commerce and of literature. We will only mention that of the late Mr. RICARDO. This gentleman, in the course of not a long life, for he died at the age of fifty-one, amassed a large fortune by his mercantile skill, activity, and attention to business, after having begun the world with little except a character for integrity and talent; and secured for himself not merely a respectable reputation as a writer, but, in the important science to

which he devoted himself, a place among the very first of his age. We cannot here enter upon any examination of his peculiar doctrines, and we express no opinion respecting the extent to which they may be well founded or may require limitation. But, whatever difference of sentiment may exist as to this point, there can be none as to the ability and ingenuity which their author always displays in unfolding and supporting them, and that originality of view which marks all his works, and has placed him at the head of a new and distinct school of inquirers in this department of philosophy. It has been said that Mr. Ricardo's attention was not directed to political economy till somewhat late in life; and a story has been told about his accidentally finding a copy of the "Wealth of Nations" one day at the country-house of a friend, and immediately purchasing the book, reading it through with great eagerness, and resolving to dedicate himself thenceforth exclusively to the study of the subject with which he had thus for the first time become acquainted. But this anecdote has been contradicted on better authority, and is not in itself very probable; for it is not likely that a mind, such as that of Ricardo, occupied as it was every day among the very matters to which the science in question especially refers, would be long in having its attention drawn to the principles of that science. Be this, however, as it may, he did not appear as an author till 1809, when he published his pamphlet entitled "The High Price of Bullion, a Proof of the Depreciation of Bank Notes," which immediately excited general attention and went eventually through four editions. He was at this time in the thirty-seventh year of his age, and, we believe, actively engaged in the pursuits of business. He continued to write and give to the world a succession of productions on his favourite subject till his death in 1823. His great work, "The Principles of Political Economy and Taxation," appeared in 1817, two years after which time he was returned to parliament, where he highly distinguished himself, especially in all discussions relating to finance and commerce.

CHAPTER X.

LITERARY PURSUITS OF BOOKSELLERS AND PRINTERS:—SOLOMON GESNER; ALDUS MANUTIUS, PAUL, AND ALDUS THE YOUNGER; R. STEPHENS; H. STEPHENS; SCAPULA; COLINÆUS; BADIUS; FROBEN; OPORINUS; RUDDIMAN; BOWYER; NICHOLS; RICHARDSON.

MANY of our readers are probably familiar with the English translation of the popular German work, the "Death of Abel." SOLOMON GESNER, the celebrated author of this production, and of others written in a

similar style, that rank high in the literature of his native country, carried on the business of a bookseller, as his father had done before him, in his native town of Zürich, in Switzerland. In his case, however, as in that of the Dutch poet, Vondel, whom we have already mentioned, the cares and interruptions of business were, during the latter part of his life, rendered less annoying by the attention of his wife, who charged herself with the principal management of his commercial concerns, that he might have more leisure for literature. But it was amid the drudgery of the shop that almost all his earliest studies were carried on, and his literary taste nourished. We are told that Gesner was accounted a dunce by his first schoolmaster, who predicted that he would never get beyond reading and writing; and yet the person who was thus unsuccessful in developing, or even discerning, the talents of the future poet, was no other than the celebrated Bodmer, who afterwards became an eminent poet himself. This anecdote shows that even genius will not always discover genius in another; although possibly some may think that Bodmer must have been but an indifferent teacher, whatever he was in another capacity. Young Gesner was afterwards sent by his father to the house of a clergyman in the neighbourhood, who, having probably no poetical faculty of his own, had more leisure to attend to the intellectual character of his pupil, and soon drew forth from the condemned dunce no doubtful indications of the light that was hidden within. But the young poet was after some time removed from the care of this congenial or judicious instructor, and despatched to Berlin, to take up his abode with a bookseller of that city in quality of his apprentice or shop-boy. Here he was of course surrounded by books; but either disliking the business, or not finding that it left him sufficient leisure to derive much advantage from the treasures of knowledge that were within his reach, he soon abandoned it, and went into lodgings, with the view of supporting himself by poetry and painting—for he had already, without having any one to give him lessons, begun to apply himself also to the latter art. In this scheme he encountered at the outset the difficulties which naturally beset one circumstanced as he was. There was no deficiency of talent, but a sad lack of experience, and ignorance of many things that a person more regularly instructed could not have failed to know. Having shown his verses to some of his literary acquaintances, he was told that they were so awkwardly constructed that he certainly never would be a poet. His paintings were still more literally the efforts of his own unaided genius than even his poetry. Here he had neither any model to imitate, nor was even acquainted with the elementary rules and most common methods and processes of the art. He had covered the walls of his humble lodging with landscapes, and he one day prevailed upon a painter of some reputation and talent, who resided in the city, to come

and see what he had done. His visitor had taste enough to discern the genius that animated many parts of his strange and lawless performances; but was not at all surprised, when, upon asking him after what models he worked, he was told that he had no models, and that the whole was merely the inspiration of his own invention. He was somewhat amused, however, when Gesner, in his ignorance of the way of managing his oil-colours, complained to him that his pictures never dried. The end of all this was, as might have been anticipated, that the runaway was soon forced to throw himself once more upon the protection of his friends, and to return to the business for which he had been originally intended, in which he became first the partner, and eventually the successor of his father. He did not, however, relinquish literature; and, although his first productions were not very flatteringly received, he persevered in writing and publishing until he had established for himself a distinguished reputation. He began, too, after some years, to add to his other employments that of an engraver, having already improved his taste and skill in painting by the study of the great masters of the Flemish school, of whose works his father-in-law possessed a valuable collection, the inspection of which had had the effect of strongly exciting his early ardour. The remainder of Gesner's life was divided between his business, his duties as a public man (for he had now become a member of the legislative council of his native city), and those several intellectual occupations and elegant arts in each of which he had attained so honourable a celebrity. His works were not only in general published by himself, but often embellished with engravings by his own hand from his own designs. Many of them were still more popular in other parts of Europe, especially in France, than even in Germany; and, among other testimonies of affection and respect which he received from his foreign admirers, he was presented with a gold medal by the Empress Catherine of Russia. He died of an attack of apoplexy in 1788, in the fifty-eighth year of his age.

A pretty long catalogue, indeed, might be given of literary booksellers and printers, among whom, in former times especially, even profound learning was not uncommon. At the head of this list would stand the celebrated ALDUS MANUTIUS (properly ALDO MANUZIO), one of the earliest of the Italian printers, whose services to literature, and we may add to civilization, it is scarcely possible to overrate. Manutius, who was born in 1447, received a learned education, and passed the early part of his life in literary pursuits, and in the society of some of the most distinguished scholars of his time. He was forty years old before he set about the establishment of his printing-office at Venice; and it was some years later before the first production of his press made its appearance. The period therefore of his labours as a printer, as he died at the age of sixty-eight, only extended over about twenty-

five years; and even this space was broken in upon by various difficulties and interruptions, arising from his limited resources and the distracted condition of the country. The latter cause, on one occasion, obliged him to retire altogether from Venice for above a twelvemonth; when not only was his property pillaged during his absence, but he himself, on quitting the city of Milan, in which he had taken refuge, was seized as a spy, and consigned to a prison, from which he only obtained his deliverance through the good offices of one of his friends, who happened to be vice-chancellor of the Milanese senate. All this being kept in mind, it is impossible not to be astonished at the immense professional labours of this first learned printer. During these twenty-five years, partially disturbed as they were, and in spite of the scanty means by which his spirit of enterprise was frequently cramped and restrained, he gave to the world editions of the chief of the Greek and Roman authors then known to be in existence—transcribing them, in almost every instance, from manuscripts which it required the utmost learning, sagacity, and patience to decipher; and often evincing eminent critical acumen in the settlement of the text by the selection of the right one among various readings. He was, in fact, the editor of nearly every work which he published; and, in the performance of his duties in that character, he had difficulties to struggle with and surmount, with which those that have fallen to the share of the generality of his successors are not to be compared. And yet it was in these circumstances, as we have said, that he produced, in the course of a few years, the first printed editions of many of the Greek and Roman classics; thus entitling himself to the gratitude of all succeeding times, as not only the author of the earliest general diffusion of this most precious literature, but in all probability the preserver of much of it from irretrievable destruction. Had Manutius not exerted himself as he did to rescue the writings in question from their insecure existence in a few half-defaced and rapidly perishing manuscripts, and to bestow on them a sure immortality through the printing-press, we know not how many of those of them we now possess it might never have been our fate to look upon, nor how much slower that march of civilization might have proceeded which owed to their wide-spread influence so much both of its excitement and of its conquests. For whatever difference of opinion there may be as to the present and future importance of the productions of Greek and Roman literature in guiding and sustaining the intellectual progress of the world, it can hardly be disputed that Europe never would have made the advancement it did in the course of the fifteenth and sixteenth centuries but for them, and that it is to their inspiration that we owe, in a great measure, at least the beginnings of our existing refinement. But if this be so, it is to Manutius that no little of our gratitude is due; since, had it not been for him, some of the greatest, very possibly, of

those ancient poets, orators, historians, and philosophers, would have written, both for us and for our fathers, in vain.

But his admirable labours, in restoring and preserving the works of others, did not by any means form the only occupation of this great father of the typographical art in Italy during those twenty years. Beside carrying through the press the productions of several of his contemporaries, he found time for the composition of several works of his own, all of them full of erudition, and some of considerable magnitude. Among these may be mentioned grammars of the Greek and Latin languages, and a Greek and Latin dictionary in folio, being the earliest work of the kind that had been given to the world. He also founded at his own house a literary association, known by the name of the Aldine Academy, which obtained great celebrity, and reckoned among its members the celebrated Erasmus, Cardinal Bembo, and several others of the most distinguished persons of that age. During the first years, too, of his residence at Venice, and while he was making preparations for commencing business as a printer, he delivered several courses of lectures on Greek and Roman literature.

Aldus Manutius died in 1515; but he left a son named Paul, who afterwards distinguished himself as much as his father had done, both as a printer and a man of letters. Many of the works which proceeded from his press were enriched by learned commentaries from his own pen. When the Venetian Academy was founded, in 1558, PAUL MANUTIUS was appointed Professor of Eloquence, and director of the printing establishment; but that association continued in existence only for three years. He was afterwards induced to settle as a printer at Rome, on the invitation of the Pope; and the last years of his life were spent in that city; although he still kept his press at work in Venice also. He died there in 1574, leaving a son, commonly called the YOUNGER ALDUS, who, although a person of some learning and talent, did not sustain the reputation of his family in either of the two departments in which its preceding members had acquired so much and such well-merited distinction. Under him, the printing-office fell into discredit and decay; and he at last gave up the business to one of his workmen. He died, it is said, from the effects of a surfeit, in 1597; and the valuable library, collected by his father and his grandfather, was soon afterwards seized upon by his creditors, and sold to pay his debts.

Contemporary with the Manutii in Italy, were the Estiennes or STEPHENSES in France. Of this family, celebrated as printers for nearly one hundred and fifty years, about a dozen members are enumerated as distinguished for their literary attainments; but we can only afford to notice the two most eminent names in the list, the first Robert and his son Henry (sometimes distinguished from his grandfather of the same name as the *second* Henry). The former was born in Paris in 1503, and

commenced business in that city as a printer on his own account about the year 1526. He had before this time acted as chief manager of the establishment of his stepfather, Simon de Colines, and had, in that situation, superintended an edition of the Vulgate (or Latin) version of the New Testament, the publication of which gave great umbrage to the Doctors of the Sorbonne, or Theological College, and first drew upon him that suspicion of an inclination towards Protestantism which he afterwards justified by his formal abandonment of the Catholic faith. He was not only the most distinguished printer but one of the most learned scholars of his time, as his works, and especially his great Thesaurus of the Latin language, amply testify. All the works which proceeded from his press are remarkable both for their extreme beauty of execution and their almost immaculate correctness. In order to secure for them this latter quality, he was wont, we are told, in many cases, to exhibit the proofs for public inspection, and to offer a reward for every error any one should detect in them. One of his editions of the Greek New Testament is known by the strange name of the "Pulres" edition, which was given to it in consequence of the word "Plures" in the Latin preface being so printed,—an error which was long supposed to be the only one in the work, till a more diligent examination in recent times discovered four others in the Greek text.

The supposed religious opinions of Robert Stephens exposed him, during a great part of his lifetime, to incessant annoyance and menace from the zealots of the Catholic church, from whose hostility he was with difficulty protected even by the patronage of the king, Francis I. When Francis died, Stephens felt that the security he had hitherto enjoyed in Paris was gone with his royal patron; and after a short time he retired to Geneva. He resided in that city for several years, carrying on his business as a printer, and died there in the year 1559, at the age of fifty-six. From many honourable testimonies that have been borne to the learning of this great printer, it is sufficient to quote the eulogium of the celebrated De Thou, who affirms that France and Christendom owe a deeper debt of gratitude to him than to their greatest captains; and that he has done more to immortalize the reign of Francis I., than all that monarch's own most famous exploits.

HENRY STEPHENS, the eldest son of Robert, was one of the most learned men that ever lived, and so voluminous an author, that, if he had spent his life in writing books, he would have left us enough to admire in the evidence of his industry and fertility. But, instead of this being the case, his days were passed partly amidst the toils of a laborious occupation, and partly under the pressure of misfortune and penury, and in wandering about in quest of mere subsistence. He was born in 1528; and after having been carefully educated, and having travelled in Italy, England, and the Netherlands, he appears to have accompanied his

father when he left Paris for Geneva. He soon, however, returned to the former city; and, although known to be attached, like his father, to the Reformed faith, contrived to obtain permission to settle there as a printer, about the year 1557. From this time there continued to issue from his press a succession of editions of the classic writers, and other works, not only printed with the greatest care and correctness, but abounding in new and improved readings, which the labours and ingenuity of the editor had discovered, and almost always accompanied by learned prefaces and commentaries from his own pen, which are read by scholars to this day with profit and admiration. But the great work, to the compilation of which he devoted himself with especial ardour and assiduity, was his celebrated Thesaurus, or Dictionary of the Greek Language. This extraordinary performance was the fruit of twelve years of laborious application. The undertaking, however, had completely exhausted the pecuniary resources of the unfortunate author; and nothing could have saved him from ruin, except a much more rapid sale of the work than its magnitude, and necessarily high price, could in almost any circumstances have allowed. He struggled with his difficulties for some years, and might, perhaps, have eventually succeeded in surmounting them, when his hopes were on a sudden extinguished by the appearance of a rival publication, professing to be the work of JOHN SCAPULA. This person had, it appears, been employed as a clerk, or corrector of the press, in Stephens's office, during the printing of the Thesaurus; and the story commonly told is, that, while acting in this capacity, he had secretly applied himself, with a base industry, to the compilation of an abridgment of that great work, which he was thus enabled to bring into the market in sufficient time to ruin the sale of the larger and dearer publication. As it seems unquestionable, however, that the first edition of Scapula's Dictionary did not make its appearance till seven years after the publication of that of Stephens, it is unnecessary to suppose the former to have acted quite so treacherously as is generally alleged, seeing that seven years were surely sufficient to finish an abridgment of a work which the original author had taken only twelve years to compile; and that, therefore, Scapula's performance may be very easily conceived to have been begun, not while he was superintending the printing of his master's Thesaurus, but some time after its publication. We do not mean to dispute either the justice of the charge of plagiarism which has been brought against Scapula, or the fact, that the appearance of his book, notwithstanding the time which elapsed between its publication and that of the work from which it was stolen, considerably injured the sale of the latter. But the truth is, that this abridgment, looked upon even as such, was a performance of very considerable ability, and much more commodious for consultation in ordinary cases than the larger work. It has ever since its appearance

ranked as one of the most valuable auxiliaries to which recourse can be had in the study of Greek, and has, without doubt, contributed essentially to the diffusion of a knowledge of that language—a circumstance which makes one learned writer observe, that Scapula has done at least as much service to scholars in general as he did injury to his master; while another goes the length of maintaining, with more sensibility, it will be thought, to the interests of Greek learning than to the principles of morality and honourable conduct, that the glory of the author of so excellent a work ought in no wise to suffer diminution from any incorrectness of conduct he may have been guilty of in the preparation of it. It is not improbable that many copies of the large Thesaurus still remained unsold when the abridgment came out; and its appearance would completely put an end to the idea of a second edition of the original work, however necessary to meet the great expenditure that had been incurred.

Stephens continued, for some years after this misfortune, to labour with unwearied diligence both as a printer and as an author, sustained partly by the patronage and promises of the king, Henry III., whom he soon found, however, to be more liberal of profession than performance. As a last resource, therefore, he left Paris, where the loss of his wife, to whom he was tenderly attached, had recently added to his calamities, and spent several years in wandering from one city to another, in the constantly disappointed hope of finding some means of re-establishing his ruined fortunes. We find him at one time at Orleans, then again at Paris, and then successively in Germany, Switzerland, and Hungary. At last, having fallen sick at Lyons, he died there in an almshouse, in the year 1598, at the age of seventy.*

The history of this great scholar has been often quoted as a signal illustration of the ill fortune not unfrequently attendant upon a life devoted to literature. Undoubtedly, learning and genius are not exempted from the disappointments and sorrows of this world, any more than ignorance; and sometimes the stroke of misfortune is more keenly

* A lively sketch of *Henri Estienne* has been given by a late writer in the *Quarterly Review* (No. 186, for September 1853), in the course of an interesting article on the *Diary* of his learned son-in-law, Isaac Casaubon. The following short extract is illustrative of our subject:—"He travelled, as was customary before the days of passable roads, on horseback, but on a high-spirited and mettlesome Arab, and not on the spavined hacks of the post-houses. These seasons—for his teeming imagination could not be idle—were claimed by his muse. An epigram, or a prologue, or a soliloquy, was composed and written down without drawing rein." In a note the writer adds:—"His father before him is supposed to have improved these equestrian hours. It was Robert Estienne

that divided the New Testament into verses and his son Henri tells us that it was effected during a journey from Lyons to Paris *inter equitandum*. The phrase has been commonly supposed to signify that he performed the task upon horseback, but Michaelis thought it might only mean that he did it between the stages, while taking his ease at his inn. The first and literal interpretation is doubtless correct. John Wesley read hundreds of volumes as he ambled upon his nag from one preaching station to another; and, however difficult it might have been to pencil figures upon the margin of the New Testament when mounted upon the fiery Arab of Henri, it might easily have been accomplished upon the back of Robert, which was probably as steady as his desk."

felt from the sensibility which high intellectual cultivation has conferred upon the sufferer. In the mere pursuit of wealth, too, it may be that the disinterestedness and comparative forgetfulness of self, which an attachment to letters has a tendency to beget in him who is under its influence, shall sometimes leave him a little way behind a more eager competitor, by allowing him to overlook opportunities of which a more unscrupulous man would take advantage, or seducing him to turn aside after speculations promising him more of glory than of profit. This is the most and the worst that can be said as to the natural tendency of learning to bring misfortunes upon the head of its possessor. But it is no great disparagement of mental cultivation, which is prodigal of so many far higher and better rewards, to say, that it has no particular tendency to put money in a man's pocket, or even that it may sometimes chance to impede in a slight degree the mere accumulation of property by the affection which it creates for richer sources of enjoyment. If it should not bring overflowing wealth, which, at best, is but one of the means of happiness, it will bring happiness itself—wealth for the mind, if not for the purse. And as for the other accusation, that the more a man's nature is refined by education and a taste for knowledge, the more sensibly will he feel such calamities as may befall him, it amounts merely to saying, that the more intense the life, the more delicate and shrinking the sensibility—the higher the elevation, the more dangerous the fall. If it be held that our nature approaches nearest to its perfection when it most resembles that of a tortoise or a vegetable, then, indeed, intellectual cultivation may be held to be pernicious and unwise. But it should not be forgotten that even in the world's ordinary pursuits and business, science and literature must give their cultivators, upon the whole, at least as many and as important advantages as they can possibly deprive them of. There is no probability at all in the supposition, that the possession of superior learning has generally had the effect of preventing its owners from succeeding in the world. On the contrary, it has most likely, in ninety-nine instances out of every hundred, materially contributed to their success, and procured for them a degree of advancement to which the generality of their less accomplished associates never ventured even to aspire. We might refer for proof to many of the names we have already had occasion to mention in these pages, as well as to many others we have yet to notice. The misfortunes of a man whose life has been principally devoted to literary pursuits, make a more touching narrative than those of him who has been thrown out in the more vulgar scramble for the good things of this life; and such stories are therefore fondly repeated and remembered. But, although good enough as stories, they are worth little as arguments; seeing that there is not one of them that might not be easily matched by another that would tell, if not as pathetically, yet just as forcibly, on the opposite

side of the question. Upon this view of the matter, however, we have no inclination to dwell; for it is not chiefly on the strength, of such considerations that we would recommend the pursuit of knowledge. It is profitable to a far higher end than the mere advancement of its votaries in worldly wealth; although in that, too, it may fairly claim to be regarded as naturally and ordinarily an ally and not an adversary. And as for the great scholar, the calamities of whose latter days we have just recorded, the generally unfortunate destiny of the learned is not the lesson to be drawn from his history. His family had risen by their learning, had through that acquired both wealth and distinction, and owed to nothing else the station they long held at the very head of their profession in Europe and in the world. Even he himself had flourished by the same means, in affluence and in honour, for many years; and if one of his undertakings at last turned out unsuccessful, partly through the unfair conduct of another, and partly, let it be allowed, from the nature of the speculation itself, into which a mere printer, who cared for nothing but his money, would not perhaps have so rashly ventured, it was, after all, but one instance of the evils of learning, among many illustrations of its advantages. Nor should we throw out of view the glory of the otherwise unprofitable enterprise, the feeling of triumph in its achievement, which all it had cost could not take away, and the anticipation of that award of posterity on the finished work, which the knowledge of the ruin it had brought on its illustrious projector would only make more cordial and generous.

To the Manutii and the Stephenses we might add the names of many other learned printers of the first age of the art; for example, that of Simon de Colines (in Latin, COLINÆUS), mentioned above, who after having been in partnership with the first Henry Stephens, the grandfather of the author of the *Thesaurus*, married his widow, and carried on the business, and who was profoundly versed in ancient literature—that of BADIUS (often called Ascentius, from *Asche*, near Brussels, the place of his nativity), also a Parisian printer, who was the author of several learned works, and whose daughter, Petronilla (or Perrette), the wife of Robert and the mother of the great Henry Stephens, was so erudite a lady that she is said to have taught both her children and her servants Latin, and to have permitted no other language to be spoken in the family—that of FROBEN, who established his press at Basle in Switzerland, and was so highly esteemed by Erasmus for his great learning, that this celebrated person was induced to take up his residence there in order to have his works printed by so able a scholar—and that of OPORINUS, the successor of Froben in the same city, many of the works published by whom, besides being remarkable for their correctness, are illustrated by his own prefaces and notes.

Of names belonging to later times and to our own country, one of the

most distinguished is that of the very learned THOMAS RUDDIMAN, who carried on a considerable business in Edinburgh, during the early part of last century. The editions of the classical authors that issued from his press are in general printed with very great accuracy, and often exhibit new readings and amendments of punctuation, in the highest degree creditable to the ingenuity and erudition of the editor; who besides found leisure for the preparation of several works of his own, among which may be particularly mentioned a Latin Grammar in two volumes, one of the most learned and elaborate performances in the whole range of philology.* Ruddiman held at the same time the office of librarian to the Faculty of Advocates in Edinburgh (in which he was succeeded by the celebrated David Hume), and was also the publisher of a newspaper, which he had established himself, and which still exists. Among recent English printers the well-known WILLIAM BOWYER long presented a conspicuous example of that accomplished scholarship, united to the most diligent habits of business, which used to be so common in the good old times of the art. Nor ought we to forget his partner and successor, the late Mr. JOHN NICHOLS, whose antiquarian knowledge, and extensive labours in different departments of literature, justly entitle him to a high place among the modern ornaments of his profession.

The father of RICHARDSON, the great novelist, was a joiner; and he himself, after having been taught reading and writing at a country school, was bound apprentice to a London printer, named Wilde, with whom he served for the usual period. Soon after his apprenticeship had expired, he found employment as foreman in a printing-office; and in this situation he remained for five or six years with scarcely a hope of any higher advancement. By the assistance of several friends, however, whom his industry, intelligence, and amiable manners had secured for him, he was at last enabled to enter into business on his own account; when he established himself in Salisbury Court, Fleet Street, and speedily acquired such a position as justified the expectations that had been entertained of him. Meanwhile his literary tastes, and even some indications he had given of his talents as a writer, had become known among his acquaintance, and he was employed on various occasions by the booksellers in the composition of prefaces and dedications for works which they were bringing out. At last they proposed to him the writing of a volume of Familiar Letters; and it was this circumstance, we are told, which suggested the idea of his "Pamela," the first production by which he obtained any distinction as an author. He was already in

* A new edition of this grammar has within the present century been published in Germany under the superintendence of one of the most eminent scholars of that country:

Thomæ Ruddimanni Institutiones Grammaticæ Latinæ; curante Godofredo Stillbaum. Lips. 1823. 2 tom. 8vo.

his fifty-second year when he commenced the composition of this work. And yet such was the eagerness with which he applied himself to it, that he finished the two volumes in as many months. It met, as is well known, with the most extraordinary success, having gone through five editions in the course of a year. The author, however, was not left to enjoy his popularity undisturbed; for, not to mention a good deal of severe criticism to which the conduct and moral tendency of the novel were subjected, the manner of the author was attacked with powerful ridicule by the celebrated Fielding in his "Joseph Andrews." The effect of this satire was so keenly felt by Richardson, that he determined to show the world that he could write as well in another style, in proof of which he produced a continuation of the work under the title of "Pamela in High Life," which was far from securing a continuation of its predecessor's popularity. He was not discouraged, however, by this failure, but only instructed by it in the true path in which he was fitted to excel. He returned to his studies, and after some years appeared again as an author by the publication of the first two volumes of his greatest work, his "Clarissa Harlowe." The success of this production was immense. Appearing as it did in parts, it excited the public curiosity in the highest degree. During the progress of its publication, and when it was translated into French, it raised its author in the estimation of continental critics to the first rank among the writers of the age. Richardson was in his sixtieth year when he gave this work to the world; but he had not yet concluded his literary career. Four years afterwards he appeared again before the public with another performance, his "Sir Charles Grandison." This novel (like its immediate predecessor) extends to the unusual length of seven volumes; and it has been asserted that the author's original manuscript, had it not been subsequently curtailed, would have made a book of three times the size. This is hardly, however, to be taken as a proof of the industry of the writer. Prolivity was the besetting fault of Richardson; his works would have cost him more time and labour had he made them shorter. With his fulness of matter, and facility of invention, it was comparatively easy for him to spread his story over any number of pages. What he most wanted was the art of rejection. Richardson is undoubtedly one of the very greatest of our writers in the department to which his works belong; but on the Continent he is very generally considered as standing at the head of his whole class, without a rival. He has some qualities in which he has never been excelled; but his works, in their original language, are too defective to permit us to rate him so high as this. Perhaps some of their faults do not appear so strongly under the disguise of translation; and amongst those most likely to be thus softened, we should especially reckon the general inelegance and extreme slovenliness of the style. This is a fault which the author, in all

probability, could have materially corrected, had he taken the requisite pains.

He published nothing of any importance after his "Sir Charles Grandison;" but it is important to notice, that his literary labours did not interfere with his attention to business, or impede his commercial success. In 1754 he was chosen Master of the Stationers' Company; and some years after he purchased half of the patent of king's printer. He had by this time amassed a respectable fortune, which enabled him to indulge himself with the luxury of a country residence, at Parson's Green, where he spent the latter part of his life in the society of his friends, and the enjoyment of the public admiration which his writings had procured for him. He died in the year 1761, at the age of seventy-two. More than forty years after his death a selection from his Correspondence, with an account of his Life, in six volumes, was published by Mrs. Barbauld.

CHAPTER XI.

BOOKSELLERS AND PRINTERS CONTINUED:—W. HUTTON; R. DODSLEY; ALMON; CRUDEN; THE PANCKOUCKES; ROTHSCHOLTZ; BAGFORD; AMES; HERBERT; PATERSON.—PURSUIT OF LITERATURE IN OTHER TRADES:—WALTON; DEFOE; LILLO.

WILLIAM HUTTON was born in 1723, in the town of Derby, where his father was a working woolcomber, burdened with a large family, for whom his utmost exertions scarcely sufficed to procure subsistence. "My poor mother," says his son in the interesting account he has left us of his life, "more than once, one infant on her knee, and a few more hanging about her, have all fasted a whole day; and when food arrived, she has suffered them with a tear to take her share." Of his mother, Hutton always retained the tenderest recollection. After a long endurance of this struggle, she died when he was only in his tenth year, and he and his brothers and sisters were left to the charge of their father, who, now become almost reckless from continued misfortune, and loosened as it were from his chief stay, soon made matters worse than ever by taking to the alehouse, and often literally leaving his children to the mere mercies of chance. "At one time," says Hutton, "I fasted from breakfast one day till noon the next, and even then dined upon only flour and water boiled into a hasty-pudding." His father appears to have been a man of a strong understanding, but of violent passions, over which he had little command. Notwithstanding his own dissoluteness, he was a despotic disciplinarian in regard to his children, and

was wont to correct their slightest faults with terrible severity. This and the rest of his conduct procured him their fear, but little of their affection.

In the midst of all this misery their education could scarcely fail to be but indifferently attended to. In fact, even if they had been kept at



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school, the instructions they received there could have availed little against such utter domestic neglect. The schoolmaster can seldom do much if he has not an auxiliary at home. William tells us that he was sent, when five years old, to a "Mr. Thomas Meat, of harsh memory, who often," he adds, "took occasion to beat my head against the wall, holding it by the hair, but never could beat any learning into it; I hated all books but those of pictures." He continued his attendance, however, for about two years, when he was taken away, and, although only a child of seven years old, sent to work at a silk mill.

Tender as was the age of many of his companions here, he was the youngest and least of them all; being indeed too short to reach the engine, in consequence of which a pair of high pattens was fixed on his feet by the superintendent, which he dragged about with him for a year. He gives a melancholy account of his sufferings in this situation. "I had now," says he (and the reader will remember what a mere child he still was), "to rise at five every morning during seven years; submit to the cane whenever convenient to the master; be the constant companion of the most rude and vulgar of the human race, never taught by nature, nor ever wishing to be taught." His master at last, he tells us, having on one occasion made a wound on his back while beating him, struck it, in administering a succeeding punishment, with the point of his cane, which brought it into such a state, that a mortification was apprehended.

He arrived at the close of this weary bondage in his fourteenth year, when he was bound apprentice again for seven years more to a brother of his father, a stocking-weaver at Nottingham. This person, though a man of regular habits of life, and kept pretty much in awe by a wife, who, on pretence of enforcing the duty of temperate living, half-starved both him and his apprentices, seems to have had naturally not a little of the violent and tyrannical disposition of his family, which would occasionally break out in an unaccountable storm. His nephew, now a youth of seventeen, and beginning to be conscious of approaching manhood, had been about three years in his house, when, having one day failed in finishing a piece of work he had been set to, he was first scolded by his uncle for his neglect, and then beaten by the enraged man with merciless severity. The disgrace was too much for him to forget. He watched his opportunity and fled from the house, taking with him his clothes in a bundle, and two shillings from a larger sum which he found in his uncle's desk, being without another penny in the world.

His own tale of this forlorn adventure is interesting and pathetic in the extreme. The first night he slept in the fields. The whole of the next day he continued his wanderings, scarcely knowing in what direction, and almost utterly without object or hope. "Arriving the same evening," the narrative then proceeds, "within the precincts of Lichfield, I approached a barn, where I intended to lodge; but finding the door shut, I opened my parcels in the fields, dressed, hid my bags near a hedge, and took a view of the city for about two hours, though very sore-footed. Returning to the spot about nine, I undressed, bagged up my things in decent order, and prepared for rest; but, alas! I had a bed to seek. About a stone's cast from the place stood another barn, which perhaps might furnish me with a lodging. I thought it needless to take the bags while I examined the place, as my stay would be very

short. The second barn yielding no relief, I returned in about ten minutes. But what was my surprise when I perceived the bags were gone! Terror seized me. I roared after the rascal, but might as well have been silent, for thieves seldom come at a call. Running, raving, and lamenting, about the fields and roads, employed some time. I was too much immersed in distress to find relief in tears. They refused to flow. I described the bags, and told the affair to all I met. I found pity, or seeming pity, from all, but redress from none. I saw my hearers dwindle with the twilight; and, by eleven o'clock, I found myself in the open street, left to tell my mournful tale to the silent night.

“It is not easy to place a human being in a more distressed situation. My finances were nothing; a stranger to the world, and the world to me; no employ, nor likely to procure any; no food to eat, or place of rest; all the little property I had upon earth taken from me; nay, even hope, that last and constant friend of the unfortunate, forsook me. I was in a more wretched condition than he who has nothing to lose. An eye may roll over these lines when the heart that writes them shall be still. May that eye move without a tear! I sought repose in the street upon a butcher’s block.”

Next day he resumed his wanderings, and, appeasing his hunger chiefly from the turnip-fields by the wayside, at length reached Birmingham. But we need not pursue the story further. The catastrophe was what might have been expected. He resolved at last, in his utter desolation, to throw himself upon the protection of his father; and the affair ended, within less than a week after his flight, in his return to his uncle’s house, and the ratification of a treaty of mutual forgiveness and forgetfulness by all parties.

He seems now to have first begun to show that ingenuity and taste for intellectual occupation which we find afterwards so strongly marking his character. His earliest predilection was in favour of music. To this amusement he for some time devoted all his leisure hours. Having bought what he calls a bell-harp for half-a-crown, he laboured, he tells us, in endeavouring to tune it for six months. He then borrowed a dulcimer, and, even before learning to play on it, set about making another after it for himself. “But in the fabrication of this instrument,” says he, “I had neither timber to work upon, tools to work with, nor money to purchase either. It is said, necessity is the mother of invention. I pulled a large trunk to pieces, one of the relics of my family, but formerly the property of Thomas Parker, the first Earl of Macclesfield: and as to tools, I considered that the hammer-key and the plyers belonging to the stocking-frame would supply the place of hammer and pincers. My pocket-knife was all the edge-tools I could raise; and a fork with one limb was made to act in the double capacity of sprig-awl and gimlet.” In this way he at last completed the dulcimer, which

after learning to play upon it, he sold to one of his wealthier companions for sixteen shillings, bought a coat with the money, and constructed a better instrument.

The term of his apprenticeship was over at Christmas, 1744; but he still continued to work with his uncle as a journeyman. It was in 1746, he tells us, that he first began to be fond of books, his earliest purchase being three volumes of the Gentleman's Magazine. His passion for books gave rise to a new application of his manual ingenuity. Those he bought being mostly in a very tattered condition, he felt anxious to be able to restore them to a somewhat more seemly appearance; and accordingly by observing a binder, with whom he had got acquainted, at his work, soon contrived to make himself a tolerable proficient in that craft. When he had bought from this man several of his cast-off tools, "among others he offered me," says Hutton, "a worn-down press for two shillings, which no man could use, and which was laid by for the fire. I considered the nature of its construction, bought it, and paid the two shillings. I then asked him to favour me with a hammer and a pin, which he brought with half a conquering smile and half a sneer. I drove out the garter-pin, which, being galled, prevented the press from working, and turned another square, which perfectly cured the press. He said in anger, 'If I had known, you should not have had it.' This proved for forty-two years my best binding-press." Soon after this, too, he began to write verses, which was a favourite amusement with him to the end of his life.

At last, seeing no prospect of anything but drudgery and poverty in the trade to which he had been brought up, he left his uncle, and took up his residence with a sister who lived in the same town—an admirable woman, whose affection and unwearied cares for his comfort and welfare did much to compensate the loss and desertion of his other relatives. His great ambition now was to be settled in business as a bookseller, and he at last determined to set up in that character in the town of Southwell, about fourteen miles from Nottingham. Here he accordingly opened a shop, with, as he expresses it, about twenty shillings' worth of trash for all his stock. "I was," says he, "my own joiner, put up my shelves and furniture, and in one day became the most eminent bookseller in the place." Being employed, however, during the other days of the week in working at Nottingham as a bookbinder, he could only give his attendance at Southwell on the Saturdays, that being besides quite enough for the literary wants of the place. Throughout a very rainy summer, "I set out," says he, "at five every Saturday morning, carried a burden of from three pounds weight to thirty, opened shop at ten, starved in it all day upon bread, cheese, and half a pint of ale, took from one to six shillings, shut up at four, and, by trudging through the solitary night and the deep roads five hours more, I arrived at Nottingham

by nine; where I always found a mess of milk porridge by the fire, prepared by my valuable sister."

This humble attempt, however, was the beginning of his prosperity. Next year he was offered about two hundred pounds' weight of old books, on his note of hand for twenty-seven shillings, by a dissenting minister to whom he was known; and upon this he immediately determined to break up his establishment at Southwell, and to transfer himself to Birmingham. He did so, and succeeded so well, that, by never suffering his expenses to exceed five shillings a week, he found that by the end of the first year he had saved about twenty pounds.

This, of course, enabled him to extend his business, which he soon made a very valuable one. Birmingham was to Hutton what Philadelphia was to Franklin. The first time he had ever seen it was when he entered it after running away from his uncle's, a wearied and homeless wanderer, with scarcely a penny in his pocket, and not a hope in the world to trust to. Yet in this place he was destined to acquire, some years after, an ample fortune, and to take his place among the most honoured of its citizens.

His future success in life was merely the result of integrity, and regular and persevering industry. After having been four or five years in business, during which time he had saved a good deal of money, he married the lady to whom he continued united for more than forty years, and in whom he always considered that he had found the chief blessing of his life. Some of the speculations in which he involved himself, now that he had become a moneyed man, were not very considerate, and he was once or twice, in this way, reduced to rather alarming difficulties; but he had a resource in his renewed industry and attention to business, which never failed to retrieve him. Even in following those fancies which led him away from his proper business, he often gave the most striking evidence of his characteristic activity and perseverance. While superintending the building of a house for himself, "up," says he, "at four every morning, I set the people to work, watched over them and laboured with them all day, and frequently charged myself with the meanest and most laborious parts of the employment." This was after he had been twenty-five years in business. Again, having engaged about the same time in farming, by which he lost a good deal of money, he tells us that he paid his visits to his farm three or four times a week, though it was distant four or five miles, always on foot, and, having arrived there by five in the morning, was back to Birmingham by breakfast. He had long before this time, too, shown an ambition for public employment; and, having been appointed a commissioner of the Court of Requests, had distinguished himself greatly by his zealous and able exertions in the discharge of the duties of that office.

It was in the midst of all these diversified occupations that Mr. Hutton conceived the idea of commencing author, and actually found time for a succession of literary performances, such as would have been accounted creditable to the application of a person leading a life of uninterrupted leisure. It shows what may be accomplished in any circumstances, if a man's heart be in his work. In such a case, the most incessant calls of business, or the most arduous professional duties, are scarcely any interruption to the prosecution of the fondly-cherished enterprise. The moments that other avocations leave for it, the fewer they are, are only the more precious; and, being so highly valued, are, in a corresponding degree, economically and profitably used. For it, too, are carefully gathered and saved all those little fragments of time, and brief opportunities of repose and meditation, of which the busiest life has many, and which, without some such object ready to take them up, are so apt to be trifled away and lost. As one of our old poets expresses it—

“A good wit, that on the immortal shrine
Of memory engraves a work divine,
Abroad, abed, at board, for ever uses
To mind his theme, and on his book still muses.”

Du Bartas—Sylvester's Translation

Mr. Hutton had been in the habit of sending verses occasionally to the magazines, almost from the commencement of his residence in Birmingham; but it was in the year 1780 that he undertook, for the first time, to write a book. This was his well-known History of Birmingham. Upon the composition of this work, he tells us, he spent nine months. “Fearing my ability,” says he, “I wrote with dread.” The mere money he received on this occasion was but a scanty remuneration for his labour, all his publisher allowed him being forty pounds, together with seventy-five copies of the work. But he was abundantly rewarded in another way; the enjoyment he took in his task itself was exquisite. “Pleased,” says he, “as a fond parent with this history, as my first literary offspring, I may be said while in manuscript to have had the whole by heart. Had a line been quoted, I could have followed it up through the chapter. Frequently, while awake in the night, I have repeated it in silence for two or three hours together, without adding or missing a word.” In referring to another of his works, he tells us, in like manner, that “the pen itself has rewarded its own labour, for the pleasure of writing is inconceivable.”

The History of Birmingham was published in 1782, and Hutton was immediately elected a Fellow of the Antiquarian Society of Edinburgh. A second edition of the work was called for the following year, and it has ever since maintained a high reputation among the class of productions to which it belongs. Its author, although nearly sixty years of age when this his first publication appeared, lived to add to it a long

list of other works. Having now fairly made his appearance before the world as a literary man, he took advantage, with his characteristic activity and eagerness, of every opportunity of supporting his new character. For instance, having been called to the metropolis in 1785 to give his evidence on a trial, he converted the incident into the matter of a book, which he published soon after his return home, under the title of "A Journey to London." In the same manner, a few years after, having gone with his family on a trip to Blackpool, a watering-place in Lancashire, he wrote and published its history. Of his other works, the principal are his Histories of the Court of Requests and of the Hundred Court of Birmingham, his History of the Battle of Bosworth Field, his History of Derby, and his Description of the Roman Wall. In order the better to prepare himself for the composition of this last work, by a personal inspection of the celebrated remnant of antiquity to which it relates, he performed a journey of above six hundred miles, entirely on foot, at the age of seventy-eight. Of this journey, which occupied thirty-five days, his daughter, who accompanied him on horseback, has published a very interesting account.

Another of the works of his old age was a volume of poems. Indeed, verse-making seems to have been the favourite amusement of his leisure, especially after he retired from business on reaching his seventieth year. In 1793, we find him recording twenty-six poetical effusions among the results of his literary industry; and, for a long while, every succeeding year added its contribution of the same species of intellectual produce. He used to tag his rhymes while taking his daily walks between his country-house and his shop in town, which, although now given up to the charge of his son, he continued to visit with nearly as much regularity as ever. Under date of 1795 he writes, "Walking and assisting my son employed the body; studying and writing, the mind." Soon after this, his wife's health, which had long been in a declining state, became alarmingly infirm; and much of his time was occupied in bestowing the most affectionate attentions upon the beloved companion of his life. "My practice," says the kind-hearted old man, "had been to rise about five, relieve the nurse of the night by holding the head of my dear love in my hand, with the elbow resting on the knee. At eight, I walked to business at Birmingham, where I stayed till four, when I returned. I nursed her till eight, amused myself with literary pursuits till ten, and then went to rest." Mrs. Hutton had suffered severely from the alarm into which she was thrown by the brutal conduct of the rioters, who, in the year 1791, were allowed, almost without any attempt being made by the constituted authorities to resist them, to commit, for several days, every species of outrage and devastation in the town of Birmingham, and by whom her husband's house was burned to the ground, and his property destroyed to the amount of many

thousands of pounds. Of these dreadful proceedings, so deeply disgraceful both to the mad perpetrators and to the complacent lookers-on, Mr. Hutton has left us a narrative, eloquent with indignation, and most interesting from its graphic details. His wife never recovered from the shock she received on this occasion, driven as she and her family were from their home, and literally obliged to fly for their lives, and to implore a shelter from strangers, while yet doubtful if a shilling remained to them in the world to pay for the accommodation they craved.

This singular man died in 1815, at the great age of ninety-two. The history of his life, written by himself in the short space of little more than two months, while in his seventy-fifth year, has been given to the world since his death by his daughter, and is altogether one of the most interesting pieces of autobiography extant. The literary performances of Hutton, like those of Franklin (whose history we shall sketch in another chapter), claim our admiration both as having been produced amidst the interruptions of a very busy life, and as being almost entirely the result of self-education and a self-acquired taste for intellectual enjoyments. He affords us, also, another instructive example, in addition to several we have already quoted, in proof of how possible it is for a man, even after being somewhat advanced in life, to overcome, to a certain extent at least, the disadvantages of the most neglected youth. Hutton had, according to his own account, reached his twenty-third year before he began to take a liking to books. Yet we have seen both how strongly attached he afterwards became to reading, and what a respectable figure he succeeded in making as an author; although he may almost be said not to have taken up his pen till the period of life at which most other writers have laid theirs down. We thus see that even the circumstances usually accounted most adverse to the attainment of eminence are all surmountable by zeal and perseverance; that excellence is, in any circumstances, almost the infallible result of the determination to excel; and that it depends chiefly upon a man himself and not upon his outward fortunes, whether he make the golden delights of knowledge and philosophy his own, or spend his life in mental torpor, and go to his grave without having known what it is to enjoy the highest and most distinguishing capacities of his nature.

The name of William Hutton naturally calls to our recollection that of ROBERT DODSLEY. Dodsley was born in 1703, at Mansfield, in the county of Nottingham, only about twenty miles distant from Derby, the native place of Hutton. His parents were very poor, and his education, consequently, of the scantiest description. He was in the first instance bound apprentice to a stocking-weaver; but after some time he abandoned this employment, and, having gone into service, became eventually footman to the Honourable Mrs. Lowther. In this situation, having addressed a copy of verses to Pope, he obtained the

notice of that celebrated writer; and, under his encouragement, was induced to publish by subscription a volume of poems, to which he gave the title of "The Muse in Livery." It attracted a good deal of the public attention, and was followed soon after by a satirical comedy, called "The Toyshop," which Pope was kind enough to read in manuscript, and to employ his influence in getting represented. Its success was so great that the profits enabled the author to emerge from his humble situation, and to set up as a bookseller in Pall Mall. His difficulties were now over, and the way to independence was before him. By his prudence and steadiness he made his business, in course of time, an extremely valuable one, and became, at last, one of the most eminent London publishers of his day. But he neither forgot in his prosperity the humble station from which he had risen, nor neglected the cultivation of those powers to which he owed his elevation. One day, when his friend Pope happened, in conversing with him, to mention a certain individual celebrated for the good table he kept, "I knew him well," said Dodsley, "I was his servant." With all his attention to business, he found time for literature and authorship; and continued till nearly the close of his life to give to the world a succession of works, almost all of which enjoyed considerable popularity, and some of which may be said to have secured for him a durable name among the writers of his country. His collection of maxims, in particular, entitled "The Economy of Human Life," which was so highly esteemed on its first appearance as to be suspected to have proceeded from the pen of Lord Chesterfield, was long a popular work, not only in England, but in other countries; so much so, that there are enumerated about a dozen different translations of it into the French language alone. Dodsley died in 1764.

The names of many other literary booksellers might be added, some of them nearly as much self-educated men as Hutton and Dodsley. Mr. JOHN ALMON, who died at an advanced age in 1805, and was well known as a political and miscellaneous writer during the latter half of the last century, made a considerable fortune as a bookseller in London, the greater part of which, however, he lost by an unlucky speculation in which he was induced to engage after he had retired from business. He was originally a bookseller's apprentice at Liverpool, and had also spent part of his early life at sea. Another instance is that of ALEXANDER CRUDEN, the author of the well-known and valuable Concordance of the Old and New Testament, who was a bookseller in London, and distinguished for considerable learning, as well as much eccentricity. He opened his shop under the Royal Exchange in 1732, and it was here that he composed his Concordance. The work appeared in 1737, and was dedicated to Queen Caroline, who died, however, only a few days after receiving the presentation copy. Poor Cruden had formed very

extravagant expectations from the patronage of his royal mistress, and this disappointment was too much for him. He had shown symptoms of insanity on a former occasion, and he was now reduced to such a state that his friends found it necessary to send him to a lunatic asylum. This interruption did not, however, terminate his literary career. Having made his escape from his place of confinement, he published a vehement remonstrance on the manner in which he had been treated; and at the same time brought an action against Dr. Monro and the other persons who had been concerned in the affair, in which, however, he was nonsuited. This new injustice, as he conceived it to be, gave occasion to several more pamphlets. After this, he found employment for some years as a corrector of the press—the character in which he had first appeared in London, and for which he was well fitted by his education and acquirements. Very accurate editions of several of the Greek and Latin classics appeared at this time, printed under his superintendence. But, in the course of a few years, his malady returned, and he was again placed in confinement. On his liberation he once more tried his old expedient of prosecuting the persons who had presumed to offer him such an indignity, laying his damages, on this occasion, at ten thousand pounds. But he was again unsuccessful. On this he determined, as before, to publish his case to the world; and accordingly forth came the statement, in four successive parts, under the title of the “Adventures of Alexander the Corrector”—a name which he now assumed, not, as the reader might suppose, in reference to his occupation of inspector of proof-sheets, but as expressive of his higher character as censor-general of the public morals. His favourite instrument and chief auxiliary in executing the duties of this office was a large sponge, which he carried constantly about with him in his walks through town, for the purpose of obliterating all offensive inscriptions which he observed on the walls, especially the famous “No. 45,” the mark of the partisans of Wilkes, to whose excesses he strenuously opposed himself, both in this way and by various admonitory pamphlets. On the publication of the second part of his adventures he went to present it at court, in the expectation of being knighted; and soon after offered himself as a candidate to represent the city of London in Parliament. Giving out, too, that he had a commission from heaven to preach a general reformation of manners, he made the attempt first amongst the gownsmen at Oxford, and then among the prisoners in Newgate; but in both cases with very little effect. In the midst of these and many other extravagances, he both brought out a second and greatly enlarged edition of his *Concordance*, and pursued his labours as a corrector of the press, and a fabricator of indexes, with as much steadiness as if his intellect had been perfectly sound. He even managed his worldly affairs with great prudence; and at his death, which took

place suddenly in 1770, he left behind him considerable property in bequests to his relations.

Among booksellers who have been likewise men of letters, we ought not to omit the names of the two PANCKOUCKES, father and son, who were both natives of Lille, where the elder carried on business during the early part of last century. He was a person of very considerable learning and talent, and the author of a number of works on subjects of philosophy, history, and belles lettres. His son, Charles Joseph, settled at Paris in the same line with his father when he was twenty-eight years of age, and eventually became one of the most eminent publishers in that capital. Besides having projected and given to the world the first collected edition of the works of Voltaire, and having borne the chief part in most of the other great literary enterprises undertaken at Paris in his time, he has made his name particularly memorable by the establishment of the "Moniteur," the idea of which is said to have suggested itself to him from what he saw during a visit to England of the influence of the newspaper press there, even at that time. With him also originated the "Encyclopédie Méthodique," which eventually extended to above 150 volumes. Panckoucke lived in habits of intimacy with all the most distinguished French writers and men of genius of his time. We find, in the published works both of Voltaire and Rousseau, many letters addressed to him by those celebrated men. He was also the author of a considerable number of works, among which may be mentioned translations of Tasso, Ariosto, and Lucretius; philosophical discourses on beauty, pleasure, and pain; treatises on certain subjects connected with finance; and an esteemed dissertation, intended to serve as an introduction to the Natural History of Buffon, of which he was the publisher. FREDERICK ROTHSCHOLTZ, of Nuremberg, who flourished in the beginning of last century, was another bookseller who acquired a distinguished name in the world of literature. The list of his productions is very extended, and many of them display considerable learning. Among them is one, in two volumes quarto, entitled, "A Short Essay towards an Ancient and Modern History of Booksellers."

The history of the art of printing has, in our own country at least, been chiefly illustrated by the labours of writers to whom authorship was only a relaxation from the toils of business and an active life. There is now in the British Museum an extensive and valuable series of tracts on the subject of typography, which originally formed part of the Harleian Library, and which were purchased by Lord Oxford from a London bookseller, named JOHN BAGFORD, who had spent a great part of his life in collecting them, and had intended to use them as materials for a History of Printing, for which, in 1709, he published proposals in the Philosophical Transactions. Bagford was in early life a shoemaker, but contrived afterwards to establish himself in business both as a

vendor and printer of books. SAMUEL PALMER, the author of a General History of Printing, published in 1733, was also himself a printer. JOSEPH AMES, the author of the well-known Typographical Antiquities, as well as of various other antiquarian works, had been originally a plane-maker, and carried on business, till his death, as a ship-chandler, in Wapping. Mr. WILLIAM HERBERT, who published an augmented edition of Ames's work, in three volumes quarto, was a map and print seller in London, having formerly carried on business as a hosier. To these names we may add that of Mr. SAMUEL PATERSON, who, having been first a bookseller, became afterwards an auctioneer, and, besides several works in light literature, is known as the author of a learned and valuable catalogue of the best books in all the different departments of study, which appeared in 1786, entitled *Bibliotheca Universalis Selecta*. But we even owe the art of printing itself, in its different forms, chiefly to persons with whom literature was not a profession, but whose attention was merely attracted to it from the midst of other, and, as is sometimes supposed, uncongenial pursuits. Of the two individuals to whom the invention of the art is generally ascribed, the one, JOHN GUTTENBERG, was a merchant of Strasburg, and the other, JOHN FAUST, was a goldsmith of Mentz. Stereotype-printing was the invention of WILLIAM GED, a goldsmith of Edinburgh; and we are indebted for the more recent process, now so well known by the name of Lithography, to M. SENEFELDER, who had spent the earlier part of his life as a strolling actor.

Most of our readers are probably familiar with IZAAK WALTON'S delightful little work, "The Complete Angler;" for its simple and natural style, and the unaffected benevolence and love of its author for his subject, together with its fresh and touching pictures of rural landscapes and rural enjoyments, give it many charms even for those who do not care at all for the sport of which it more particularly professes to treat. Walton was during the greater part of his life a linen-draper in London, and kept a shop in Fleet Street. He appears to have received only a very ordinary education; but his love of reading enabled him, even while actually engaged in carrying on his business, to store his mind with a great variety of information, and so to fit himself for becoming an able and highly-interesting writer. The occasion of his first attempting authorship was this:—On the death of his friend, the celebrated Doctor Donne, it was proposed that the life of that distinguished poet and divine should be written by Sir Henry Wotton; and he employed Walton, as an acquaintance and ardent admirer of the deceased, to collect the necessary materials for that purpose. Sir Henry, however, died before finishing the work, and there was no one to undertake the completion of it but Walton; who, having, in these circumstances, been induced to apply himself to the task, produced a very

interesting piece of biography, which was placed at the head of the first edition of Donne's Sermons and has since been frequently reprinted. At this time he was still in business; but a few years after, having attained a competent fortune, he retired, and spent the evening of his life chiefly among his friends in the country, and in those literary



IZAAK WALTON.

occupations for which the success of his first attempt had shown his aptitude. His next production was a *Life of Sir Henry Wotton*; and it was followed by those of Hooker, George Herbert, and Bishop Sander-son, all of which were well received by the public, and still rank among the most esteemed pieces of biography in the language. His *Complete Angler* appeared for the first time in 1653, and went through many

editions even during the lifetime of the author, who died in 1683, at the age of ninety. In his latter days he published also a poetical work of much merit, entitled "Thealma and Clearchus," purporting to be written by John Chalkhill, but which has been recently suspected, on very probable grounds, to have been the production of his own pen.

There is another celebrated name which we may mention here, although it would be out of place for us to attempt even the most rapid sketch of the varied and eventful history of the person to whom it belongs—that of DANIEL DEFOE, the immortal author of *Robinson Crusoe*. Defoe, born in 1661, was only twenty-one years of age when he commenced that career of authorship in which he subsequently showed such extraordinary fertility; and was then, and for some time afterwards, engaged in trade, having been at first a horse-factor, and next a maker of bricks at Tilbury Fort. He soon, however, relinquished everything else for literature and politics; for which, indeed, his temper and talents adapted him much more than for business. In the new profession which he had chosen his industry was almost altogether unparalleled, as the mere list of his productions may suffice to show; nor does either misfortune, disease, or old age appear to have abated his exertions. He lived till 1731. For a long time it was the fashion to regard Defoe as merely the unprincipled hireling and vulgar libel-monger of a party—a reputation for which he was probably not a little indebted to a famous line of Pope's, whose connections happened to unite him most closely with the faction in the state to which Defoe was chiefly opposed. It is gratifying to think that public opinion is at last beginning to do justice to one whose writings testify him to have been uniformly the honest and intrepid advocate of what he deemed to be right, without regard to the views or interests of any party, and whom his whole history demonstrates to have never shrunk from any danger or any sacrifice in the defence or avowal of his principles. As a man of genius, nobody entitled to express an opinion upon such matters can fail to think highly of the author of *Robinson Crusoe*, which, however, is by no means the only one of his productions that evinces extraordinary powers, both of invention and of writing.

We may here also notice the name of another man of genius, GEORGE LILLO, the author of "*Fatal Curiosity*," "*George Barnwell*," and other well-known dramatic pieces. Lillo was born in London in 1693, and spent his life in business as a jeweller in the city. Few particulars of his history, however, have come down to us; nor do we know anything of the education he received, although there is reason to believe that he owed his literary acquirements chiefly to his own application and love of reading. He is recorded to have been attentive to business, and to have acquired, as a tradesman, a high character for probity, and a competent, if not an abundant fortune. Yet, although he died at the early age of

forty-six, he had already produced eight or nine dramas, several of them of great power. A few months after his death his character was sketched in the following terms by his friend Fielding: "He had a perfect knowledge of human nature, though his contempt of all base means of application, which are the necessary steps to great acquaintance, restrained his conversation within very narrow bounds. He had the spirit of an old Roman, joined to the innocence of a primitive Christian; he was content with his little state of life, in which his excellent temper of mind gave him an happiness beyond the power of riches, and it was necessary for his friends to have a sharp insight into his want of their services as well as good inclination or abilities to serve him. In short, he was one of the best of men, and those who knew him best will most regret his loss."

Men circumstanced like Walton, Defoe, and Lillo, are well fitted, it may be remarked, to give new vigour to the literature of a country, by infusing into it something of what we may call the spirit of the living world, when it is waxing feeble under the regimen of recluse students and dealers in mere erudition. Their works are almost sure to bear the stamp of originality in conception and manner, which is in literature the very principle of life and strength. The point from which they look at their subject is different from that which the mere scholar would naturally select; their subject itself is probably not one which he would have chosen; and, at all events, the conceptions it suggests will in their minds amalgamate with different associations, and take altogether a different shape and character. Erudition, which should be but the furniture, is too often made the food, of the mind; which, under such unfit sustenance, cannot but languish and dry away, even as the body would do if it were fed only with chalk or sawdust. A man who mixes much with the world is little liable to have his powers of thinking thus destroyed by being crushed and suffocated under the worn and cast-off thoughts of his predecessors; his mind cannot fail to be kept awake by the stir of the living humanity about him, which will act upon it like a healthy breeze blowing away all dust and rubbish, and keeping its faculties in their proper tone. But if, in addition to this salutary intercourse with the living world, a man of true genius shall have been further exposed to the necessity of acquiring his knowledge of literature principally by his own efforts, and of working out his own way to that mastery over his thoughts and expressions which constitutes the power of writing, it is probable that, whatever may be his deficiencies in other respects (which, if they were ever so many, the possession of true genius will go far to cover), his productions will have the advantage, in respect of originality, over those of an equally gifted but more regularly educated mind. In the very style of the writers we have mentioned, especially of the first two, there is a charm of nature, which we generally look for in

vain in the compositions of more learned wits. In Defoe's political works, too, there is often all the vigour and dexterity of a most consummate rhetoric, rendered only more effective by many a racy idiom which would probably have been rejected by a mere rhetorician of the schools. Lillo's tragedies, again, full of power and pathos, are unlike anything else in the dramatic literature either of our own or any other country. It seems as if we could tell almost by the perusal of them that their author must have been in business—that he was a regularly-bred tradesman, as well as a self-taught poet. The humblest and the highest walks of life are both favourite regions of poetry; Lillo is the only poet of middle life. His personages are merely the ordinary men and women we meet with every day—neither heroes and emperors, nor beggars and banditti; and his scenes are mostly in streets or on country roads by daylight, and at evening in domestic parlours. Yet even to this atmosphere of common life he has communicated not a little of the excitement of poetry. This is true originality; one of the miracles of that power of genius, to which nothing is impossible.

CHAPTER XII.

SELF-EDUCATED MEN CONTINUED:—FERGUSON.—INFLUENCE OF ACCIDENT IN DIRECTING PURSUITS: RENNIE; LINNÆUS; VERNET; CARAVAGGIO; TASSIE; CHATTERTON; HARRISON; EDWARDS; VILLARS; JOLY; JOURDAIN; BANDINELLI; PALISSY.

AMONG the histories of self-educated men there are few more remarkable than that of JAMES FERGUSON. If ever any one was literally his own instructor in the very elements of knowledge, it was he. Acquisitions that have scarcely in any other case, and probably never by one so young, been made without the assistance either of books or a living teacher, were the discoveries of his solitary and almost illiterate boyhood. There are few more interesting narratives in any language than the account which Ferguson himself has given of his early history. He was born in the year 1710, a few miles from the village of Keith, in Banffshire; his parents, as he tells us, being in the humblest condition of life (for his father was merely a day-labourer), but religious and honest. It was his father's practice to teach his children himself to read and write, as they successively reached what he deemed the proper age; but James was too impatient to wait till his regular turn came. While his father was teaching one of his elder brothers, "the eager child" was



Painted by James Northcote. R.A.

Engraved by T. Wright.

JAMES FERGUSON, F.R.S.



secretly occupied in listening to what was going on; and, as soon as he was left alone, used to get hold of the book, and work hard in endeavouring to master the lesson which he had thus heard gone over. Being ashamed, as he says, to let his father know what he was about, he was wont to apply to an old woman who lived in a neighbouring cottage to solve his difficulties. In this way he actually learned to read tolerably well before his father had any suspicion that he knew his letters. His father at last, very much to his surprise, detected him one day reading by himself, and thus found out his secret.

When he was about seven or eight years of age, a simple incident occurred which seems to have given his mind its first bias to what became afterwards its favourite line of pursuit. The roof of the cottage having partly fallen in, his father, in order to raise it again, applied to it a beam, resting on a prop in the manner of a lever, and was thus enabled, with comparative ease, to produce what seemed to his son quite a stupendous effect. The circumstance set our young philosopher thinking; and, after a while, it struck him that his father, in using the beam, had applied his strength to its extremity, and this, he immediately concluded, was probably an important circumstance in the matter. He proceeded to verify his notion by experiment; and having made several levers, which he called bars, soon not only found that he was right in his conjecture as to the importance of applying the moving force at the point most distant from the fulcrum, but discovered the rule or law of the machine, namely, that the effect of any force or weight made to bear upon it is always exactly proportioned to the distance of the point on which it rests from the fulcrum. "I then," says he, "thought that it was a great pity that, by means of this bar, a weight could be raised but a very little way. On this, I soon imagined that, by pulling round a wheel, the weight might be raised to any height, by tying a rope to the weight, and winding the rope round the axle of the wheel; and that the power gained must be just as great as the wheel was broader than the axle was thick; and found it to be exactly so, by hanging one weight to a rope put round the wheel, and another to the rope that coiled round the axle." The boy had thus, it will be observed, actually discovered two of the most important of the elementary truths in mechanics—the principles of the lever, and of the wheel and axle; he afterwards hit upon others; and, all the while, he had not only possessed neither book nor teacher to assist him, but was without any other tools than a simple turning-lathe of his father's, and a little knife wherewith to fashion his blocks and wheels, and the other contrivances he needed for his experiments. After having made his discoveries, however, he next, he tells us, proceeded to write an account of them; thinking his little work, which contained sketches of the different machines drawn with a pen, to be the first treatise ever composed of the sort. When, some time after,

a gentleman showed him the whole in a printed book, although he found that he had been anticipated in his inventions, he was much pleased, as he was well entitled to be, on thus perceiving that his unaided genius had already carried him so far into what was acknowledged to be the region of true philosophy.

It is a ludicrous blunder that the French astronomer Lalande makes in speaking of Ferguson, when he designates him as "*Berger au Roi d'Angleterre en Ecosse*"—the King of England's Shepherd for Scotland. He had no claim to this pompous title: but it is true that he spent some of his early years as a keeper of sheep, though in the employment, not of the state, but of a small farmer in the neighbourhood of his native place. He was sent to this occupation, he tells us, as being of weak body; and, while his flock was feeding around him, he used to busy himself in making models of mills, spinning-wheels, &c., during the day, and in studying the stars at night, like his predecessors of Chaldea. When a little older, he went into the service of another farmer, a respectable man called James Glasham, whose name well deserves to be remembered. After the labours of the day, young Ferguson used to go at night to the fields, with a blanket about him and a lighted candle, and there, laying himself down on his back, pursued for long hours his observations on the heavenly bodies. "I used to stretch," he says, "a thread with small beads on it, at arm's length, between my eye and the stars; sliding the beads upon it, till they hid such and such stars from my eye, in order to take their apparent distances from one another; and then laying the thread down on a paper, I marked the stars thereon by the beads. My master," he adds, "at first laughed at me; but, when I explained my meaning to him, he encouraged me to go on; and, that I might make fair copies in the daytime of what I had done in the night, he often worked for me himself. I shall always have respect for the memory of that man." Having been employed by his master to carry a message to Mr. Gilchrist, the minister of Keith, he took with him the drawings he had been making, and showed them to that gentleman. Mr. Gilchrist upon this put a map into his hands, and having supplied him with compasses, ruler, pens, ink, and paper, desired him to take it home with him, and bring back a copy of it. "For this pleasant employment," says he, "my master gave me more time than I could reasonably expect; and often took the threshing flail out of my hands, and worked himself, while I sat by him in the barn, busy with my compasses, ruler, and pen." This is a beautiful, we may well say, and even a touching picture—the good man so generously appreciating the worth of knowledge and genius, that, although the master, he voluntarily exchanges situations with his servant, and insists upon doing the work that must be done himself, in order that the latter may give his more precious talents to their more appropriate vocation. We know

not that there is on record an act of homage to science and learning more honourable to the author.

Having finished his map, Ferguson carried it to Mr. Gilchrist's, and there he met Mr. Grant of Achoynaney, who offered to take him into the house, and make his butler give him lessons. "I told Squire Grant," he says, "that I should rejoice to be at his house, as soon as the time was expired for which I was engaged with my present master. He very politely offered to put one in my place, but this I declined." When the period in question arrived, accordingly, he went to Mr. Grant's, being now in his twentieth year. Here he found both a good friend and a very extraordinary man, in Cantley the butler, who had first fixed his attention by a sun-dial which he happened to be engaged in painting on the village school-house, as Ferguson was passing along the road on his second visit to Mr. Gilchrist. Dialling, however, was only one of the many accomplishments of this learned butler, who, Ferguson assures us, was profoundly conversant with both arithmetic and mathematics, played on every known musical instrument except the harp, understood Latin, French, and Greek, and could let blood and prescribe for diseases. These multifarious attainments he owed, we are told, entirely to himself and to nature. Ferguson designates him "God Almighty's scholar."

From this person Ferguson received instructions in Decimal Fractions and Algebra, having already made himself master of Vulgar Arithmetic by the assistance of books. Just as he was about, however, to begin Geometry, Cantley left his place for another in the establishment of the Earl of Fife, and his pupil thereupon determined to return home to his father.

Cantley, on parting with him, had made him a present of a copy of Gordon's Geographical Grammar. The book contains a description of an artificial globe, which is not, however, illustrated by any figure. Nevertheless, "from this description," says Ferguson, "I made a globe in three weeks at my father's, having turned the ball thereof out of a piece of wood; which ball I covered with paper, and delineated a map of the world upon it; made the meridian ring and horizon of wood, covered them with paper, and graduated them; and was happy to find that by my globe (which was the first I ever saw) I could solve the problems."

For some time after this he was very unfortunate. Finding that it would not do to remain idle at home, he engaged in the service of a miller in the neighbourhood, who, feeling probably that he could trust to the honesty and capacity of his servant, soon began to spend all his own time in the alehouse, and to leave poor Ferguson at home, not only with everything to do, but with very frequently nothing to eat. A little oatmeal, mixed with cold water, was often, he tells us, all he was allowed. In this situation he remained a year, and then returned to his

father's, very much the weaker for his fasting. His next master was a Dr. Young, who, having induced him to enter his service by a promise to instruct him in medicine, not only broke his engagement as to that point, but used him in other respects so tyrannically, that, although engaged for half a year, he found he could not remain beyond the first quarter, at the expiration of which, accordingly, he came away without receiving any wages, having "wrought the last fortnight," he says, "as much as possible with one hand and arm, when I could not lift the other from my side." This was in consequence of a severe hurt he had received, which the Doctor was too busy to look to, and by which he was confined to his bed for two months after his return home.

Reduced as he was, however, by exhaustion and actual pain, he could not be idle. "In order," he says, "to amuse myself in this low state, I made a wooden clock, the frame of which was also of wood, and it kept time pretty well. The bell on which the hammer struck the hours was the neck of a broken bottle." A short time after this, when he had recovered his health, he gave a still more extraordinary proof of his ingenuity, and the fertility of his resources for mechanical invention, by actually constructing a time-piece, or watch, moved by a spring. But we must allow him to give the history of this matter in his own words:—

"Having then," he says, "no idea how any time-piece could go but by weight and line, I wondered how a watch could go in all positions; and was sorry that I never thought of asking Mr. Cantley, who could very easily have informed me. But happening one day to see a gentleman ride by my father's house (which was close by a public road), I asked him what o'clock it then was. He looked at his watch and told me. As he did that with so much good-nature, I begged of him to show me the inside of his watch; and though he was an entire stranger, he immediately opened the watch, and put it into my hands. I saw the spring box, with part of the chain round it; and asked him what it was that made the box turn round? He told me that it was turned round by a steel spring within it. Having then never seen any other spring than that of my father's gun-lock, I asked him how a spring within a box could turn the box so often round as to wind all the chain upon it? He answered that the spring was long and thin; that one end of it was fastened to the axis of the box, and the other end to the inside of the box; that the axis was fixed, and the box was loose upon it. I told him that I did not yet thoroughly understand the matter. 'Well, my lad,' says he, 'take a long, thin piece of whalebone; hold one end of it fast between your finger and thumb, and wind it round your finger; it will then endeavour to unwind itself; and if you fix the other end of it to the inside of a small hoop and leave it to itself, it will turn the hoop round and round, and wind up a thread tied to the outside of the hoop.'

I thanked the gentleman, and told him I understood the thing very well. I then tried to make a watch with wooden wheels, and made the spring of whalebone; but found that I could not make the wheel go when the balance was put on, because the teeth of the wheels were rather too weak to bear the force of a spring sufficient to move the balance; although the wheels would run fast enough when the balance was taken off. I enclosed the whole in a wooden case, very little bigger than a breakfast teacup; but a clumsy neighbour one day, looking at my watch, happened to let it fall, and turning hastily about to pick it up, set his foot upon it, and crushed it all to pieces; which so provoked my father, that he was almost ready to beat the man, and discouraged me so much, that I never attempted to make such another machine again, especially as I was thoroughly convinced I could never make one that would be of any real use."

What a vivid picture this gives us of an ingenuous mind thirsting for knowledge! And who is there, too, that does not envy the pleasure that must have been felt by the courteous and intelligent stranger by whom the young mechanician was carried over his first great difficulty, if he ever chanced to learn how greatly his unknown questioner had profited from their brief interview! He may possibly have read the above narrative, as given to the world by Ferguson, after the talents which this little incident probably contributed to develop, had raised him from his obscurity to a distinguished place among the philosophers of his age; and if he did, he must have felt that encouragement in well-doing which a benevolent man may always gather, either from the positive effects of his kindness upon others, or from its influence upon himself. Civility, charity, generosity, may sometimes meet an ill return, but one person *must* be benefited by their exercise; the kind heart has its own abundant reward, whatever be the gratitude of others.

Ferguson's attention having thus been turned to the mechanism of time-pieces, he now began to do a little business in the neighbourhood as a cleaner of clocks, by which he made some money. He was invited also to take up his residence in the house of Sir James Dunbar, of Durn, to whom he seems to have made himself useful by various little services which his ingenuity enabled him to render. Among other things he converted two round stones that graced the gateway into a pair of stationary globes, by painting a map of the earth upon one, and a map of the heavens upon the other. "The poles of the painted globes," he informs us, "stood towards the poles of the heavens; on each the twenty-four hours were placed around the equinoctial, so as to show the time of the day when the sun shone out, by the boundary where the *half* of the globe at any time enlightened by the sun was parted from the other half in the shade; the enlightened parts of the terrestrial globe answering to the like enlightened parts of the earth at all times. So that,

whenever the sun shone on the globe, one might see to what places the sun was then rising, to what places it was setting, and all the places where it was then day or night throughout the earth." Having been introduced to Sir James's sister, Lady Dipple, he was induced at her suggestion to attempt the drawing of patterns for ladies' dresses, in which he soon became quite an adept. "On this," says he, "I was sent for by other ladies in the country, and began to think myself growing very rich by the money I got by such drawings; out of which I had the pleasure of occasionally supplying the wants of my poor father." He still continued, however, his astronomical studies, making observations on the stars, as usual, with his beaded threads, and delineating on paper the apparent paths of the planets as thus ascertained. So excited would he become while thus engaged, that he often conceived, he says, that he saw the ecliptic lying like a broad highway across the firmament, and the planets making their way in "paths like the narrow ruts made by cart-wheels, sometimes on one side of a plane road, and sometimes on the other, crossing the road at small angles, but never going far from either side of it."

He now began to copy pictures and prints with pen and ink; and having gone to reside with Mr. Baird, of Auchmeddan, Lady Dipple's son-in-law, where he enjoyed access to a tolerably well-stocked library, he made his first attempt at taking likenesses from the life, in a portrait which he drew of that gentleman; "and I found," says he, "it was much easier to draw from the life than from any picture, whatever, as nature was more striking than any imitation of it." His success in this new profession struck his country patrons as so remarkable, that they determined upon carrying him to Edinburgh, in order that he might be regularly instructed in those parts of the art of which he was still ignorant, Lady Dipple liberally agreeing to allow him to live in her house for two years. But when he came to that city he could find no painter who would consent to take him as an apprentice without a premium—a circumstance which his sanguine friends had not counted upon. In this extremity, not knowing what to do, he was advised by the Reverend Dr. Keith to trust to his own genius, and to commence the practice of his intended profession without waiting for any other instruction than what he had already received from nature. It was certainly a bold counsel; but Ferguson, having in truth no other resource, followed it, and succeeded beyond his most sanguine expectations; in a very short time making so much money as to enable him not only to defray his own expenses, but to gratify his kind heart by contributing largely to the support of his now aged parents. Portrait-painting was the business by which he mainly lived for twenty-six years.

Yet he does not appear to have ever given his heart to it, and, notwithstanding his success, he made various attempts to escape from it as

a profession altogether. When he had been only about two years in Edinburgh, he was seized with so violent a passion for the study, or at least the practice, of medicine, that he actually returned to his father's, carrying with him a quantity of pills, plasters, and other preparations, with the intention of setting up as the *Æsculapius* of the village. But it would not do. Of those who took his medicines very few paid him for them, and still fewer, he acknowledges, were benefited by them. So he applied again to his pencil; but, instead of returning immediately to Edinburgh, fixed his residence for a few months at Inverness. Here he employed his leisure in pursuing his old and favourite study of astronomy; and, having discovered by himself the cause of eclipses, drew up a scheme for showing the motions and places of the sun and moon in the ecliptic, on each day of the year, perpetually. This he transmitted to the celebrated Maclaurin, who found it to be very nearly correct, and was so much pleased with it, that he had it engraved. It sold very well, and Ferguson was induced once more to return to Edinburgh. He had now a zealous patron in Maclaurin, and one extremely disposed to assist him in his philosophical studies. One day Ferguson having asked the Professor to show him his orrery, the latter readily complied with his request, in so far as to exhibit to him the outward movements of the machine, but would not venture to open it in order to get at the wheel-work, which he had never himself inspected, being afraid that he should not be able to put it to rights again if he should chance to displace any part of it. Ferguson, however, had seen enough to set his quick and ingenious mind a working; and in a short time he succeeded in finishing an orrery of his own, and had the honour of reading a lecture on it to Maclaurin's pupils. He some time after made another of ivory (his first had been of wood); and in the course of his life he constructed, he tells us, six more, all unlike each other.

His mind was now becoming every day more attached to philosophical pursuits; and quite tired, as he says, of drawing pictures, in which he never strove to excel, he resolved to go to London, in the hope of finding employment as a teacher of mechanics and astronomy. Having written out a proof of a new astronomical truth which had occurred to him, namely, that the moon must move always in a path concave to the sun, he showed his proposition and its demonstration to Mr. Folkes, the President of the Royal Society, who thereupon took him the same evening to the meeting of that learned body. This had the effect of bringing him immediately into notice. He soon after published his first work, "A Dissertation on the Phenomena of the Harvest Moon," with the description of a new Orrery, having only four wheels. Of this work he says, with his characteristic modesty, "Having never had a grammatical education, nor time to study the rules of just composition, I acknowledge that I was afraid to put it to the press; and, for the same cause, I ought

to have the same fears still." It was, however, well received by the public; and its ingenious author afterwards followed it up by various other productions, most of which became very popular. In 1748 he began to give public lectures on his favourite subjects, which were numerous and fashionably attended, his late Majesty George III., who was then a boy, being occasionally among his auditors. He had till now continued to work at his old profession of a portrait painter; but about this time he at last bade it a final farewell, having secured another, and, in his estimation, a much more agreeable means of providing a subsistence for himself and his family. Soon after the accession of George III., a pension of fifty pounds per annum was bestowed upon him from the privy purse. In 1763 he was elected a Fellow of the Royal Society; the usual fees being remitted, as had been done in the cases of Newton and Thomas Simpson. But he eventually accumulated a good deal of money. He died in 1776, having for many years enjoyed a distinguished reputation both at home and abroad; for several of his works had been translated into foreign languages, and were admired throughout Europe for the simplicity and ingenuity of their elucidations. Of his Dialogues on Astronomy, Madame de Genlis says, "This book is written with so much clearness, that a child of ten years old may understand it perfectly from one end to the other."

The faculties of distinct apprehension and luminous exposition belonged, indeed, to Ferguson in a pre-eminent degree. He doubtless owed his superiority here in a great measure to the peculiar manner in which he had been obliged to acquire his knowledge. Nothing that he had learned had been set him as a task. He had applied himself to whatever subject of study engaged his attention simply from the desire and with the view of understanding it. All that he knew, therefore, he knew thoroughly, and not by rote merely, as many things are learned by those who have no higher object than to master the task of the day. On the other hand, as has often happened in the case of self-educated men, the want of a regular director of his studies had left him ignorant of many departments of knowledge in which, had he been introduced to them, he was probably admirably adapted to distinguish himself, and from which he might have drawn, at all events, the most valuable assistance in the prosecution of his favourite investigations. Thus, familiar as he was with the phenomena of astronomy and the practical parts of mechanics, and admirable as was his ingenuity in mechanical invention, he knew nothing, or next to nothing, either of abstract mathematics or of the higher parts of algebra. He remained, in this way, to the end of his life, rather a clever empiric, to use the term in its original and more honourable signification, as meaning a practical and experimenting philosopher, than a man of science. This was more peculiarly the sort of peril to which self-educated men were exposed in

Ferguson's day, when books of any kind were comparatively scarce, and good elementary works scarcely existed on any subject. Much has since been done, and is now doing, to supply that great desideratum; and even already, in many departments, the man who can merely read is provided with the means of instructing himself both at little expense, and with a facility and completeness such as a century, or even half a century ago, were altogether out of the question. Not a little, however, still remains to be accomplished before the good work can be considered as finished; nor, indeed, is it in the nature of it ever to be finished, seeing that, even if we should have perfectly arranged and systematized all our present knowledge, time must be constantly adding to our possessions here, and opening new worlds for philosophy to explore and conquer. We still want especially a general scheme or method of the sciences—a disposition of the several departments of human knowledge according to their mutual relation and dependence—so as to form a directory by which the student might, in all cases, pursue his way from one to another of them by the best route. This would be one of the most valuable aids, not to self-education only, but to all education.

It was, as has been stated, the accident of the roof of his father's cottage coming down, while he was a child, that first turned Ferguson's attention to mechanical contrivances. Such are the chances which often develop genius, and probably even give it in part its direction, and peculiar character. The late eminent engineer, JOHN RENNIE, used to trace his first notions in regard to the powers of machinery to his having been obliged, when a boy, in consequence of the breaking down of a bridge, to go, one winter, every morning to school by a circuitous road, which carried him past a place where a thrashing-machine was generally at work. Perhaps, had it not been for this casualty, he might have adopted another profession than the one in which he so much distinguished himself, before ever reflecting that there was such a thing as machinery in the world. It was the appearance of the celebrated comet of 1744 which first attracted the imagination of LALANDE, then a boy of twelve years of age, to astronomy. The great LINNÆUS was probably made a botanist by the circumstance of his father having a few rather uncommon plants in his garden. HARRISON is said to have been originally inspired with the idea of devoting himself to the constructing of marine time-pieces by his residence in view of the sea. It was a voyage to the Mediterranean which first gave to VERNET his enthusiasm for marine painting. Other great painters have probably been indebted to still slighter circumstances for their first introduction to the art. CLAUDE LORRAINE derived his taste for design from frequenting the workshop of his brother, who was a wood-engraver. The elder CARAVAGGIO (Polidoro Caldara), was born of poor parents, at the town in the north of Italy from which he takes his common designation;

and having, when a young man, wandered as far as Rome in search of work, was at last engaged to carry mortar for the fresco-painters, who were then employed in decorating the Vatican, which humble occupation, giving him the opportunity of observing the operations of these artists, first inspired him with the ambition of becoming himself a painter. The commencement of the history of MICHAEL ANGELO CARAVAGGIO is not very different. He, as his name denotes, was a native of the same place as Polidoro, though he flourished more than half a century later, and he is recorded to have had his love of the art first awakened by being, when a boy, employed by his father, who was a mason, to mix plaster for some fresco-painters at Milan. Another Italian painter, CAVEDONE, owed his introduction to his profession to the accident of having been received, after he had been turned out of doors by his father, into the service of a gentleman who happened to possess a good collection of pictures, which he began by copying in ink with a pen. JAMES TASSIE, the celebrated modeller and maker of paste gems, commenced life as a stone-mason in Glasgow, and was first prompted to aspire to something beyond his humble occupation, by having gone by chance on a holiday to see the paintings in the Academy for instruction in the Fine Arts, established in that city by Messrs. Robert and Andrew Foulis, the printers. Having obtained admission to the academy as a pupil, he continued to work at his original trade to maintain himself, until he had acquired a knowledge of drawing. Tassie became eventually the most distinguished artist in his line in Europe; and carried, indeed, the art itself which he practised to a degree of perfection that before his time had not been approached. A descriptive catalogue of his pastes, which, at the time of his death, in 1799, amounted to twenty thousand, has been published in two quarto volumes, and among them are enumerated imitations, or rather *fac-similes*, of all the more celebrated gems, ancient and modern, known to be in existence.

The taste of the youthful prodigy, CHATTERTON, for the study of English antiquities, is related to have been first awakened by the accidental circumstance of a quantity of ancient parchment manuscripts having fallen into his hands, which had been taken by his father, who kept a school, from an old chest in the church of St. Mary Redcliffe, at Bristol, to make covers for the writing-books used by his scholars. GEORGE EDWARDS, the naturalist, the author of the splendid book entitled "History of Birds," in four volumes quarto, was in the first instance apprenticed to a London merchant; but the accident of a bedroom being assigned to him which contained a collection of books that had been left by a former lodger of his master's, gradually formed in him so strong an attachment to study, and especially to natural history, to which many of the volumes related (their original possessor having

been a medical gentleman), that he resolved to give up commerce, and to dedicate his life to literature and science. He held the situation of Librarian to the College of Physicians, and died at the age of eighty in 1773. The late eminent French botanist, VILLARS, in like manner, after having set out in life as a farmer, suddenly became enamoured of natural science, from looking into an old work on medicine which he chanced to find at a house where he was staying.

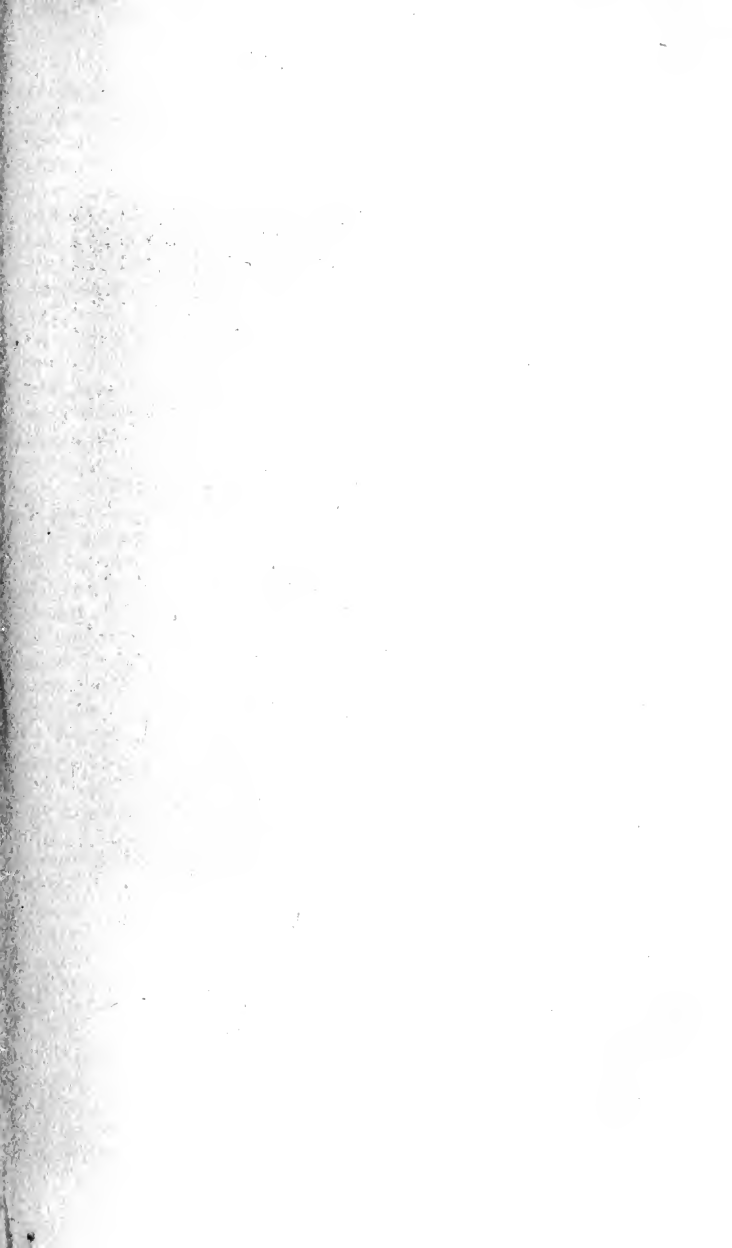
The French dramatist, JOLY, was the son of a keeper of a coffee-house in Paris, where a sort of literary club was wont to meet. One evening a tale of Madame de Murat's was the subject of their conversation; and the warm encomiums they united in bestowing upon it arrested in an extraordinary degree the attention of Joly. As soon as the club broke up he retired to his bedroom, spent the night in writing, and, before morning, had contrived the plan of a drama in verse, and advanced a considerable way in its composition. A few days more enabled him to complete his work; which, to the astonishment of his father's literary guests, he put into their hands at their next meeting, requesting their opinion of it. The proposal of having the performance read excited at first only the merriment of the assembled critics; but its merits were soon felt and acknowledged; and, when it had been heard to the end, there was only one opinion as to the certainty of its success on the stage. Accordingly, the piece, entitled "A School for Lovers," in three acts, was brought out and received with great applause. Joly now gave himself up to literature; but, although he afterwards produced several other dramatic compositions, it is remarked that scarcely any of them equalled his first performance.

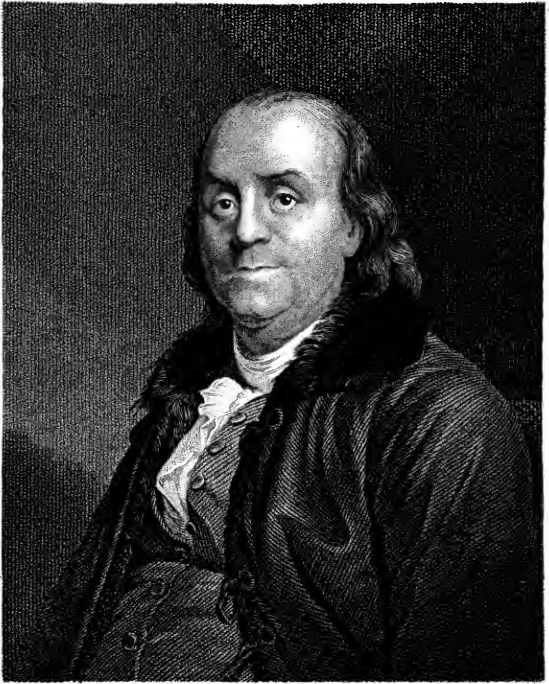
The late French Orientalist, JOURDAIN, was originally intended for the law, and had been placed with a notary, when, in the year 1805, the admiration he heard bestowed upon Anquetil Du Perron, then newly dead, who had in his youth enlisted as a private soldier in a corps going to India, in order that he might enjoy an opportunity of studying the Eastern languages, kindled in him an irresistible passion to devote himself to similar pursuits. Jourdain was at this time only seventeen years of age, and died when just thirty. Yet in that short interval he had acquired a distinguished name as an Oriental scholar, and had given to the world a variety of able works; among which may be especially mentioned a very learned statistical account of Persia, in five volumes, which appeared when the author was only in his twenty-sixth year.

We will mention only a very few other instances of the manner in which accidental, and apparently trivial, occurrences have sometimes operated in exciting latent genius. The Italian sculptor BANDINELLI, whose name has been mentioned in a former chapter, is said to have been first led to turn his thoughts to the art of statuary by a great fall

of snow, which happened when he was a boy at his native city of Florence. He fashioned a statue of the snow, which was conceived to give a striking indication of his talent for modelling. The late eminent English engraver, RICHARD EARLOM, is reported to have been originally inspired with a taste for the art of design by seeing the ornaments on the Lord Mayor's state coach, which happened to have been painted by the elegant pencil of Cipriani. Another of our countrymen, highly distinguished as an engraver of scientific subjects, the late Mr. LOWRY, was induced to embrace the profession in which he afterwards acquired so much celebrity by the accidental inspection, when he was about fifteen years of age, of a portfolio of prints by Woollett, another of our eminent engravers. Thus, too, the famous German printer, BREITKOPF, the inventor of moveable types for printing music, and of many other improvements in typography and letter-founding, was first inspired with a liking for his profession, which he had originally embraced on compulsion, by falling in with a work of Albert Durer, in which the shapes of the letters are deduced from mathematical principles.

The celebrated BERNARD PALISSY, to whom France was indebted, in the sixteenth century, for the introduction of the manufacture of enamelled pottery, had his attention first attracted to the art, his improvements in which form to this time the glory of his name among his countrymen, by having one day seen by chance a beautiful enamelled cup, which had been brought from Italy. He was then struggling to support his family by his attempts in the art of painting, in which he was self-taught; and it immediately occurred to him that, if he could discover the secret of making these cups, his toils and difficulties would be at an end. From that moment his whole thoughts were directed to this object; and in one of his works he has himself given us such an account of the unconquerable zeal with which he prosecuted his experiments as it is impossible to read without the deepest interest. For some time he had little or nothing to expend upon the pursuit which he had so much at heart; but at last he happened to receive a considerable sum of money for a work which he had finished, and this enabled him to commence his researches. He spent the whole of his money, however, without meeting with any success, and he was now poorer than ever. Yet it was in vain that his wife and his friends besought him to relinquish what they deemed his chimerical and ruinous project. He borrowed more money, with which he repeated his experiments; and, when he had no more fuel wherewith to feed his furnaces, he cut down his chairs and tables for that purpose. Still his success was inconsiderable. He was now actually obliged to give a person who had assisted him part of his clothes by way of remuneration, having nothing else left; and, with his wife and children starving before his eyes, and by their appearance silently reproaching him as the cause of





From a French Painting.

Engraved by T. Wright.

BENJAMIN FRANKLIN, L. L. D., F. R. S.

their sufferings, he was at heart miserable enough. But he neither despaired, nor suffered his friends to know what he felt; preserving, in the midst of all his misery, a gay demeanour, and losing no opportunity of renewing his pursuit of the discovery which he all the while felt confident he should one day achieve. And at last, after sixteen years of persevering exertion, his efforts were crowned with complete success, and his fortune was made. Palissy was, in all respects, one of the most extraordinary men of his time; in his moral character displaying a high-mindedness and commanding energy altogether in harmony with the reach and originality of conception by which his understanding was distinguished. Although a Protestant, he had escaped, through the royal favour, from the massacre of St. Bartholomew; but, having been soon after shut up in the Bastille, he was visited in his prison by the king, who told him, that, if he did not comply with the established religion, he should be forced, however unwillingly, to leave him in the hands of his enemies. "Forced!" replied Palissy, "this is not to speak like a king; but they who force you cannot force me; I can die!" He never regained his liberty, but ended his life in the Bastille in the ninetieth year of his age.*

CHAPTER XIII.

BENJAMIN FRANKLIN.

THE name we are now to mention is perhaps the most distinguished to be found in the annals of self-education. Of all those, at least, who, by their own efforts, and without any usurpation of the rights of others, have raised themselves to a high social position, there is no one, as has been remarked, the close of whose history presents so great a contrast to its commencement as that of BENJAMIN FRANKLIN. It fortunately happens, too, in his case, that we are in possession of abundant information as to the methods by which he contrived to surmount the many disadvantages of his original condition; to raise himself from the lowest poverty and obscurity to affluence and distinction; and above all, in the absence of instructors, and of the ordinary helps to the acquisition of knowledge, to enrich himself so plentifully with the treasures of literature and science, as not only to be enabled to derive from that source the chief happiness of his life, but to succeed in placing himself high among the most famous writers and philosophers of his time. It

* A much more complete account of this remarkable person than previously existed has now been given to the world in "The Life of Bernard Palissy, of Saintes; his Labours and Discoveries in Art and Science. By Henry Morley." 8vo, Lond. 1852.

is in this latter point of view, chiefly, that at present we propose to consider him; and we shall avail ourselves, as liberally as our limits will permit, of the ample details, respecting the early part of his life especially, that have been given to the public, in order to present to the reader a full and distinct account of the successive steps of a progress so eminently worthy of being recorded, both from the interesting nature of the narrative, and from its value as an example and lesson, perhaps the most instructive to be anywhere found, for all who have to be either the architects of their own fortunes, or their own guides in the pursuit of knowledge.

Franklin has himself told us the story of his early life inimitably well. His account is given in the form of a letter to his eldest son, and does not appear to have been written originally with any view to publication. "From the poverty and obscurity," he says, "in which I was born, and in which I passed my earliest years, I have raised myself to a state of affluence, and some degree of celebrity in the world. As constant good fortune has accompanied me, even to an advanced period of life, my posterity will perhaps be desirous of learning the means which I employed, and which, thanks to Providence, so well succeeded with me. They may also deem them fit to be imitated, should any of them find themselves in similar circumstances." It is not many years since this letter was, for the first time, given to the world by the grandson of the illustrious writer, only a small portion of it having previously appeared, and that merely a re-translation into English from a French version of the original manuscript which had been published at Paris.

Franklin was born at Boston, in North America, on the 17th of January, 1706; the fifteenth child of his parents, and perhaps expected to prove the last (whence probably his Christian name), although, as it happened, there were still two daughters to come. His father, who had emigrated from England about twenty-four years before, followed the occupation of a soap-boiler and tallow-chandler, a business to which he had not been bred, and by which he seems with difficulty to have been able to support his numerous family. At first it was proposed to make Benjamin a clergyman; and he was accordingly, having before learned to read, put to the grammar-school at eight years of age;—an uncle, whose namesake he was, and who appears to have been an ingenious man, encouraging the project by offering to give him several volumes of sermons to set up with, which he had taken down, in a short-hand of his own invention, from the different preachers he had been in the habit of hearing. This person, who was now advanced in life, had been only a common silk-dyer, but had been both a great reader and writer in his day, having filled two quarto volumes with his own manuscript poetry. What he was most proud of, however, was his short-hand, which he was very anxious that his nephew should learn. But young Franklin had

not been quite a year at the grammar-school, when his father began to reflect that the expense of a college education for him was what he could not very well afford ; and that, besides, the Church in America was a poor profession after all. He was accordingly removed, and placed for another year under a teacher of writing and arithmetic ; after which his father took him home, when he was no more than ten years old, to



BENJAMIN FRANKLIN.

assist him in his own business. He was now, therefore, employed, he tells us, in cutting wicks for the candles, filling the moulds for cast candles, attending the shop, going errands, and other drudgery of the same kind. He showed so much dislike, however, to this business, that his father, afraid he would break loose and go to sea, as one of his elder brothers had done, found it advisable, after a trial of two years, to look about for another occupation for him ; and after he had been taken round to see a great many different sorts of tradesmen at their work, it was agreed upon that he should be bound apprentice to a cousin of his own, who was a cutler. But he had been only for some days on trial at this business when, his father thinking the apprentice-fee which his cousin asked too high, he was again taken home. In this state of things it was finally resolved to place him with his brother James, who had been bred a printer, and had just returned from England, and set up on his own account at Boston. To him, therefore, Benjamin was bound

apprentice, when he was yet only in his twelfth year, on an agreement that he should remain with him in that capacity till he reached the age of twenty-one.

One of the principal reasons which induced his father to determine upon this profession for him was the fondness he had from his infancy shown for reading. All the money he could get hold of used to be eagerly laid out in the purchase of books. His father's small collection consisted principally of works in controversial divinity, a subject which could not be expected to be very interesting to a reader of his age; but, such as they were, he went through most of them. Fortunately there was also a copy of "Plutarch's Lives," which he says he read abundantly. This and a book by Daniel Defoe, called "An Essay on Projects," he seems to think were the two works from which he derived the most advantage. His new profession of a printer, by procuring him the acquaintance of some booksellers' apprentices, enabled him considerably to extend his acquaintance with books by frequently borrowing a volume in the evening, which he sat up reading the greater part of the night, in order that he might return it in the morning, lest it should be missed. But these solitary studies did not prevent him from soon acquiring a great proficiency in his business, in which he was every day becoming more useful to his brother. After some time, too, his access to books was greatly facilitated by the kindness of a liberal-minded merchant who was in the habit of frequenting the printing-office, and, being possessed of a tolerable library, invited young Franklin, whose industry and intelligence had attracted his attention, to come to see it; after which he allowed him to borrow from it such volumes as he wished to read.

Our young student was now to distinguish himself in a new character. The perusal of the works of others suggested to him the idea of trying his own talent at composition; and his first attempts in this way were a few pieces of poetry. Verse, it may be observed, is generally the earliest sort of composition attempted either by nations or individuals, and for the same reasons in both cases—namely, first, because poetry has peculiar charms for the unripe understanding; and secondly, because people at first find it difficult to conceive what composition is at all, independently of such measured cadences and other regularities as constitute verse. Franklin's poetical fit, however, did not last long. Having been induced by his brother to write two ballads, he was sent to sell them through the streets; and one of them, at least, being on a subject that had just made a good deal of noise in the place, sold, as he tells us, prodigiously. But his father, who, without much literary knowledge, was a man of a remarkably sound and vigorous understanding, soon brought down the rising vanity of the young poet, by pointing out to him the many faults of his performances, and convincing him what wretched stuff they really were. Having been told, too, that

verse-makers were generally beggars, with his characteristic prudence he determined to write no more ballads.

He had an intimate acquaintance of the name of Collins, who was, like himself, passionately fond of books, and with whom he was in the habit of arguing upon such subjects as they met with in the course of their reading. Among other questions which they discussed in this way, one accidentally arose on the abilities of women, and the propriety of giving them a learned education. Collins maintained their natural unfitness for any of the severer studies, while Franklin took the contrary side of the question—"perhaps," he says, "a little for dispute sake." His antagonist had always the greater plenty of words; but Franklin thought that, on this occasion in particular, his own arguments were rather stronger; and, on their parting without settling the point, he sat down and put a summary of what he advanced in writing, which he copied out and sent to Collins. This gave a new form to the discussion, which was now carried on for some time by letters, of which three or four had been written on both sides, when the correspondence fell into the hands of Franklin's father. His natural acuteness and good sense enabled him here again to render an essential service to his son, by pointing out to him how far he fell short of his antagonist in elegance of expression, in method, and in perspicuity, though he had the advantage of him in correct spelling and punctuation, which he evidently owed to his experience in the printing-office. From that moment Franklin determined to spare no pains in endeavouring to improve his style; and we shall give in his own words, the method he pursued for that end.

"About this time," he says, "I met with an odd volume of the *Spectator*; I had never before seen any of them. I bought it, read it over and over, and was much delighted with it. I thought the writing excellent; and wished, if possible, to imitate it. With that view, I took some of the papers, and making short hints of the sentiments in each sentence, laid them by a few days; and then, without looking at the book, tried to complete the papers again, by expressing each hinted sentiment at length, and as fully as it had been expressed before, in any suitable words that should occur to me. Then I compared my *Spectator* with the original, discovered some of my faults, and corrected them. But I found I wanted a stock of words, or a readiness in recollecting and using them, which I thought I should have acquired before that time if I had gone on making verses; since the continual search for words of the same import, but of different length, to suit the measure, or of different sound for the rhyme, would have laid me under a constant necessity of searching for variety, and also have tended to fix that variety in my mind, and make me master of it. Therefore, I took some of the tales in the *Spectator*, and turned them into verse; and after a time, when I had pretty well forgotten the prose, turned them back again. I also

sometimes jumbled my collection of hints into confusion ; and, after some weeks, endeavoured to reduce them into the best order, before I began to form the full sentences and complete the subject. This was to teach me method in the arrangement of the thoughts. By comparing my work with the original, I discovered many faults and corrected them ; but I sometimes had the pleasure to fancy that in certain particulars of small consequence I had been fortunate enough to improve the method or the language ; and this encouraged me to think that I might, in time, come to be a tolerable English writer, of which I was extremely ambitious."

Even at this early age nothing could exceed the perseverance and self-denial which he displayed, in pursuing his favourite object of cultivating his mental faculties to the utmost of his power. When only sixteen, he chanced to meet with a book in recommendation of a vegetable diet, one of the arguments at least in favour of which made an immediate impression upon him—namely, its greater cheapness ; and from this and other considerations, he determined to adopt that way of living for the future. Having taken this resolution, he proposed to his brother, if he would give him weekly only half what his board had hitherto cost, to board himself, an offer which was immediately accepted. He presently found that by adhering to his new system of diet he could still save half what his brother allowed him. "This," says he, "was an additional fund for buying of books ; but I had another advantage in it. My brother and the rest going from the printing-house to their meals, I remained there alone, and dispatching presently my light repast (which was often no more than a biscuit, or a slice of bread, a handful of raisins, or a tart from the pastrycook's, and a glass of water), had the rest of the time, till their return, for study ; in which I made the greater progress, from that greater clearness of head and quicker apprehension which generally attend temperance in eating and drinking." It was about this time that, by means of Cocker's Arithmetic, he made himself master of that science, which he had twice attempted in vain to learn while at school ; and that he also obtained some acquaintance with the elements of geometry, by the perusal of a treatise on Navigation. He mentions, likewise, among the works which he now read, "Locke on the Human Understanding," and the Port-Royal "Art of Thinking," together with two little sketches on the arts of Logic and Rhetoric which he found at the end of an English Grammar, and which initiated him in the Socratic mode of disputation, or that way of arguing by which an antagonist, by being questioned, is imperceptibly drawn into admissions which are afterwards dexterously turned against him. Of this method of reasoning he became, he tells us, excessively fond, finding it very safe for himself and very embarrassing for those against whom he used it ; but he afterwards abandoned it, apparently from a feeling that it gave advantages rather to

cunning than to truth, and was better adapted to gain victories in conversation than either to convince or to inform.

A few years before this his brother had begun to publish a newspaper, the second that had appeared in America. This brought most of the Boston people, who had anything of a literary turn, occasionally to the printing-office; and young Franklin often heard them conversing about the articles that appeared in the newspaper, and the approbation which particular ones received. At last, inflamed with the ambition of sharing in this sort of fame, he resolved to try how a communication of his own would succeed. Having written his paper, therefore, in a disguised hand, he put it at night under the door of the printing-office, where it was found in the morning, and submitted to the consideration of the critics when they met as usual. "They read it," says he; "commented on it in my hearing; and I had the exquisite pleasure of finding it met with their approbation; and that, in their different guesses at the author, none were named but men of some character among us for learning and ingenuity. I suppose," he adds, "that I was rather lucky in my judges, and that they were not really so very good as I then believed them to be." Encouraged, however, by the success of this attempt, he sent several other pieces to the press in the same way, keeping his secret, till, as he expresses it, all his fund of sense for such performances was exhausted. He then discovered himself, and immediately found that he began to be looked upon as a person of some consequence by his brother's literary acquaintances.

This newspaper soon after afforded him, very unexpectedly, an opportunity of extricating himself from his indenture to his brother, who had all along treated him with great harshness, and to whom his rising literary reputation only made him more an object of envy and dislike. An article which they had admitted having offended the local government, his brother, as proprietor of the paper, was not only sentenced to a month's imprisonment, but prohibited from any longer continuing to print the offensive journal. In these circumstances, it was determined that it should appear for the future in the name of Benjamin, who had managed it during his brother's confinement; and, in order to prevent it being alleged that the former proprietor was only screening himself behind one of his apprentices, the indenture by which the latter was bound was given up to him; he at the same time, in order to secure to his brother the benefit of his services, signing new indentures for the remainder of his time, which were to be kept private. "A very flimsy scheme it was," says Franklin; "however, it was immediately executed; and the paper was printed accordingly under my name for several months. At length, a fresh difference arising between my brother and me, I took upon me to assert my freedom, presuming that he would not venture to produce the new indenture. It was not fair in me to take this

advantage ; and this I therefore reckon one of the first *errata* of my life ; but the unfairness of it weighed little with me, when under the impressions of resentment for the blows his passion too often urged him to bestow upon me, though he was otherwise not an ill-natured man : perhaps I was too saucy and provoking."

Finding, however, that his brother, in consequence of this exploit, had taken care to give him such a character to all those of his own profession in Boston, that nobody would employ him there, he now resolved to make his way to New York, the nearest place where there was a printer ; and accordingly, after selling his books to raise a little money, he embarked on board a vessel for that city, without communicating his intention to his friends, who he knew would oppose it. In three days he found himself at the end of his voyage, near three hundred miles from his home, at the age of seventeen, without the least recommendation, as he tells us, or knowledge of any person in the place, and with very little money in his pocket. Worst of all, upon applying to the only printer likely to give him any employment, he found that this person had nothing for him to do, and that the only way in which he could serve him was by recommending him to proceed to Philadelphia, a hundred miles farther, where he had a son, who, he believed, might employ him. We cannot follow our runaway through the disastrous incidents of this second journey ; but, for the reason which he states himself, we shall allow him to give his own most graphic description of his first appearance in Philadelphia :—

After concluding the account of his voyage, "I have been the more particular," he says, "in this description of my journey, and shall be so of my first entry into that city, that you may, in your mind, compare such unlikely beginnings with the figure I have since made there. I was in my working dress, my best clothes coming round by sea. I was dirty from my being so long in the boat ; my pockets were stuffed out with shirts and stockings ; and I knew no one, nor where to look for lodging. Fatigued with walking, rowing, and the want of sleep, I was very hungry ; and my whole stock of cash consisted in a single dollar, and about a shilling in copper coin, which I gave to the boatmen for my passage. At first they refused it, on account of my having rowed ; but I insisted on their taking it. Man is sometimes more generous when he has little money than when he has plenty ; perhaps to prevent his being thought to have but little. I walked towards the top of the street, gazing about till near Market-street, where I met a boy with bread. I had often made a meal of dry bread, and inquiring where he had bought it, I went immediately to the baker's he directed me to. I asked for biscuits, meaning such as we had at Boston ; that sort, it seems, was not made in Philadelphia. I then asked for a three-penny loaf, and was told they had none. Not knowing the different prices, nor the names of the

different sorts of bread, I told him to give me three-penny worth of any sort. He gave me, accordingly, three great puffy rolls. I was surprised at the quantity, but took it; and having no room in my pockets, walked off with a roll under each arm, and eating the other. Thus I went up Market-street, as far as Fourth-street, passing by the door of Mr. Read, my future wife's father, when she, standing at the door, saw me, and thought I made, as I certainly did, a most awkward, ridiculous appearance. Then I turned and went down Chesnut-street and part of Walnut-street, eating my roll all the way, and coming round found myself again at Market-street Wharf, near the boat I came in, to which I went for a draught of the river-water; and being filled with one of my rolls, gave the other two to a woman and her child that came down the river in the boat with us, and were waiting to go farther. Thus refreshed, I walked again up the street, which by this time had many clean-dressed people in it, who were all walking the same way. I joined them, and thereby was led into the great meeting-house of the Quakers, near the market. I sat down among them; and after looking round a while, and hearing nothing said, being very drowsy, through labour and want of rest the preceding night, I fell fast asleep, and continued so till the meeting broke up, when some one was kind enough to rouse me. This, therefore, was the first house I was in, or slept in, in Philadelphia."

Refreshed by his brief sojourn in this cheap place of repose, he then set out in quest of a lodging for the night. Next morning he found the person to whom he had been directed, who was not, however, able to give him any employment; but upon applying to another printer in the place, of the name of Keimer, he was a little more fortunate, being set by him, in the first instance, to put an old press to rights, and afterwards taken into regular work. He had been some months at Philadelphia, his relations in Boston knowing nothing of what had become of him, when a brother-in-law, who was the master of a trading sloop, happening to hear of him in one of his voyages, wrote to him in very earnest terms to entreat him to return home. The letter which he sent in reply to this application reaching his brother-in-law when he chanced to be in company with Sir William Keith, the Governor of the Province, it was shown to that gentleman, who expressed considerable surprise on being told the age of the writer; and immediately said that he appeared to be a young man of promising parts, and that if he would set up on his own account in Philadelphia, where the printers were wretched ones, he had no doubt he would succeed; for his part he would procure him the public business, and do him every service in his power. Some time after this, Franklin, who knew nothing of what had taken place, was one day at work along with his master near the window, when "we saw," says he, "the Governor and another gentleman (who proved to be Colonel French, of Newcastle, in the province of

Delaware), finely dressed, come directly across the street to our house, and heard them at the door. Keimer ran down immediately, thinking it a visit to him; but the Governor inquired for me, came up, and with a condescension and politeness I had been quite unused to, made me many compliments, desired to be acquainted with me, blamed me kindly for not having made myself known to him when I first came to the place, and would have me away with him to the tavern, where he was going with Colonel French, to taste, as he said, some excellent Madeira. I was not a little surprised, and Keimer stared with astonishment."

The reader already perceives that Sir William must have been rather an odd sort of person; and this becomes still more apparent in the sequel of the story. Having got his young protégé to the tavern, he proposed to him, over their wine, that he should as soon as possible set up in Philadelphia as a master printer, only continuing to work with Keimer till an opportunity should offer of a passage to Boston, when he would return home, to arrange the matter with his father, who, the Governor had no doubt, would, upon a letter from him, at once advance his son the necessary funds for commencing business. Accordingly, Franklin set out for Boston by the first vessel that sailed; and, upon his arrival, was very kindly received by all his family, except his brother, and surprised his father not a little by presenting him with the Governor's letter. For some time his father said little or nothing on the subject, merely remarking, that Sir William must be a person of small discretion, to think of setting a youth up in business who wanted three years to arrive at man's estate. But at last he decidedly refused to have anything to do with the arrangement; and Franklin returned to his patron to tell him of his bad success, going this time, however, with the consent and blessing of his parents, who, finding how industrious he had been while in Philadelphia, were willing that he should continue there. When Franklin presented himself to Sir William with his father's answer to the letter he had been honoured with from that functionary, the Governor observed that he was too prudent: "but since he will not set you up," added he, "I will do it myself." It was finally agreed that Franklin should proceed in person to England, to purchase types and other necessary articles, for which the Governor was to give him letters of credit to the extent of a hundred pounds.

After repeated applications to the Governor for the promised letters of credit, Franklin was at last sent on board the vessel for England, which was just on the point of sailing, with an assurance that Colonel French should be sent to him with the letters immediately. That gentleman soon after made his appearance, bearing a packet of dispatches from the Governor: in this packet Franklin was informed his letters were. Accordingly, when they got into the British Channel, the Captain having allowed him to search for them among the others, he

found several addressed to his care, which he concluded of course to be those he had been promised. Upon presenting one of them, however, to a stationer, to whom it was directed, the man, having opened it, merely said, "Oh, this is from Riddlesdon (an attorney in Philadelphia, whom Franklin knew to be a thorough knave); I have lately found him to be a complete rascal;" and, giving back the letter, turned on his heel, and proceeded to serve his customers. Upon this, Franklin's confidence in his patron began to be a little shaken; and, after reviewing the whole affair in his own mind, he resolved to lay it before a very intelligent mercantile gentleman, who had come over from America with them, and with whom he had contracted an intimacy on the passage. His friend very soon put an end to his doubts. "He let me," says Franklin, "into Keith's character; told me there was not the least probability that he had written any letters for me; that no one who knew him had the smallest dependence on him; and he laughed at the idea of the Governor's giving me a letter of credit, having, as he said, no credit to give."

Thus thrown once more on his own means, our young adventurer found there was no resource for him but to endeavour to procure some employment at his trade in London. Accordingly, having applied to a Mr. Palmer, a printer of eminence in Bartholomew close, his services were accepted, and he remained there for nearly a year. During this time, although he was led into a good deal of idleness by the example of a friend, somewhat older than himself, he by no means forgot his old habits of reading and study. Having been employed in printing a second edition of Wollaston's "Religion of Nature," he was led by his perusal of the work to compose and publish a small pamphlet in refutation of some of the author's positions, which, he tells us, he did not afterwards look back upon as altogether a wise proceeding. He employed the greater part of his leisure more profitably in reading a great many works, which (circulating libraries, he remarks, not being then in use) he borrowed, on certain terms that were agreed upon between them, from a bookseller, whose shop was next door to his lodgings in Little Britain, and who had an immense collection of second-hand books. His pamphlet, however, was the means of making him known to a few of the literary characters then in London, among the rest to the noted Dr. Mandeville, author of the "Fable of the Bees;" and to Dr. Pemberton, Sir Isaac Newton's friend, who promised to give him an opportunity some time or other, of seeing that great man: but this, he says, never happened. He also became acquainted about the same time with the famous collector and naturalist, Sir Hans Sloane, the founder of the British Museum, who had heard of some curiosities which Franklin had brought over from America. Among these was a purse made of *asbestos*, which Sir Hans purchased from him.

While with Mr. Palmer, and afterwards with Mr. Watts, near Lincoln's Inn Fields,* he gave very striking evidence of those habits of temperance, self-command, industry, and frugality, which distinguished him through after-life, and were undoubtedly the source of much of the success that attended his persevering efforts to raise himself from the humble condition in which he passed his earlier years. While Mr. Watts's other workmen spent a great part of every week's wages on beer, he drank only water, and found himself a good deal stronger, as well as much more clear-headed, on his light beverage, than they on their strong potations. "From my example," says he, "a great many of them left off their muddling breakfast of beer, bread, and cheese, finding they could with me be supplied from a neighbouring house with a large porringer of hot water-gruel sprinkled with pepper, crumbled with bread, and a bit of butter in it, for the price of a pint of beer, viz., three half-pence. This was a more comfortable, as well as a cheaper breakfast, and kept their heads clearer. Those who continued sopping with their beer all day, were often, by not paying, out of credit at the alehouse, and used to make interest with me to get beer,—*their light*, as they phrased it, *being out*. I watched the pay-table on Saturday night, and collected what I stood engaged for them, having to pay sometimes near thirty shillings a week on their accounts. This, and my being esteemed a pretty good *riggite*, that is, a jocular verbal satirist, supported my consequence in the society. My constant attendance (I never making a *St. Monday*) recommended me to the master; and my uncommon quickness at composing occasioned my being put upon works of despatch, which are generally better paid: so I went on now very agreeably."

He spent about eighteen months altogether in London, during most part of which time he worked hard, he says, at his business, and spent but little upon himself except in seeing plays, and in books. At last his friend Mr. Denham, the gentleman with whom, as we mentioned before, he had got acquainted on his voyage to England, informed him he was going to return to Philadelphia to open a store, or mercantile establishment, there, and offered him the situation of his clerk at a salary of fifty pounds. The money was less than he was now making as a compositor; but he longed to see his native country again, and he accepted the proposal. Accordingly they set sail together; and, after a long voyage, arrived in Philadelphia on the 11th of October, 1726.

* It is said that when Franklin was in England in 1766, holding the appointment of Provincial Agent for the State of Pennsylvania, he one day went to Mr. Watts's printing office, in Wild Court, Wild Street, Lincoln's Inn Fields, and, having entered the press-room, walked up to a particular press, and thus addressed the two men who were at work at it:—"Come, my friends, we will drink together;

it is now forty years since I worked like you at this press, a journeyman printer." He then sent for a gallon of porter, and they drank success to printing. This press was some years ago in the possession of Messrs. Cox and Baylis, Great Queen Street, but has since been sold to "The Franklin Association," and sent to America.

Franklin was at this time only in his twenty-first year; and he mentions having formed, and committed to writing, while at sea, a plan for regulating the future conduct of his life. This, unfortunately, has been lost; but he tells us himself, that, although conceived and determined upon when he was so young, it had yet "been pretty faithfully adhered to quite through to old age."

Mr. Denham had only begun business for a few months when he died; and Franklin was once more left upon the world. He now engaged again with his old master, Keimer, the printer, who had got a better house, and plenty of new types, though he was still as ignorant of his business as he was at the time of Franklin's former connexion with him. While in this situation Franklin got acquainted with several persons, like himself, fond of literary pursuits; and as the men never worked on Saturday, that being Keimer's self-appointed Sabbath, he had the whole day for reading.* He also showed his ingenuity, and the fertility of his resources, on various occasions. They wanted some new types, which, there being no letter-foundry in America, were only to be procured from England; but Franklin, having seen types cast in London, though he had paid no particular attention to the process, contrived a mould, made use of the letters they had as punches, struck the matrices in lead, and thus supplied, as he tells us, in a pretty tolerable way, all deficiencies. "I also," he adds, "engraved several things, on occasion; made the ink; I was warehouseman; and, in short, quite a *factotum*."

He did not, however, remain long with Keimer, who had engaged him only that he might have his other workmen taught through his means; and, accordingly, when this object was in some sort attained, contrived to pick a quarrel with him, which produced an immediate separation. He then entered into an agreement with one of his fellow-workmen, of the name of Meredith, whose friends were possessed of money, to begin business in Philadelphia in company with him, the understanding being that Franklin's skill should be placed against the capital to be supplied by Meredith. While he and his friend, however, were secretly preparing to put their plan into execution, he was induced to return for a few months to Keimer, on his earnest invitation, to enable him to perform a contract for the printing of some paper-money for the State of New Jersey, which required a variety of cuts and types that nobody else in the place could supply; and, the two having gone together to Burlington to superintend this business, Franklin was fortunate enough, during the three months he remained in that city, to acquire, by his agreeable manners and intelligent conversation, the friendship of several of the principal inhabitants, with whom his em-

* Keimer had peculiar notions upon religious observances, and, amongst other things, fancied it a Christian duty to observe the Sabbath on the last day of the week.

ployment brought him into connexion. Among these he mentions particularly, Isaac Decow, the surveyor-general. "He was," says Franklin, "a shrewd, sagacious old man, who told me that he began for himself, when young, by wheeling clay for the brickmakers, learned to write after he was of age, carried the chain for surveyors, who taught him surveying, and he had now by his industry acquired a good estate; and, said he, I foresee that you will soon work this man (Keimer) out of his business, and make a fortune in it at Philadelphia. He had then not the least intimation of my intention to set up there or any where."

Soon after he returned to Philadelphia, the types that had been sent for from London arrived; and, settling with Keimer, he and his partner took a house and commenced business. "We had scarce opened our letters," says he, "and put our press in order, before George House, an acquaintance of mine, brought a countryman to us, whom he had met in the street, inquiring for a printer. All our cash was now expended in the variety of particulars we had been obliged to procure, and this countryman's five shillings, being our first-fruits, and coming so seasonably, gave me more pleasure than any crown I have since earned; and, from the gratitude I felt towards House, has made me often more ready than perhaps I otherwise should have been to assist young beginners." He had in the autumn of the preceding year, suggested to a number of his acquaintances a scheme for forming themselves into a club for mutual improvement; and they had accordingly been in the habit of meeting every Friday evening under the name of the Junto. All the members of this association exerted themselves in procuring business for him; and one of them, named Breinthal, obtained from the Quakers the printing of forty sheets of a history of that sect of religionists, then preparing at the expense of the body. "Upon these," says Franklin, "we worked exceeding hard, for the price was low. It was a folio. I composed a sheet a day, and Meredith worked it off at press. It was often eleven at night, and sometimes later, before I had finished my distribution for the next day's work; for the little jobs sent in by our other friends, now and then, put us back. But so determined was I to continue doing a sheet a day of the folio, that one night, when, having imposed my forms, I thought my day's work over, one of them by accident was broken, and two pages (the half of the day's work) reduced to *pye*, I immediately distributed and composed it over again before I went to bed; and this industry, visible to our neighbours, began to give us character and credit." The consequence was that business, and even offers of credit, came to them from all hands.

They soon found themselves in a condition to think of establishing a newspaper; but, Franklin having inadvertently mentioned this scheme to a person who came to him wanting employment, that individual carried the secret to their old master, Keimer, with whom he, as well as

themselves, had formerly worked; and he immediately determined to anticipate them by issuing proposals for a paper of his own. The manner in which Franklin met and defeated this treachery is exceedingly characteristic. There was another paper published in the place, which had been in existence for some years; but it was altogether a wretched affair, and owed what success it had merely to the absence of all competition. For this print, however, Franklin, not being able to commence his own paper immediately, set about writing, in conjunction with a friend, a series of amusing communications under the title of the "Busy Body," which the publisher printed, of course, very gladly. "By this means," says he, "the attention of the public was fixed on that paper; and Keimer's proposals, which we burlesqued and ridiculed, were disregarded. He began his paper, however, and before carrying it on three-quarters of a year, with at most only ninety subscribers, he offered it to me for a trifle; and I, having been ready some time to go on with it, took it in hand directly, and it proved in a few years extremely profitable to me." The paper, indeed, had no sooner got into Franklin's hands than its success equalled his most sanguine expectations. Some observations which he wrote and printed in it on a colonial subject, then much talked of, excited so much attention among the leading people of the place, that it obtained the proprietors many friends in the House of Assembly, and they were, on the first opportunity, appointed printers to the house. Fortunately, too, certain events occurred about this time which ended in the dissolution of Franklin's connection with Meredith, who was an idle, drunken fellow, and had all along been a mere incumbrance upon the concern. His father failing to advance the capital which had been agreed upon, when payment was demanded at the usual time by their paper-merchant and other creditors, he proposed to Franklin to relinquish the partnership, and leave the whole in his hands, if the latter would take upon him the debts of the company, return to his father what he had advanced on their commencing business, pay his little personal debts, and give him thirty pounds and a new saddle. By the kindness of two friends, who, unknown to each other, came forward unasked to tender their assistance, Franklin was enabled to accept of this proposal; and thus, about the year 1729, when he was yet only in the twenty-fourth year of his age, he found himself, after all his disappointments and vicissitudes, with nothing, indeed, to depend upon but his own skill and industry for gaining a livelihood, and for extricating himself from debt, but yet in one sense fairly established in life, and with at least a prospect of well-doing before him.

Having followed his course thus far with so minute an observance, we need not trace the remainder of his career with the same particularity. His subsequent efforts in the pursuit of fortune and independence were, as is well known, eminently successful; and we find in his whole history,

even to its close, a display of the same spirit of intelligence and love of knowledge, and the same active, self-denying, and intrepid virtues, which so greatly distinguished its commencement. The publication of a pamphlet, soon after Meredith had left him, in recommendation of a paper currency, a subject then much debated in the province, obtained him such popularity, that he was employed by the government in printing the notes after it had been resolved to issue them. Other profitable business of the same kind succeeded. He then opened a stationer's shop, began gradually to pay off his debts, and soon after married. By this time his old rival, Keimer, had gone to ruin; and he was (with the exception of an old man, who was rich, and did not care about the business) the only printer in the place. We now find him taking a leading part as a citizen. He established a circulating library, the first ever known in America, which, although it commenced with only fifty subscribers, became in time a large and valuable collection, the proprietors of which were eventually incorporated by royal charter. While yet in its infancy, however, it afforded its founder facilities of improvement of which he did not fail to avail himself, setting apart, as he tells us, an hour or two every day for study, which was the only amusement he allowed himself. In 1732 he first published, under the name of "Richard Saunders," his celebrated Almanac, commonly known by the name of Poor Richard's Almanac, which he continued annually for twenty-five years, and the proverbs and pithy sentences scattered up and down in the different numbers of which, were afterwards thrown together into a connected discourse under the title of "The Way to Wealth," a production which has become so extensively popular that every one of our readers is probably familiar with it.

We will quote, in his own words, the account he gives of the manner in which he pursued one branch of his studies :

"I had begun," says he, "in 1733, to study languages. I soon made myself so much a master of the French, as to be able to read the books in that language with ease. I then undertook the Italian. An acquaintance, who was also learning it, used often to tempt me to play chess with him. Finding this took up too much of the time I had to spare for study, I at length refused to play any more, unless on this condition, that the victor in every game should have a right to impose a task, either of parts of the grammar to be got by heart, or in translations, &c., which task the vanquished was to perform upon honour before our next meeting. As we played pretty equally, we thus beat one another into that language. I afterwards, with a little painstaking, acquired as much of the Spanish as to read their books also. I have already mentioned that I had only one year's instruction in a Latin school, and that when very young, after which I neglected that language entirely. But when I had attained an acquaintance with the French, Italian, and

Spanish, I was surprised to find, on looking over a Latin Testament that I understood more of that language than I had imagined, which encouraged me to apply myself again to the study of it; and I met with the more success, as those preceding languages had greatly smoothed my way."

In 1736, he was chosen clerk of the General Assembly, and, being soon after appointed Deputy-postmaster for the State, he turned his thoughts to public affairs, beginning, however, as he says, with small matters. He first occupied himself in improving the city watch; then he suggested and promoted the establishment of a fire insurance company; afterwards he exerted himself in organizing a philosophical society, an academy for the education of youth, and a militia for the defence of the province. In short, every part of the civil government, as he tells us, and almost at the same time, imposed some duty upon him. "The Governor," he says, "put me into the commission of the peace; the corporation of the city chose me one of the common council, and soon after alderman; and the citizens at large elected me a Burgess to represent them in the Assembly. This latter station was the more agreeable to me, as I grew at length tired with sitting there to hear the debates, in which, as clerk, I could take no part, and which were often so uninteresting that I was induced to amuse myself with making magic squares or circles, or anything to avoid weariness; and I conceived my becoming a member would enlarge my power of doing good. I would not, however, insinuate that my ambition was not flattered by all these promotions—it certainly was: for, considering my low beginning, they were great things to me; and they were still more pleasing as being so many spontaneous testimonies of the public good opinion, and by me entirely unsolicited."

CHAPTER XIV.

FRANKLIN'S ELECTRICAL DISCOVERIES.

It is time, however, that we should introduce this extraordinary man in a new character. A much more important part in civil affairs than any he had yet acted was in reserve for him. He lived to attract to himself on the theatre of politics the eyes, not of his own countrymen only, but of the whole civilized world; and to be a principal agent in the production of events as mighty in themselves, and as pregnant with mighty consequences, as any belonging to modern history. But our immediate object is to exhibit a portrait of the diligent student, and of the acute and patient philosopher. We have now to speak of Franklin's famous

electrical discoveries. Of these discoveries we cannot, of course, here attempt to give anything more than a very general account. But we shall endeavour to make our statement intelligible, so far as it goes, even to those of our readers to whom the subject may be new.

The term electricity is derived from *electron*, the Greek name for amber, which was known, even in ancient times, to be capable of acquiring, by being rubbed, the curious property of attracting very light bodies, such as small bits of paper, when brought near to them. This virtue was thought to be peculiar to the substance in question, and one or two others, down to the close of the sixteenth century, when our ingenious and philosophic countryman, William Gilbert, a physician of London, announced for the first time, in his Latin treatise on the magnet, that it belonged equally to the diamond and many other precious stones; to glass, sulphur, sealing-wax, rosin, and a variety of other substances. It is from this period that we are to date the birth of the science of Electricity, which, however, continued in its infancy for above a century, and could hardly, indeed, be said to consist of anything more than a collection of unsystematized and ill-understood facts, until it attracted the attention of Franklin.

Among the facts, however, that had been discovered in this interval, the following were the most important. In the first place, the list of the substances capable of being excited by friction to a manifestation of electric virtue had been considerably extended. It was also found that the bodies which had been attracted by the excited substance were immediately after as forcibly repelled by it, and could not be again attracted until they had touched a third body. Other phenomena, too, besides those of attraction and repulsion, were found to take place when the body excited was one of sufficient magnitude. If any other body, not capable of being excited, such as the human hand or a rod of metal, was presented to it, a slight sound would be produced, which, if the experiment was performed in a dark room, would be accompanied with a momentary light. Lastly, it was discovered that the electric virtue might be imparted to bodies not capable of being themselves excited, by making such a body, when insulated, that is to say, separated from all other bodies of the same class by the intervention of one capable of excitation, act either as the rubber of the excited body, or as the drawer of a succession of sparks from it, in the manner that has just been described. It was said, in either of these cases, to be *electrified*; and it was found that if it was touched, or even closely approached, when in this state, by any other body, in like manner incapable of being excited by friction, a pretty loud report would take place, accompanied, if either body were susceptible of feeling, with a slight sensation of pain at the point of contact, and this would instantly restore the electrified body to its usual and natural condition.

In consequence of its thus appearing that all those bodies, and only those, which could not be themselves excited, might in this manner have electricity, as it were, transferred to them, they were designated *conductors*, as well as *non-electrics*: while all *electrics*, on the other hand, were also called *non-conductors*. It is proper, however, that the reader should be aware, that of the various substances in nature, none, strictly speaking, belong exclusively to either of these classes; the truth being merely, that different bodies admit the passage of the electric influence with extremely different degrees of facility, and that those which transmit it readily are called conductors—the metals, and fluids, and living animals particularly belonging to this class; while such as resist its passage, or permit it only with extreme reluctance—among which are amber, sulphur, wax, glass, and silk, are described by the opposite denomination.

The beginning of the year 1746 is memorable in the annals of electricity for the accidental discovery of the possibility of accumulating large quantities of the electric fluid, by means of what was called the Leyden jar or phial. M. Cuneus, of that city, happened one day, while repeating some experiments which had been originally suggested by M. Von Kleist, Dean of the Cathedral in Camin,* to hold in one hand a glass vessel, nearly full of water, into which he had been sending a charge from an electrical machine, by means of a wire dipped into it, and communicating with the prime conductor, or insulated non-electric, exposed in the manner we have already explained to the action of the excited cylinder. He was greatly surprised, upon applying his other hand to disengage the wire from the conductor, when he thought that the water had acquired as much electricity as the machine could give it, by receiving a sudden shock in his arms and breast, much more severe than anything of the kind he had previously encountered in the course of his experiments. The same thing, it was found, took place when the glass was covered, both within and without, with any other conductors than the water and the human hand, which had been used in this instance; as, for example, when it was coated on both sides with tin-foil, in such a manner, however, that the two coatings were completely separated from each other, by a space around the lip of the vessel being left uncovered. Whenever a communication was formed by the interposition of a conducting medium between the inside and outside coating, an instant and loud explosion took place, accompanied with a flash of light, and the sensation of a sharp blow, if the conductor employed was any part of the human body.

The first announcement of the wonders of the Leyden phial excited

* Sir John Leslie's account is, that "the experiment appears to have been originally performed in Poland, but was repeated in November 1745 by Cuneus and Lallemand at Leyden, and described by Musschenbroeck." —Dissertation, in *Encycl. Britannica*.

the curiosity of all Europe. The accounts given of the electric shock by those who first experienced it are quite ludicrous, and well illustrate how strangely the imagination is acted upon by surprise and terror, when novel or unexpected results suddenly come upon it. From these original accounts, as Dr. Priestley observes, could we not have repeated the experiment, we should have formed a very different idea of the electric shock from what it really is, even when given in greater strength than it could have been by those earlier experimenters. It was this experiment, however, that first made electricity a subject of general curiosity. Everybody was eager, notwithstanding the alarming reports that were spread of it, to feel the new sensation; and in the same year in which the experiment was first made at Leyden, numbers of persons, in almost every country in Europe, obtained a livelihood by going about and showing it.

The particulars, then, that we have enumerated may be said to have constituted the whole of the science of Electricity, in the shape in which it first presented itself to the notice of Dr. Franklin. In the way in which we have stated them, they are little more, the reader will observe, than a mass of seemingly unconnected facts, having, at first sight, no semblance whatever of being the results of a common principle, or of being reducible to any general and comprehensive system. It is true that a theory, that of M. Dufay, had been formed before this time to account for many of them, and also for others that we have not mentioned; but it does not appear that Franklin ever heard of it until he had formed his own, which is, at all events, entirely different; so that it is unnecessary for us to take it at all into account. We shall form a fair estimate of the amount and merits of Franklin's discoveries, by considering the facts we have mentioned as really constituting the science in the state in which he found it.

It was in the year 1746, as he tells us himself in the narrative of his life, that, being at Boston, he met with a Dr. Spence, who had lately arrived from Scotland, and who showed him some electrical experiments. They were imperfectly performed, as the doctor was not very expert; "but, being," says Franklin, "on a subject quite new to me, they equally surprised and pleased me. Soon after my return to Philadelphia, our Library Company received from Mr. Peter Collinson, F.R.S. of London, a present of a glass tube, with some account of the use of it in making such experiments. I eagerly seized the opportunity of repeating what I had seen at Boston; and by much practice, acquired great readiness in performing those also which we had an account of from England, adding a number of new ones. I say much practice, for my house was continually full for some time with persons who came to see these new wonders. To divide a little this incumbrance among my friends, I caused a number of similar tubes to be blown in our glass-house, with which they fur-

nished themselves, so that we had at length several performers." The newly-discovered and extraordinary phenomena exhibited by the Leyden phial of course very early engaged his attention in pursuing these interesting experiments; and his inquisitive mind immediately set itself to work to find out the reason of such strange effects, which still astonished and perplexed the ablest philosophers of Europe. Out of his speculations arose the ingenious and beautiful theory of the action of the electric influence which is known by his name.

Dr. Franklin's earliest inquiries were directed to ascertain the *source* of the electricity which friction had the effect of at least rendering manifest in the glass cylinder, or other electric. The question was, whether this virtue was created by the friction in the electric, or only thereby communicated to it from other bodies. In order to determine this point, he resorted to the very simple experiment of endeavouring to electrify himself, that is to say, having insulated himself, and excited the cylinder by rubbing it with his hands, he then drew off its electricity from it in the usual manner into his own body. But he found that he was not thereby electrified at all, as he would have been by doing the same thing, had the friction been applied by another person. No spark could be obtained from him, after the operation, by the presentment of a conductor; nor did he produce on such bodies as were brought near him any of the other usual evidences of being charged with electricity.

If the electricity had been created in the electric by the friction, it was impossible to conceive why the person who drew it off should not have been electrified in this case, just as he would have been had another person acted as the rubber. The result evidently indicated that the friction had effected a change upon the person who had performed that operation, as well as upon the cylinder, since it had rendered him incapable of being electrified by a process by which, in other circumstances, he would have been so. It was plain, in short, that the electricity had passed, in the first instance, out of his body into the cylinder; which, therefore, in communicating it to him in the second instance, only gave him back what it had received, and, instead of electrifying him, merely restored him to his usual state—to that in which he had been before the experiment was begun.

This accordingly was the conclusion to which Franklin came: to confirm it, he next insulated two individuals, one of whom he made to rub the cylinder, while the other drew the electricity from it. In this case, it was not the latter merely that was affected; both were electrified. The one had given out as much electricity to the cylinder in rubbing it, as the other had drawn from it. To prove this still farther, he made them touch one another, when both were instantly restored to their usual state, the redundant electricity thrown off by the one exactly

making up the deficiency in the other. The spark produced by their contact was also, as was to have been expected, greater than that which took place when either of them was touched by any third person who had not been electrified.

Proceeding upon the inferences which these results seemed so evidently to indicate, Franklin constructed the general outlines of his theory. Every body in nature he considered to have its natural quantity of electricity, which may, however, be either diminished by part of it being given out to another body, as that of the rubber, in the operation of the electrical machine, is given out to the cylinder; or increased, as when the body is made to receive the electricity from the cylinder. In the one case he regarded the body as *negatively*, in the other as *positively*, electrified. In the one case it had less, in the other more, than its natural quantity of electricity; in either, therefore, supposing it to be composed of electricity and common matter, the usual equilibrium or balance between its two constituent ingredients was, for the time, upset or destroyed.

But how should this produce the different effects which are observed to result from the action of electrified bodies? How is the mere circumstance of the overthrow of the customary equilibrium between the electricity and the matter of a body, to be made to account for its attraction and repulsion of other bodies, and for the extraordinary phenomena presented by the Leyden phial? The Franklinian theory answers these questions with great ease and completeness.

The fundamental law of the electric fluid, according to this theory, is, that its particles attract matter, and repel one another. To this we must add a similar law with regard to the particles of matter, namely, that they repel each other, as well as attract electricity. This latter consideration was somewhat unaccountably overlooked by Franklin; but was afterwards introduced by Æpinus, of Petersburg, and our celebrated countryman, Mr. Cavendish, in their more elaborate expositions of his theory of the electrical action. Let us now apply these two simple principles to the explanation of the facts we have already mentioned.

In the first place, when two bodies are in their ordinary or natural state, the quantity of matter is an exact balance for the quantity of electricity in each, and there is accordingly no tendency of the fluid to escape; no spark will take place between two such bodies when they are brought into contact. Nor will they either attract or repel each other, because the attractive and repulsive forces operating between them are exactly balanced, the two attractions, of the electricity in the first for the matter in the second, and of the electricity in the second for the matter in the first, being opposed by the two repulsions of the electricity in the first for the electricity in the second, and of the matter in the first for the matter in the second. They, therefore, produce no effect upon each other whatever.

But let us next suppose that one of the bodies is an electric which has been excited in the usual way by friction, a stick of wax, or a glass cylinder, for example, which has been rubbed with the hand, or a piece of dry silk. In this case, the body in question has received an addition to its natural quantity of electricity, which addition, accordingly, it will most readily part with whenever it is brought into contact with a conductor. But this is not all. Let us see how it will act, according to the law that has been stated, upon the other body, which we shall suppose to be in its natural state when they are brought near each other. First, from the repulsive tendency of the electric particles, the extra electricity in the excited body will drive away a portion of the electricity of the other from its nearest end, which will thus become negatively electrified, or will consist of more matter than is necessary to balance its electricity. In this state of things, what are the attractive and repulsive forces operating between the two bodies, the one, be it remembered, having an excess of electricity, and the other an excess of matter? There are, in fact, five attractive forces opposed by only four repulsive; the former being those of the matter in the first body for the electricity in the second, of the balanced electricity in the first for the balanced matter in the second, of the same for the extra matter in the second, together with the two of the extra electricity in the first for the same two quantities of matter; and the latter being those of the matter in the first for the balanced matter in the second, of the same for the extra matter in the second, together with those of the electricity in the second both for the balanced and the extra electricity in the first. The two bodies therefore, ought to meet, as we find they actually do. But no sooner do they meet than the extra electricity of the first, attracted by the matter of the second, flows over partly to it, and both bodies become positively electrified; that is to say, each contains a quantity of electricity beyond that which its matter is capable of balancing. It will be found, upon examination, that we have now four powers of attraction opposed by five of repulsion; the former being those of the matter in each body for the two electricities in the other, the latter those exerted by each of the electricities in the one against both the electricities of the other, together with that of the matter in the one for the matter in the other. The bodies now accordingly should repel each other, just as we find to be the fact. Of course the same reasoning applies to the case of a neutral body and any other containing a superabundance of electricity, whether it be an electric or no, and in whatever way its electricity may have been communicated to it. We may add that there is no case of attraction or repulsion between two bodies in which the results indicated by the theory do not coincide with those of observation as exactly as in this.

We now come to the phenomena of the Leyden phial. The two

bodies upon which we are here to fix our attention are the interior and exterior coatings, which, before the process of charging has commenced, are of course in their natural state, each having exactly that quantity of electricity which its matter is able to balance, and neither therefore exerting any effect whatever upon the other. But no sooner has the interior coating received an additional portion of electricity from the prime conductor, with which the reader will remember it is in communication, than, being now positively electrified, it repels a corresponding portion of its electricity from the exterior coating, which therefore becomes negatively electrified. As the operation goes on, both these effects increase, till at last the superabundance of electricity in the one surface, and its deficiency in the other, reach the limit to which it is wished to carry them. All this while, it will be remarked, the former is prevented from giving out its superfluity to the latter by the interposition of the glass, which is a non-conductor, and the uncovered space which had been left on both sides around the lip of the vessel. If the charge were made too high, however, even these obstacles would be overcome, and the unbalanced electricity of the interior coating, finding no easier vent, would at last rush through the glass to the unsaturated matter on its opposite surface, probably shattering it to pieces in its progress. But, to effect a discharge in the usual manner, a communication must be established by means of a good conductor between the two surfaces, before this extreme limit be reached. If either a rod of metal, for example, or the human body, be employed for this purpose, the fluid from the interior coating will instantly rush along the road made for it, occasioning a pretty loud report, and, in the latter case, a severe shock, by the rapidity of its passage. Both coatings will, in consequence, be immediately restored to their natural state.

That this is the true explanation of the matter, Franklin further demonstrated by a variety of ingenious experiments. In the first place, he found that, if the outer coating was cut off, by being insulated from every conducting body, the inner coating could not be charged; the electricity in the outer coating had here no means of escape, and it was consequently impossible to produce in that coating the requisite negative electricity. On the other hand, if a good conductor was brought within the striking distance from the outside coating, while the process of charging was going on, the expelled fluid might be seen passing away towards it in sparks, in proportion as more was sent from the prime conductor into the inside of the vessel. He observed also that, when a phial was charged, a cork ball, suspended on silk, would be attracted by the one coating when it had been repelled by the other—an additional indication and proof of their opposite states of electricity, as might be easily shown by an analysis of the attractive and repulsive forces operating between the two bodies in each case.

But Franklin did not rest contented with ascertaining the principle of the Leyden phial. He made also a very happy application of this principle, which afforded a still more wonderful manifestation than had yet been obtained of the powers of accumulated electricity. Considering the waste that took place, in the common experiment, of the fluid expelled, during the process of charging, from the exterior coating, he conceived the idea of employing it to charge the inner surface of a second jar, which he effected, of course, by the simple expedient of drawing it off by means of a metal rod communicating with that surface. The electricity expelled from the outside of this second jar was conveyed, in like manner, into the inside of a third: and, in this way, a great number of jars were charged with the same facility as a single one. Then, having connected all the inside coatings with one conductor, and all the outside coatings with another, he had merely to bring these two general conductors into contact or communication, in order to discharge the whole accumulation at once. This contrivance he called an *Electrical Battery*.

The general sketch we have just given will put the reader in possession, at least, of the great outlines of the Franklinian theory of electricity, undoubtedly one of the most beautiful generalizations to be found in the whole compass of science. By the aid of what we may call a single principle, since the law with regard to the electric fluid and common matter is exactly the same, it explains satisfactorily not only all the facts connected with this interesting subject which were known when it was first proposed, but all those that have been since discovered, diffusing order and light throughout what seemed before little better than a chaos of unintelligible contradictions. We must now, however, turn to a very brilliant discovery of this illustrious philosopher, the reality of which does not depend upon the truth or falsehood of any theory.

Franklin was by no means the first person to whom the idea had suggested itself of a similarity between electricity and lightning. Not to mention many other names which might be quoted, the Abbé Nollet had, before him, not only intimated his suspicion that thunder might be in the hands of Nature what electricity is in ours, but stated a variety of reasons on which he rested his conjecture. It is to Franklin alone, however, that the glory belongs of both pointing out the true method of verifying this conjecture, and of actually establishing the perfect identity of the two powers in question. "It has, indeed, been of late the fashion," says the editor of the first account of his electrical experiments, published at London in 1751, "to ascribe every grand or unusual operation of nature, such as lightning and earthquakes, to electricity; not, as one would imagine from the manner of reasoning on these occasions, that the authors of these schemes have discovered any

connection betwixt the cause and effect, or saw in what manner they were related; but, as it would seem, merely because they were unacquainted with any other agent, of which it could not positively be said the connection was impossible." Franklin transformed what had been little more than a figure of rhetoric into a most important scientific fact.

In a paper, dated November 7, 1749, he enumerates all the known points of resemblance between lightning and electricity. In the first place, he remarks, it is no wonder that the effects of the one should be so much greater than those of the other; for if two gun-barrels electrified will strike at two inches distance, and make a loud report, at how great a distance will ten thousand acres of electrified cloud strike, and give its fire; and how loud must be that crack! He then notices the crooked and waving course both of the lightning, and, in some cases, of the electric sparks; the tendency of lightning, like electricity, to take the readiest and best conductor; the facts that lightning, as well as electricity, dissolves metals, burns some bodies, rends others, strikes people blind, destroys animal life, reverses the poles of magnets, &c.

He had known for some time the extraordinary power of pointed bodies, both in drawing and in throwing off the electric fire. The true explanation of this fact did not occur to him; but it is a direct consequence of the fundamental principle of his own theory, according to which the repulsive tendency of the particles of electricity towards each other, occasioning the fluid to retire, in every case, from the interior to the surface of bodies, drives it with especial force towards points and other prominences, and thus favours its escape through such outlets; while, on the other hand, the more concentrated attraction which the matter of a pointed body, as compared with that of a blunt one, exerts upon the electricity to which it is presented, brings it down into its new channel in a denser stream. In possession, however of the fact, we find him concluding the paper we have mentioned as follows:—"The electric fluid is attracted by points. We do not know whether this property be in lightning; but, since they agree in all the particulars in which we can already compare them, it is not improbable that they agree likewise in this. Let the experiment be made."

Full of this idea, it was yet some time before he found what he conceived a favourable opportunity of trying its truth in the way he meditated. A spire was about to be erected in Philadelphia, which he thought would afford him facilities for the experiment; but, his attention having been one day drawn by a kite which a boy was flying, it suddenly occurred to him, that here was a method of reaching the clouds preferable to any other. Accordingly, he immediately took a large silk handkerchief, and stretching it over two cross sticks, formed in this manner his simple apparatus for drawing down the lightning from its cloud. Soon

after, seeing a thunderstorm approaching, he took a walk into a field in the neighbourhood of the city, in which there was a shed, communicating his intentions, however, to no one but his son, whom he took with him, to assist him in raising the kite. This was on Thursday the 15th of June, 1752.

The kite being raised, he fastened a key to the lower extremity of the hempen string, and then, insulating it by attaching it to a post by a cord of silk, he placed himself under the shed, and waited the result. For some time no signs of electricity appeared. A cloud, apparently charged with lightning, had even passed over them without producing any effect. At length, however, just as Franklin was beginning to despair, he observed some loose threads of the hempen string rise and stand erect, exactly as if they had been repelled from each other by being charged with electricity. He immediately presented his knuckle to the key, and, to his inexpressible delight, drew from it the well-known electrical spark. It is said that his emotion was so great at this completion of a discovery which was to make his name immortal, that he heaved a deep sigh, and felt that he could that moment have willingly died. As the rain increased, the cord became a better conductor, and the key gave out its electricity copiously. Had the hemp been thoroughly wet, the bold experimenter might, as he was contented to do, have paid for his discovery with his life.

He afterwards brought down the lightning into his house by means of an insulated iron rod, and performed with it, at his leisure, all the experiments that could be performed with electricity. But he did not stop here. His active and practical mind was not satisfied even with the splendid discovery he had made, until he had turned it to a useful end. It suggested to him, as is well known, the idea of a method of preserving buildings from lightning, which is extremely simple and cheap, as well as effectual; consisting, as it does, in nothing more than attaching to the building a pointed metallic rod, rising higher than any part of it, and communicating at the lower end with the ground. This rod the lightning is sure to seize upon in preference to any part of the building; by which means it is conducted to the earth, and prevented from doing any injury. There was always a strong tendency in Franklin's philosophy to these practical applications. The lightning-rod was probably the result of some of the amusing experiments with which Franklin was, at the commencement of his electrical investigations, accustomed to employ his own leisure, and afford pleasure to his friends. In one of his letters to Mr. Collinson, dated so early as 1748, we find him expressing himself in the following strain, in reference to his electrical experiments:—"Chagrined a little that we have hitherto been able to produce nothing in this way of use to mankind, and the hot weather coming on, when electrical experiments are not so agreeable, it

is proposed to put an end to them for this season, somewhat humorously, in a party of pleasure on the banks of *Skuykill*. Spirits at the same time are to be fired by a spark sent from side to side through the river, without any other conductor than the water—an experiment which we have some time since performed to the amazement of many. A turkey is to be killed for dinner by the *electrical shock*, and roasted by the *electrical jack*, before a fire kindled by the *electrical bottle*; when the healths of all the famous electricians in *England, Holland, France, and Germany*, are to be drunk in *electrified bumpers*, under the discharge of guns from the *electrified battery*.*

Franklin's electrical discoveries did not, on their first announcement, attract much attention in England; and, indeed, he had the mortification of learning that his paper on the similarity of lightning to electricity, when read by a friend to the Royal Society, had been only laughed at by that learned body. In France, however, the account that had been published in London of his experiments, fortunately fell into the hands of the celebrated naturalist, Buffon, who was so much struck with it, that he had it translated into French, and printed at Paris. This made it immediately known to all Europe; and versions of it in various other modern languages soon appeared, as well as one in Latin. The theory propounded in it was at first violently opposed in France by the Abbé Nollet, who had one of his own to support, and, as Franklin tells us, could not at first believe that such a work came from America; but said it must have been fabricated by his enemies at Paris. The Abbé was eventually, however, deserted by all his partisans, and lived to see himself the last of his sect. In England, too, the Franklinian experiments gradually began to be more spoken of; and, at last, even the Royal Society was induced to resume the consideration of the papers that had formerly been read to them. One of their members verified the grand experiment of bringing down lightning from the clouds; and upon his reading to them an account of his success, "they soon," says Franklin, "made me more than amends for the slight with which they had before treated me. Without my having made any application for that honour, they chose me a member; and voted that I should be excused the customary payments, which would have amounted to twenty-five guineas; and ever since have given me their Transactions gratis. They also presented me with the gold medal of Sir Godfrey Copley, for the year 1753, the delivery of which was accompanied with a very handsome speech of the President, Lord Macclesfield, wherein I was highly honoured." Some years afterwards, when he was in this

* The *Skuykill*, it is remarked in the original account, is "the river that washes one side of Philadelphia, as the Delaware does the other; both are ornamented with summer habitations of the citizens, and the agreeable mansions of the principal people of

this colony." An electrical bumper, we are further informed, was a small tumbler of thin glass, nearly filled with wine, and electrified, which, when brought to the lips, gave a shock, if the person drinking was close shaved and did not breathe on the liquor.

country with his son, the University of St. Andrew's conferred upon him the degree of Doctor of Laws; and the example was followed by the Universities of Edinburgh and Oxford. He was also elected a member of many of the learned societies throughout Europe.

No philosopher of the age now stood on a prouder eminence than this extraordinary man, who had originally been one of the most obscure of the people, and had raised himself to all this distinction almost without the aid of any education but such as he had given himself. Who will say, after reading his story, that anything more is necessary for the attainment of knowledge than the determination to attain it?—that there is any other obstacle to even the highest degree of intellectual advancement which may not be overcome, except a man's own listlessness or indolence? The secret of this man's success in the cultivation of his mental powers was, that he was ever awake and active in that business; that he suffered no opportunity of forwarding it to escape him unimproved; that, however poor, he found at least a few pence, were it even by diminishing his scanty meals, to pay for the loan of the books he could not buy; that, however hard-wrought, he found a few hours in the week, were it by sitting up half the night after toiling all the day, to read and study them. Others may not have his original powers of mind; but his industry, his perseverance, his self-command, are for the imitation of all; and, though few may look forward to the rare fortune of achieving discoveries like his, all may derive both instruction and encouragement from his example. They who may never overtake the light may at least follow its path, and guide their footsteps by its illumination.

Were we to pursue the remainder of Franklin's history, we should find the fame of the patriot vying with that of the philosopher in casting a splendour over it; and the originally poor and unknown tradesman standing before kings, associating as an equal with the most eminent statesmen of his time, and arranging along with them the wars and treaties of mighty nations. When the struggle of American Independence commenced, he was sent as ambassador from the United States to the Court of France, where he soon brought about an alliance between the two countries, which produced an immediate war between the latter and England. In 1783, he signed, on the part of the United States, the treaty of peace with England, which recognised their Independence. Two years after he returned to his native country, where he was received with acclamation by his grateful and admiring fellow-citizens, and immediately elected President of the Supreme Executive Council. He closed his eventful and honourable life on the 17th of April, 1790, in the eighty-fifth year of his age.

CHAPTER XV.

DEVOTION TO KNOWLEDGE IN EXTREME POVERTY:—ERASMUS; KEP-
LER; SCHAEFFER; BULLINGER; MUSCULUS; POSTELLUS; CASTALIO;
ADRIAN VI.; PERRIER; CLAUDE LORRAINE; SALVATOR ROSA; MAR-
MONTEL; HOCHÉ; LAGRANGE; DR. JOHNSON; DR. PARR; SPAGNOLETTA;
LE JAY; CASTELL; DAVIES; TYTLER; WILLIAM DAVY.—IN EXILE
AND IMPRISONMENT:—OVID; BOETHIUS; BUCHANAN; TASSO; SMART;
MAGGI; LE MAISTRE; LORENZINI; PRYNNE; MADAME ROLAND; RA-
LEIGH; LADY JANE GREY; JAMES I. (OF SCOTLAND); LOVELACE.

IN attempting to illustrate such a subject as the triumphs of the Love of Knowledge, and to set forth the exceeding might of that passion, the delight with which the indulgence of it is fraught, and the obstacles of all sorts in the way of its gratification which it has so often overcome, the materials which present themselves are so abundant and so various, that the chief difficulty in using them is which to choose. The examples we have already cited may be considered sufficient to show how perfectly practicable it is to unite the pursuit of literature with that of any description of business or professional occupation. We shall now proceed to notice some aspirants after knowledge, who have had other difficulties to struggle with than those arising from either the seducing excitements or engrossing cares and toils of active life.

Anecdotes illustrating the devotion with which knowledge has been pursued under the pressure of severe penury, or other forms of worldly misfortune, are evidences, not of any calamities to which literature has a peculiar tendency to expose its votaries, but rather of the power with which it arms them to conquer and rise superior to calamities. Students, and authors, and men of genius, have their share of adversity with others; but few others enjoy their peculiar advantages, if not for warding it off, at least for bearing up against it. The man who is most to be pitied under misfortune is he whose whole happiness or misery hangs on outward circumstances. The scholar has sources of enjoyment within himself of which no severity of fortune can altogether deprive him. Hence, a man who is truly in love with philosophy will often make light of sufferings and privations which to another would be almost intolerable: if his body be in want, his mind has store of riches. When ERASMUS was a poor student at Paris, he was indeed very anxious to be a little richer; but, almost in rags as he was, it was not fine or even comfortable raiment after which he principally longed. "As soon as I get money," says he, in a letter to a friend, "I will buy, first Greek books, and then clothes." "It is the mind," says Shakspeare, "that

makes the body rich :” and so the young scholar felt. Of his two contemplated purchases, it was not the clothes, he knew, but the Greek books, that were to bring him anything permanent, in the way either of enjoyment or of distinction.

And similar to those of Erasmus have been the feelings of many another aspirant after intellectual eminence, when struggling, like him, with the inconveniences of indigence, or braving every variety of labour and privation in pursuit of the object on which his heart was set. The illustrious KEPLER spent his life in poverty ; yet, amidst all his difficulties, he used to declare that he would rather be the author of the works he had written than possess the duchy of Saxony. There is hardly any severity of endurance to which ardent spirits have not subjected themselves, under the inspiration of an attachment to literature or the arts. The German naturalist, SCHAEFFER, was so poor when he entered the University of Halle, that for the first six months of his attendance his whole expenditure did not exceed a few halfpence a-day : a little bread and a few vegetables boiled in water were his only food ; and, although the winter was a very rigorous one, no fire ever warmed his chimney. Yet all this he bore cheerfully, counting the opportunity he enjoyed of pursuing his studies as more than a compensation for it all. This heroism, indeed, has never been uncommon among German scholars. We have already mentioned the cases of Heyne and Winckelman. The latter, according to a practice not unusual among poor students in that country, was wont, while attending the grammar-school, to support himself chiefly by singing at night through the streets ; and not himself only, but in a great measure his father also. But Winckelman’s expenses were always on the very humblest scale. Even when his fondest wishes were at last crowned by an opportunity having been afforded him of visiting Rome, he considered himself in possession of an ample revenue in the pension of a hundred crowns, which he was allowed, by his patron Father Rauch, in addition to his board, which he had free. The learned theologian, HENRY BULLINGER, one of the distinguished names of the Reformation, had also supported himself at school for several years by his talents as a street-musician. His contemporary and fellow-labourer in the same cause, WOLFGANG MUSCULUS, had commenced his career as a scholar in a similar manner, having for some time sung ballads through the country, and begged his way from door to door, in order to obtain a pittance wherewith to put himself to school : till he was at length charitably received into a convent of Benedictine monks, who, greatly to his delight, offered to educate him, and admit him of their order. Musculus was afterwards, on embracing the tenets of the Lutherans, reduced to such distress, that he was obliged to send his wife to service, and to bind himself apprentice to a weaver of Strasburg, who no sooner discovered his heretical opinions than he

turned him out of doors. He had then no other resource but to offer himself as a common labourer to assist in repairing the fortifications of the city. Yet even in this condition he employed every moment he could spare in study; and applied himself, in particular, with so much ardour to the Hebrew language, that he placed himself eventually almost at the head of the scholars by whom that branch of learning was cultivated in his time.

Another great Orientalist of that age, and in many respects one of the most extraordinary characters of any age, WILLIAM POSTELLUS, was, when a mere boy, so fond of reading, that he would often, it is related, while engaged with his book, forget to take his meals. Having set out from his native village in Normandy, for Paris, in the expectation of finding means to pursue his studies in that capital, he was attacked, in the course of his journey, by robbers, who took from him all the little he had in the world, and used him besides so barbarously, that he was obliged to take refuge in a hospital, where he lay for two years before his health was restored. On his recovery, he bent his steps once more towards Paris; being at the time, however, in such a state of destitution, that he had no way of obtaining wherewithal to buy himself a coat, except by offering his services as a reaper to assist in cutting down the crop which then happened to be ready for the sickle. Having arrived at Paris, he thought himself fortunate in being received as a domestic into the College of St. Barbe, not doubting that even this situation would afford him, in some degree, those opportunities of improvement which he so ardently longed for. Accordingly, having contrived to get possession of a Greek and a Hebrew grammar, he soon made himself master of both these languages, solely by his own efforts; and, although the fragments of time he could steal from the duties of his humble place were all the leisure he had for study, he afterwards became one of the greatest scholars of his time, being distinguished especially for his knowledge both of ancient and modern languages, of which there was scarcely one that he was not familiar with. To his vast acquirements, however, he added, in the latter part of his life, no little extravagance both of opinion and conduct: and, indeed, some of his notions could have proceeded from nothing else than partial derangement. But it does not belong to our present purpose to pursue this part of his history. Some of his works exhibit an extraordinary mixture of learning and genius, with the most singular delusion and absurdity.

SEBASTIAN CASTALIO, whose elegant Latin version of the Scriptures we have mentioned in a former chapter, was for many years of his life so poor, that, having a wife and family to support, he was obliged to employ the whole day in labouring in the fields, and could give only the earlier part of the morning to study. Yet, even in these circumstances

literature was the great consolation of his life. Calvin, with whom he had quarrelled, having, in the heat of controversy, allowed himself directly to charge him with theft, because he was in the habit of occasionally bringing home with him a little wood to serve for fuel, was answered by Castalio in a mild but dignified remonstrance, in which he admits that, as he dwelt on the banks of the Rhine, he had indeed been sometimes accustomed to employ himself, at leisure hours, in catching with a hook the floating wood which it carries down in its inundations, in order to warm his family,—the wood being in fact, he remarks, public property, and belonging to the first taker. And this he did, he says, being at the time wholly occupied with his translation of the Scriptures, and resolved rather to beg than to quit it. Such a love for literature as this would have almost made beggary honourable.

Pope ADRIAN VI. was the son of a poor barge-builder of Utrecht, who, desirous of procuring for his son a good education, and yet unable to pay for it, found means at last to get him admitted among the boys educated gratuitously at the University of Louvain. While attending this seminary, however, the pecuniary resources of the young scholar were so extremely scanty, that he was unable to afford himself candles whereby to study at night. But he did not on that account spend his time in idleness. He used to take his station, we are told, with his book in his hand, in the church porches, or at the corners of the streets, where lamps were generally kept burning, and to read by their light. After passing through a succession of ecclesiastical preferments, which he owed to his eminent acquirements and unimpeachable character, Adrian was appointed preceptor to the young Archduke Charles, grandson to Ferdinand, King of Spain, who afterwards became so powerful and celebrated as the Emperor Charles V. To this connection he was indebted for his elevation to the papal throne, which he ascended in the sixty-second year of his age, and occupied for two years, having died in 1523. The short time he held this lofty station was not, however, the happiest period of Adrian's life, as the following inscription, which he desired to be placed over his tomb, may testify:—
“Here lies Adrian VI., who esteemed no misfortune which happened to him in life so great as his being called to govern.” A striking lesson to that ambition whose aim is only high place and domination, as if man were ever to find true satisfaction in that which is not within himself, but has both its support and its object, its beginning and its end, in the changing and perishing things around him. Thus, too, felt the contemporary of Adrian, the great Cardinal Ximenes, when, after having arrived at the dignities of Archbishop of Toledo, Regent of Spain, and one of the Princes of the Church, he used to sigh for the groves of his beloved Castagnar (the religious establishment embosomed among the chestnuts), where, when only a simple monk, he had lived

on the humblest fare, in a hut constructed by his own hands; forgetting the world, and desiring nothing so much as to be forgotten by it.

We have already had occasion to quote several examples of the enthusiasm with which cultivators of the fine arts have devoted themselves to the acquisition of that knowledge and skill to which they afterwards owed their eminence and fame. The dream of every young artist's ambition is Rome. The French painter, FRANCIS PERRIER, when a young man, living in poverty and obscurity at Lyons, was haunted by so eager a desire of visiting "the eternal city," that he gladly consented to act as guide to a blind person who was travelling thither, on condition that the latter should pay the expenses of both; and in this way, after a journey of above four hundred miles on foot, he arrived among those monuments of ancient and modern genius, which, ere he had yet seen them, he had so long and fondly worshipped in fancy. The first engagement he obtained was a humble and laborious one—to make copies for a dealer in paintings from originals of merit; but he profited by the advantage it afforded him of studying the works of several distinguished masters. Perrier afterwards established himself in Paris, and obtained a high reputation among the artists of his day. He died in that city in 1660.

CLAUDE LORRAINE is said to have been originally apprenticed to a pastry-cook, and to have been, on his first appearance in Rome, so destitute of resources, that he was obliged to accept of the meanest employment connected with the art he was desirous of studying, and in which he afterwards attained so rare an eminence. SALVATOR ROSA, who was born in 1615, a few years later than Claude, had made himself already an able painter, principally by the study of nature, while still residing in his native village in the neighbourhood of Naples, and before he had ever been able to gratify his earnest desire of visiting Rome. Salvator's genius, indeed, was nursed in hardships and sorrows, which yet had only the effect of strengthening and exalting it. When very young, he had been left, by the death of his father, the sole support of his mother and sisters; and so heavily did this burden press upon him, that, although he wrought hard, he was sometimes, it has been said, after finishing a picture, scarcely able to save enough from the scanty price he received for it, to purchase the canvas for another. He was in his twentieth year, when a friend and brother artist, somewhat richer than himself, proposed to take him to Rome with him, and to pay the expenses of both; an offer which Salvator gladly accepted. When he found himself at last in that celebrated capital, his ardour would scarcely suffer him to take sustenance or repose, while he examined, with the enthusiasm of a painter and a poet, the precious remains of ancient art by which he was surrounded; and the incessant fatigue to which he exposed himself at last brought

on an attack of fever, which rendered it necessary for him to be carried back to Naples. It was some years before it was again in his power to visit Rome; but it continued to fill his visions of the future, and to make his residence at Naples seem an exile. At length, however, his eye rested once more on the objects among which his heart had so long been. Rome was at this time crowded with painters, whose names have now become the household words of fame, and several of whom were even already regarded with an admiration as great as is ever bestowed on living genius. But, undismayed by their glory, Salvator aspired from the first to be, not the imitator of any of them, but their competitor and rival,—to form a style, and found a school, of his own. We need not say how greatly he succeeded in this object, since his name, too, is now familiar to every ear, as one of the most distinguished in the second generation of the great painters of Italy.

The celebrated MARMONTEL was born of parents who belonged to the humblest rank of the people, and was indebted for the elements of education to the charity of a priest. The able and accomplished French general HOCHÉ, who so greatly distinguished himself in the early wars of the Revolution, was originally a stable boy. While in that situation, and after having enlisted in the army, which he did at the age of sixteen, he used to work at any employment he could find during the day, to get money to buy books, which he would often spend the greater part of the night in reading. And Hoche continued to be all his life fond of study. When he was arrested and thrown into prison under the suspicious despotism of Robespierre, with the prospect of being at any moment dragged off to the guillotine, from which he was only saved by the death of the tyrant, he found in his books what often made him forget the horrors of his situation, and more than compensated him, as he afterwards felt, for all that he had suffered. LAGRANGE, the French translator of Lucretius, was so poor while attending the University, that his only food for the day was a little bread, which he carried with him from home in the morning, and used to eat in an alley, or the vestibule of a church, during the intervals between the different classes. Dr. JOHNSON was indebted for his maintenance at college to the scanty aid of a wealthy individual, who professed to keep him there as a companion to his son. The learned Dr. PARR, after having, at the early age of fourteen, distinguished himself above all his schoolfellows at Harrow, was taken from school by his father, who wished to initiate him in his own business of a surgeon and apothecary. Young Parr, however, continued still to pursue his studies with as much benefit as before, by getting one or other of his old companions to report to him the master's remarks on the lesson of every day as it was read; until his father, finding the contest with nature likely in this case to turn out a vain one, at last consented that he should proceed to the

University. He had been but a short time, however, at Cambridge, when his father died; and that event, leaving him almost literally



DR. JOHNSON

penniless, compelled him with a heavy heart to bid farewell also to this new theatre of his ambition. Yet these cruel disappointments, and a long succession of other struggles with indigence and misfortune, by which they were followed, did not prevent Parr from attaining eventually the distinction he merited, and becoming one of the greatest scholars of his time. Such early difficulties form often, indeed, the very influences to which no small portion of the future eminence of their victims is to be attributed. The illustrious French mathematician Lagrange used to say, that he certainly never should have been the mathematician he had turned out, if he had been born to a fortune, instead of having had to make his own way to one.

It is related of the painter, Joseph Ribera, commonly called Lo SPAGNOLETTO (the little Spaniard), that, after having for some time pursued his art at Rome in great indigence, he was patronised by one of the Cardinals, who, giving him apartments in his palace, enabled him to live at his ease; but that, after a while, finding himself growing indolent amidst his new comforts and luxuries, he actually withdrew himself from their corrupting influence, and voluntarily returned to poverty and labour—thus exhibiting the choice of Hercules in real life, and verifying the beautiful fiction of Prodicus.

It has been the same with the devotees of literature, many of whom have pursued the objects upon which their hearts were set with a resolution which no difficulties seem to have had any effect in alarming or impairing. The French Polyglot Bible of 1645, in ten volumes folio, was the undertaking of an advocate of Paris, GUY MICHAEL LE JAY, who, having spent his fortune on its completion, declined the overtures of Cardinal Richelieu to repay part of the expenditure on condition of the work being allowed to come forth in his name, preferring to submit to poverty rather than to share with any one the glory of so great an enterprise. So our own countryman, the most learned Dr. EDMUND CASTELL, expended his whole fortune, amounting to twelve thousand pounds, on his "Lexicon Heptaglotton," which appeared in 1669, as a companion to Bishop Walton's Polyglot Bible; and he, besides, lost his sight in preparing the work, to which he is said to have devoted eighteen hours a day for seventeen years. MILES DAVIS, a writer on antiquities in the earlier part of last century, some of whose works show considerable learning, is said to have hawked his productions himself from door to door. A work, entitled "Essays on the most important Subjects of Natural and Revealed Religion," which appeared at Edinburgh in 1772, was both composed and printed by the late Mr. JAMES TYTLER, while he resided in the sanctuary of Holyrood House, without ever having been written, the sentences being merely formed in the first instance in the mind of the author, and then directly put in types. This reminds us of what Franklin tells us of Keimer, the first master with whom he served at Philadelphia, whom he found, on being introduced to him, employed in printing an Elegy on a young poet of the place, who had recently died. "Keimer," says he, "made verses, too, but very indifferently. He could not be said to *write* them, for his method was to compose them in the types directly out of his head: there being no copy, but one pair of cases, and the elegy probably requiring all the letter, no one could help him."

But perhaps the most extraordinary instance of literary industry and perseverance on record is afforded us in the history of a work entitled "A System of Divinity," by the Reverend WILLIAM DAVY, B.A., a clergyman of the Church of England. Mr. Davy was born in 1743, near Chudleigh in Devonshire, where his father resided on a small farm, his own freehold. From a very early age he gave proofs of a mechanical genius, and when only eight years old he cut out with a knife and put together the parts of a small mill, after the model of one that was then building in the neighbourhood, the progress made in constructing which he used to observe narrowly every day, while he proceeded with equal regularity in the completion of his own little work. When the large mill was finished, it was found not to work exactly as it ought to have done, and the defect at first eluded the detection even of the builder.

It is said that while they were endeavouring to ascertain what was wrong, the young self-taught architect presented himself, and, observing that his mill went perfectly well, pointed out, after an examination of a few minutes, both the defect and the remedy.

Being intended for the Church, he was placed at the Exeter Grammar School: and here he distinguished himself by his proficiency in classical learning, while he still retained his early attachment to mechanical pursuits, and exercised his talents in the construction of several curious and ingenious articles. At the age of eighteen he entered at Oxford, where he took the degree of B.A. at the usual time. It was during his residence at the University that he conceived the idea of compiling a system of divinity, to consist of selections from the best writers, and began to collect, in a common-place book, such passages as he thought would suit his purpose.

On leaving College, he was ordained to the curacy of Moreton, in the diocese of Exeter, and not long after he removed to the adjoining curacy at Lustleigh, with a salary of 40*l.* a-year. In the year 1786 he published, by subscription, six volumes of sermons, by way of introduction to his intended work; but this proved an unfortunate speculation, many of the subscribers forgetting to pay for their copies, and he remained in consequence indebted to his printer above a hundred pounds. This disaster, however, did not discourage him: he pursued his labours of reading and compilation, and completed the work. But when his voluminous manuscript was finished he found that it would cost not less than two thousand pounds to get it printed. In these circumstances, he again thought of publication by subscription, and issued his proposals accordingly; but the names he collected were too few to induce any bookseller to risk the expense of an impression of the work. Determined not to be defrauded of the honours of authorship, Mr. Davy now resolved to become a printer himself. So, having constructed his own press, and purchased from a printer, at Exeter, a quantity of worn and cast-off types, he commenced operations, having no one to assist him except his female servant, and having of course to perform alternately the offices of compositor and pressman. Yet in this manner did the ingenious and persevering man, sustained by the anticipation of the literary fame awaiting him, proceed until he had printed off forty copies of the first three hundred pages, his press only permitting him to do a single page at a time. Confident that he had now produced so ample a specimen of the work as would be certain to secure for it the general patronage of the learned, he here suspended his labours for a while; and having forwarded copies to the Royal Society, the Universities, certain of the bishops, and the editors of the principal reviews, waited with eager expectation for the notice and assistance which he conceived himself sure of receiving from some of these quarters. He waited, however, in vain;

the looked-for encouragement came not. Still, although thus a second time disappointed, he was not to be driven from his purpose, but returned with unabated courage to his neglected labours. He no doubt thought that posterity would repair the injustice of his contemporaries. In one respect, however, he determined to alter his plan. His presents to the bishops, critics, and learned bodies, had cost him twenty-six of his forty copies; and for the completion of these, so thanklessly received, he naturally enough resolved that he would give himself no further trouble, but limit the impression of the remainder of the work, so as merely to complete the fourteen copies which he had reserved, in this way saving both his labour and his paper. And he had at last, after thirteen years of unremitting toil, the gratification of bringing his extraordinary undertaking to a conclusion. The book, when finished, the reader will be astonished to learn, extended to no fewer than twenty-six volumes 8vo., of nearly 500 pages each! In a like spirit of independence he next bound all the fourteen copies with his own hands; after which he proceeded in person to London, and deposited one in each of the principal public libraries there. We may smile at so preposterous a dedication of the labours of a life-time as this; but, at least, the power of extraordinary perseverance was not wanting here, nor the capability of being excited to arduous exertion, and long sustained under it, by those motives that act most strongly upon the noblest natures—the consciousness of honourable pursuit, and a trust in the verdict of posterity. It is true this temper of mind might have been more wisely exercised; and the patience, ingenuity, and toil, which were expended upon a performance of no great use in itself, bestowed upon something better fitted to benefit both the zealous labourer and his fellow men. Yet this consideration does not entitle us to refuse our admiration to so rare an example of the unwearied and inflexible prosecution of an object, in the absence of all those vulgar encouragements which are generally believed and felt to be so indispensable.*

* There is a short notice of Mr. Davy in the "Quarterly Review," vol. viii., and another containing some additional particulars in Gorton's 'Biographical Dictionary.' But the account that has been here given is principally from the communication of a valued correspondent, to whom the reverend gentleman was known. "A few years after the completion of his work," continues our authority, "I became acquainted with him. Though advanced in years, and much disappointed at the neglect he conceived he had experienced, he still hoped that a time would come when his labours would be noticed. His genius was decidedly mechanical, and his industry great. He had formed a curious garden among the rocks close to his house, and his health and strength were unabated. He showed me the only copy of his work in his possession. It was a curious one, being interspersed with

manuscript remarks. The printing was not elegant, but fair and legible. He still entertained hopes that the whole would be reprinted, as well as an index which he had completed to it in two volumes. In the year 1823 he recommenced his printing, and worked off a new volume of sermons; and in 1825, he published at Exeter, an abridgment of his system of divinity in two volumes, being then in his eighty-second year. [These volumes, however, the first of which contains a print of the author, were not, we believe, printed by himself.] In the following year he was presented by the Bishop of Exeter to the vicarage of Winckleigh, Devon. He was exceedingly gratified by this circumstance, and, contrary to the wishes of his friends, he removed to his living. The exertion was too much for him, and he died on the 13th of June, 1826, in his eighty-third year, and is

There is nothing more depressing to the spirit than protracted exile or imprisonment; yet we have many instances of the successful pursuit of literary labours under these heavy inflictions. The case of OVID will occur to the recollection of many of our readers. He spent the last years of his life in banishment among the barbarians of Tomi, on the inhospitable coast of the Black or Euxine Sea, having been sent thither by order of the Emperor Augustus, and stripped of all his property, as well as torn from his wife and family. For a long time despair was the only feeling which the mind of the poet could indulge under his changed fortunes; but he rose at last above the pressure of his deprivations, and some of the finest works that he has left us were written in that abode of universal rudeness and desolation, for which he had been obliged so suddenly to exchange the splendid and luxurious capital of the world. He even learned the language of the Getae, among whom he lived; and, as he tells us himself, took the trouble of composing a poem in that barbaric tongue, which procured him unmeasured admiration from his new associates. Ovid never again beheld his family or native country, but died among the Getae after an exile of seven or eight years, and in the fifty-ninth year of his age.* We have mentioned in a former chapter the translation, by our own Alfred the Great, of BOETHIUS'S "Consolations of Philosophy." This beautiful treatise was written in the beginning of the sixth century by Boethius, while confined under sentence of death in the tower of Pavia, and when he was not even allowed the use of books. In more modern times, BUCHANAN, as we have already stated, commenced his elegant Latin version of the Psalms, while lying in prison at Coimbra, in Portugal; and "Don Quixote" was written in a dungeon, to which an unjust judgment had consigned its great author. TASSO was shut up in a cell of the monastery of St. Anne, at Ferrara, under the imputation of being deranged, when he produced several of the ablest of his minor pieces both in prose and verse. An English poetical composition of great power, entitled "A Song of David," which was reprinted some years ago, and attracted considerable notice, in consequence of a resemblance which some stanzas of it were conceived to present to a celebrated passage in one of Lord Byron's works, was written by its author, CHRISTOPHER SMART, with charcoal on the walls of his cell, while

buried at Winckleigh, having possessed his living only a few months. Having acquired some property during the latter part of his life, he founded a school for the poor at Lustleigh, and endowed it with a meadow, worth about three hundred pounds. He likewise subscribed towards building a school-room, and gave some handsome communion plate to the church."

* See a short but striking notice of Ovid's exile at Tomi, in the concluding chapter of

Mr. Grote's "History of Greece," vol. xii. pp. 641, 642. "The picture drawn by Ovid," Mr. Grote observes, "of his situation as an exile at Tomi, can never fail to interest from the mere beauty and felicity of his expression; but it is not less interesting as a real description of Hellenism in its last phase, degraded and overborne by adverse fates. . . . His complaints run through the five books of the 'Tristia,' and the four books of 'Epistolæ ex Ponto.'"

confined in a mad-house. The learned JEROME MAGGI, who occupied a high situation under the Venetian government in the island of



TORQUATO TASSO.

Cyprus, when it was attacked by the Turks in 1571, contrived, during the captivity to which he was afterwards subjected by the conquerors, to write his two Latin works, entitled "On Bells," and "On the Wooden Horse," both displaying great erudition, although he was altogether deprived of books, and obliged to toil so constantly the whole day, that the only leisure he had was what he stole from the hours allotted him for sleep, and although his life was spared only for about a year by his barbarous jailors, who at last finished their cruelties by strangling him in his dungeon. The French translation of the Scriptures, in thirty-two volumes 8vo, by LE MAISTRE, or SACI, as he chose to call himself by a transposition of his Christian name Isaac, or Isac, was commenced by the author while confined in the Bastile; the New Testament and a considerable part of the Old having been finished by him in the three years and a half during which his imprisonment lasted. LORENZO LORENZINI, a learned Italian who lived in the early part of the last century, relieved the weariness of an imprisonment of nearly twenty years by the composition of a work on Conic Sections. Our countryman the famous WILLIAM PRYNNE, after having been condemned to imprisonment for life (from which, however, he was subsequently released), continued to write as actively and with as unconquered a spirit as he had done while at liberty. The celebrated Madame ROLAND, who perished in the storm

of the French Revolution, wrote her well-known Memoirs during the two months she spent in prison immediately before her execution,



MADAME ROLAND.

while her own fate was full in her view, and that of her husband—to whom she was tenderly attached, and whose death, self-inflicted in his misery, so soon followed her own—was in suspense; and yet the manuscript, it has been remarked, scarcely exhibited an erasure.

Another name which naturally suggests itself to us under this head is that of our celebrated countryman, SIR WALTER RALEIGH, whose "History of the World" is perhaps the greatest literary work ever accomplished under the circumstances we are now considering. Raleigh's life was a busy one from his earliest years, having been passed chiefly in the camp and on ship-board, amid the toils and agitations of war, and every other variety of daring and hazardous adventure. Yet thus occupied it was his custom to spend four hours every day in reading and study, only five being given to sleep. The duties of his situation, and the exercises he underwent to improve himself in his profession, employed the rest of his time. The first part of his "History of the World" appeared when its author was sixty-two years of age, having been written in the Tower, to which he had been consigned more than ten years before. All the time during which he was employed in composing the work, he was lying under that sentence of death which, a few years after his book was finished, was carried into execution by a singularly barbarous perversion of law. He had in the interim, as is



SIR WALTER RALEIGH

well known, been not only liberated from confinement, but restored to public employment, and thus, by implication at least, pardoned, when advantage was taken of his condemnation fifteen years before, to destroy him for his commission of certain other alleged offences, for which he was never brought to trial. His *History* ranks very high, as one of the classical works of our language; exhibiting in its style one of the most perfect models we possess of that easy but vigorous and graphic eloquence, which testifies both the learning of the scholar and a mind fertilized by converse with the living world. It was the largest, but not the only literary performance with which he occupied the hours of his long imprisonment of twelve years, a period of his life during which he may be said, through these labours, to have earned his best and most enduring renown.

The unfortunate **LADY JANE GREY**, and her equally unfortunate cousin, **QUEEN MARY** of Scotland, both solaced hours of captivity, destined to terminate only on the scaffold, by learned labours. The

ancestor of the latter, JAMES I. of Scotland, one of the most amiable and accomplished of princes, having been in his twelfth year taken captive on his way to France by one of the ships of King Henry IV. of England, was detained by him in close confinement for nearly twenty years, having been lodged in the first instance in the Tower, afterwards in the Castle of Nottingham, and eventually in that of Windsor. It was while in this last-mentioned prison that he wrote his beautiful allegory, "The King's Quhair," certainly the finest poem that had been yet produced in the English language, with the exception only of the immortal works of Chaucer. It was occasioned by his passion for Lady Joanna Beaufort, a young person of distinguished beauty, and nearly allied to the royal family, whom he afterwards married, and of whom he became enamoured by beholding her from the window of his apartments walking in the gardens of the Castle. Such examples as these call to remembrance what another of our poets, the elegant LOVELACE, has beautifully said, writing also from a place of confinement:—

"Stone walls do not a prison make,
Nor iron bars a cage;
Minds innocent and quiet take
That for an hermitage."

CHAPTER XVI.

DEFECTS OF THE SENSES OR OTHER NATURAL BODILY POWERS OVERCOME:—DEMOSTHENES; DE BEAUMONT; NAVARETE; SAUNDERSON; RUGENDAS; DIODOTUS; DIDYMUS; EUSEBIUS; NICASIVS DE VOERDA; DE PAGAN; GALILEO; EULER; MOYES.

STILL more depressing than any of those deprivations which we have yet considered, are such natural afflictions as close up altogether some one or more of the ordinary avenues by which knowledge finds its way into the mind, and thus seem to oppose an almost insurmountable obstacle to the pursuit, perhaps, of the very studies in which the intellectual powers, thus cramped or darkened, might otherwise have been best fitted to excel. Several instances might be mentioned, in which individuals, strongly attached to a particular path of ambition, have, by mere perseverance, entirely overcome the slighter impediments presented by physical mal-conformation. Thus, for example, DEMOSTHENES is said to have strengthened a weak voice, and cured his natural indistinctness of articulation, by exercising himself in declamation while ascending the brow of a hill, or walking amid the noise of the waves along the sea shore. Others have contrived to prosecute certain profes-

sional employments with distinguished success, under disadvantages of this sort, which no discipline could cure. The French Advocate, ELIE



DEMOSTHENES.—FROM AN ANTIQUE BUST IN THE TOWNELEY GALLERY.

DE BEAUMONT, who lived in the last century, after having been educated for the bar, found his voice so weak as completely to prevent his making any figure as a speaker; but, by devoting himself to the writing of memorials for his clients, he soon established for himself the most brilliant reputation as a master both of law and eloquence. The celebrated Spanish painter, FERNANDEZ NAVARETE, was seized with an illness when only two years old, which left him deaf and dumb for life. Yet in this state he displayed from his infancy the strongest passion for drawing, covering the walls of the apartments with pictures of all sorts of objects, done with charcoal; and, having afterwards studied under Titian, he became eventually one of the greatest artists of his age. Navarete, who flourished in the sixteenth century, could both read and write, and even possessed considerable learning.

Blindness, however, is the calamity that seems most effectually to shut the mind up from the acquisition of knowledge. Yet we have many examples of the attainment of distinguished eminence in intellectual pursuits, under this severe deprivation.

NICHOLAS SAUNDERSON was born at the village of Thurston, in Yorkshire, in 1682. He was only a year old, when he was deprived, by small-pox, not only of his sight, but even of his eyes themselves, which were destroyed by abscesses. Yet it was probably to this apparent misfortune that Saunderson chiefly owed both a good education, and the

leisure he enjoyed from his earliest years, for the cultivation of his mind and the acquisition of knowledge. He was sent when very young to the free-school at Penniston, in the neighbourhood of his native place; and here, notwithstanding the mighty disadvantage under which it would seem that he must have contended with his schoolfellows, he soon distinguished himself by his proficiency in Greek and Latin. It is to be regretted that we have no account of the mode of teaching that was adopted by his master in so singular a case, or the manner in which the poor boy contrived to pursue his studies in the absence of that sovereign organ to which the mind is wont to be chiefly indebted for knowledge. Some one must have read the lesson to him, till his memory, strengthened by the habit and the necessity of exertion, had obtained complete possession of it, and the mind, as it were, had made a book for itself, which it could read without the assistance of the eye. At all events, it is certain that the progress he made in this part of his education was such as is not often equalled even by those to whom nature has given all the ordinary means of study; for he acquired so great a familiarity with the Greek language, as to be in the habit of having the works written in it read to him, and following the meaning of the author as if the composition had been in English, while he showed his perfect mastery over the Latin, on many occasions in the course of his life, by both dictating and speaking it with the utmost fluency and command of expression.

These acquirements were due of course, in a great measure, to an excellent memory, which again owed, no doubt, much of its power and aptitude to the very difficulties under which it was obliged to exert itself. Every one of our faculties, corporeal and mental, is to a certain extent weakened, or at least prevented from reaching its utmost possible vigour and development, by the assistance it usually receives in its labours from other faculties. Individuals deprived of the use of their hands have learned to write and paint with their toes; no reason in the world, certainly, why those in possession of the fitter and more natural instrument should relinquish it for the other, but yet an evidence of how much more some of our members are capable of performing, and may be made by a certain discipline to perform, than we generally suppose. The German painter, RUGENDAS, celebrated for the spirit of his battle-pieces, was originally an engraver, but was obliged to abandon that profession in consequence of a weakness in his right hand, which, however, permitted him to manage the pencil, although not the burin, and accordingly he applied himself to painting. But, some years after, his disease increased so much that, even for the lighter work it had now to do, his right hand became quite unserviceable; and he would have been without a profession, or any means of subsistence at all, if he had not determined to make his left hand supply the place of its disabled

companion. The experiment, after being persevered in for some time, succeeded perfectly, and he came at last to use the one hand with more ease and effect than he had ever done the other.

Any one of us, it is obvious from this, might acquire for himself two right hands instead of one, if he thought it worth his while, and chose to take the requisite pains. And the same rule holds as to the other organs and higher faculties. The peculiar attribute of the eye is to distinguish colours; there is none of its other functions which may not be performed by some one or more of the other senses. But yet it does commonly serve us in a variety of other ways; or rather by means of the power it possesses of distinguishing colours, it is able better than any of the other senses to do us certain services which yet they also might be made to perform. However convenient this arrangement may be in most respects, it is not unattended with disadvantages. If we did not possess the faculty of sight, or never opened our eyes except when we wanted merely to distinguish colours, many of our other senses and faculties would acquire a degree of power of which we have scarcely any conception. We derive more knowledge of the external world from the eye, than from all our other senses put together; for it is its power of distinguishing colours which we chiefly make use of to measure every variety of distance, form, and motion, which objects assume, and of many of them to ascertain even a multitude of other qualities. Above all, it is by this simple power of distinguishing colours that we read books, and are enabled to drink our fill from these most abounding fountains of knowledge and reflection. But, even without the eye, we should not be altogether destitute of the means of forming an acquaintance with the things around us. We should only have to make our other faculties do more than they now do. Our touch would detect inequalities in surfaces that now feel to us perfectly smooth; our taste and smell would acquire a delicacy and power of discernment, which would enable them to intimate to us, with exactness, the presence or approach of many bodies and substances, by which they are now scarcely affected; our hearing would come to their aid with a fineness of perception and discrimination that would tell the direction and distance of every sound, and measure, with ease and instinctively, differences of tone which at present only the closest attention can render sensible to the acutest ear. Undoubtedly we derive all this knowledge with infinitely greater convenience through the medium of the eye, than we should do by this augmentation of the powers of our other senses, which, if so invigorated, would probably occasion us no little annoyance and discomfort in conveying to us the information we sought from them—to say nothing of the extremely inferior degree of service they would after all render us as compared with that which we receive from the eye. But the consideration of these sleeping capabilities which are in us (beside its im-

portance in a philosophic point of view) ought not to be without its use in showing us, should we be deprived of the most valuable of our bodily organs, what resources we still have for perseverance to avail itself of; and perhaps also in exciting us to bestow a little more pains than we ordinarily do in what we may call the education of those of our natural powers, which, however susceptible of being put to profitable exercise, we are apt to allow to remain inactive, merely because we do not find it absolutely necessary to make a call upon them for their services.

What has been stated may teach us at least how much more efficient we might make almost any one of our faculties by subjecting it to the proper discipline. They are all invigorated by the habit of exertion. And more especially may the memory be rendered, by judicious cultivation, both quick and retentive, to a degree of which its ordinary efficiency seems to give no promise. In blind men this faculty is almost always powerful. Not having the same opportunities which others enjoy of frequent or long-continued observation in regard to things with which they wish to make themselves acquainted, or of repeated reference to sources of information respecting them (their knowledge coming to them mostly in words, and not through the medium of the eye, which in general can both gather what it may desire to learn more deliberately, and recur at any time for what may have been forgotten to some permanent and ready remembrancer), they are obliged to acquire habits of more alert and watchful attention than those who are beset by so many temptations to an indolent and relaxed use of their faculties, as well as to give many matters in charge to their memory, which it is not commonly thought worth while to put it to the trouble of treasuring up. Their reward for all this is an added vigour of that mental power, proportioned to the labour they give it to perform. But any one of us might improve his memory to the same extent by a voluntary perseverance in something like the same method of discipline in regard to it, to which a blind man is obliged to resort. The memory is not one of the highest faculties of the mind, but it is yet a necessary instrument and auxiliary both in the acquisition and application of knowledge. The training, too, it may be observed, which is best adapted to augment its strength, is exactly that which, instead of being hurtful to any of our other faculties, must be beneficial to them all.

On being brought home from school, young Saunderson was taught arithmetic by his father, and soon evinced as remarkable an aptitude for this new study, as he had done for that of the ancient languages. A gentleman residing in the neighbourhood of his native village gave him his first lessons in geometry; and he received additional instruction from other individuals, to whose notice his unfortunate situation and rare talents introduced him. But he soon got beyond all his masters, and left the most learned of them without anything more to

teach him. He then pursued his studies for some time by himself, needing no other assistance than a good author and some one to read to him. It was in this way that he made himself acquainted with the works of the old Greek mathematicians, Euclid, Archimedes, and Diophantus, which he had read to him in the original.

But he was still without a profession, or any apparent resource by which he might support himself through life, although he had already reached his twenty-fourth or twenty-fifth year. His own wish was to go to the University; but the circumstances of his father, who held a place in the excise, did not enable him to gratify this ambition. At last, however, it was resolved that he should proceed to Cambridge, not in the character of a student, but to open classes for teaching mathematics and natural philosophy. Accordingly, in the year 1707, he made his appearance in that University, under the protection of a friend, one of the Fellows of Christ's College. That Society, with great liberality, immediately allotted him a chamber, admitted him to the use of their library, and gave him every other accommodation they could for the prosecution of his studies. It is to be recorded, likewise, to the honour of the eccentric Whiston, who then held the Lucasian Professorship of Mathematics in the University (a chair in which he had succeeded Sir Isaac Newton, having been appointed at the express recommendation of that great man), that, on Saunderson opening classes to teach the same branches of science upon which he had been in the habit of reading lectures, he not only showed no jealousy of one whom a less generous mind might not unnaturally have regarded as a rival and intruder, but exerted himself, in every way in his power, to promote his success. Saunderson commenced his prelections with Newton's Optics. The Newtonian philosophy was as yet only beginning to attract attention among the learned at Cambridge. Whiston himself informs us, in that curious production called his Memoirs, that his own attention had been first strongly excited to the "Principia" by a paper written by Dr. [David] Gregory (nephew of the celebrated James Gregory, whom we have already mentioned), when professor at Edinburgh, "wherein," says he, "he had given the most prodigious commendations to that work, as not only right in all things, but in a manner the effect of a plainly divine genius; and had already caused several of his scholars to keep Acts, as we call them, upon several branches of the Newtonian philosophy; while we at Cambridge, poor wretches! were ignominiously studying the fictitious hypothesis of the Cartesian, which Sir Isaac Newton had also himself done formerly, as I have heard him say."

The subject itself which Saunderson chose, independently of the manner in which he treated it, was well calculated to attract notice; few things seeming at first view more extraordinary than that a man who

had been blind almost from his birth should be able to explain the phenomena and expound the doctrines of light. The disadvantage under which Saunderson laboured here, however, was merely that he did not know experimentally the peculiar nature of the sensations communicated by the organ of vision. There was nothing in this to prevent him from apprehending perfectly the laws of light—that it moves in straight lines—that it falls upon surfaces and is reflected from them at equal angles—that it is refracted, or has its course changed, on passing from one medium into another of different density—that rays of different colours are so refracted in different degrees; and the consequences to which these primary laws necessarily lead. He was not, it is true, able to see the rays, or rather, to experience the sensation which they produce by falling upon the eye; but, knowing their direction, he could conceive them, or represent them, by other lines, palpable to the sense of touch, which he did possess. This latter was the way he generally took to make himself acquainted with any geometrical figure. He had a board with a great number of holes in it, at small and regular distances from each other; and on this he easily formed any diagram he wished to have before him, by merely fixing a few pins in the proper places; and extending a piece of twine over them to represent the lines. In this manner, we are told, he formed his figures more readily than another could with a pen and ink. On the same board he performed his calculations, by means of a very ingenious method of notation which he had contrived. The holes were separated into sets of nine, each set forming a square, having a hole at each corner, another at the middle point of each side, and one in the centre. It is obvious that in such a figure, one pin placed at the centre might be made to stand in any one of eight different positions with reference to another pin placed on the boundary line of the square; and each of these positions might represent, either to the eye or the touch, a particular number, thus affording signs for eight of the digits. Saunderson used to employ a pin with a larger head for the central hole; so that even when it stood alone, it formed a symbol easily distinguishable from any other. Lastly, by using two large-headed pins in one of the positions, instead of one with a large and another with a small head as usual, he formed a tenth mark, and so obtained representatives for the nine digits and the cipher—all the elementary characters required, as every one knows, in the common system of notation. Here, then, were evidently the means of performing any operation in arithmetic.

In a description of this contrivance, which we have from the pen of Mr. Colson, Saunderson's successor at Cambridge, we are assured that its inventor, in making use of it, "could place and displace his pins with incredible nimbleness and facility, much to the pleasure and

surprise of all the beholders. He could even break off in the middle of a calculation, and resume it when he pleased, and could presently know the condition of it by only drawing his fingers gently over the table." But Saunderson was also wont to perform many long operations, both in arithmetic and algebra, solely by his powerful and admirably disciplined memory. And his mind, after having once got possession of even a very complicated geometrical figure, would, without the aid of any palpable symbols, easily retain a perfect conception of all its parts, and reason upon it, or follow any demonstration of which it might be the subject, as accurately as if he had it all the while under his eye. It occasionally cost him some effort, it was remarked, to imprint upon his mind, in the first instance, a figure unusually intricate; but when this was once done all his difficulties were over. He seems indeed to have made use of sensible representations chiefly in explaining the theorems of science to his pupils. In the print affixed to his Algebra, he is represented discoursing upon the geographical and astronomical circles of the globe by the assistance of an armillary sphere constructed of wood. His explanations were always remarkable for their simplicity and clearness, qualities which they derived, however, not from any tedious or unnecessary minuteness by which they were characterised, but from the skill and judgment with which he gave prominence to the really important points of his subject, and directed the attention of his hearers to the particulars most concerned in its elucidation.

His ability and success as a teacher continued and augmented that crowded attendance of pupils, which, in the first instance, he had owed perhaps principally to the mere curiosity of the public. Every succeeding University examination afforded additional evidence of the benefit derived from his prelections. His merits, consequently, were not long in being appreciated both at Cambridge and among scientific men in general. He obtained the acquaintance of Sir Isaac Newton, his veneration for whom was repaid by that illustrious philosopher with so much regard, that, when Whiston was expelled from his chair in 1711, Sir Isaac exerted himself with all his influence to obtain the vacant situation for Saunderson. On this occasion, too, the heads of colleges applied to the Crown in his behalf to issue a mandate for conferring upon him the degree of Master of Arts, as a necessary preliminary to his election; and, their request being complied with, he was appointed to the professorship. From this time Saunderson gave himself up almost entirely to his pupils. Of his subsequent history we need only relate that he married in 1723, and was created Doctor of Laws in 1728, on a visit of George II. to the University, on which occasion he delivered a Latin oration of distinguished eloquence. He died in 1739, in the 57th year of his age, leaving a son and daughter.

His constant labours as a teacher had left him but little time to pre-

pare anything for the press. But an able and well-known treatise on Algebra, which he had employed his latter years in compiling, appeared in two volumes quarto the year after his death. With the exception of a work on Fluxions, and a Latin commentary on Sir Isaac Newton's "Principia," which were printed together several years afterwards, none of the other papers left by this eminent mathematician have yet been given to the world.

Saunderson's knowledge of the external world, as we have already observed, was principally obtained by his sense of touch, which he possessed in exquisite perfection. He could not, however, by this means distinguish colours, as it has been asserted that blind men have sometimes done; and after many efforts he became convinced that the attempt was quite impossible. But he would detect counterfeit from genuine medals with great exactness, even in cases in which able connoisseurs were deceived. He always felt a roughness on the new cast coin, although imperceptible either to the touch or the eye of others. His feeling of the changes of the atmosphere was in like manner, as might be supposed, extremely delicate. "I have been present with him in a garden, making observations on the sun," says the writer of the account of his life prefixed to his Algebra, who had been one of his intimate friends, "when he has taken notice of every cloud that disturbed our observation, almost as justly as we could. He could tell when anything was held near his face, or when he passed by a tree at no great distance, provided the air was calm, and little or no wind; this he did by the different pulse of the air upon his face." His sense of hearing, too, was exceedingly refined; and it was thought that he might have risen to great eminence as a musician, if his geometrical talents had not withdrawn him to other pursuits. He played with great skill on the flute; but the principal advantage which he derived from the accuracy of his ear was the means it afforded him, in the absence of a higher sense, of distinguishing not only persons by the sound of their voices, but places, distances, and the different sizes of rooms, by the echo which they returned of his own voice or his tread. To such perfection had he carried the art of interpreting these signs, which are so vague to ordinary observers, because so little noticed by them, that we are told he scarcely ever was carried a second time to any place in which he had once been, without recognising it.

Saunderson is not the only blind mathematician on record. The writer of his life whom we have already quoted mentions DIODOTUS the Stoic, DIDYMUS of Alexandria, EUSEBIUS, and NICASIUS DE VOERDA. Diodotus was the preceptor of Cicero in Greek literature and geometry, and, as that great philosopher himself informs us, lived many years in his house after becoming blind, giving himself to philosophy more assiduously than ever, and even continuing to teach geometry; a thing,

says Cicero, which one would think scarcely possible for a blind man to do, yet would he direct his pupils where every line was to be drawn just as exactly as if he had had the use of his eyes. This was nothing, however, to what Saunderson did, who directed his pupils how to draw figures not only which he did not see, but which he had never seen. Didymus, who flourished in the fourth century, is known only as a theological writer; but we are informed by St. Jerome, who was his pupil, that, although he lost his sight at five years of age, he distinguished himself at the school of Alexandria by his proficiency not merely in grammar, rhetoric, logic, music, and arithmetic, but in the remaining two of the seven departments then conceived to constitute the whole field of human learning, geometry and astronomy; sciences of which, remarks the narrator, it is scarcely conceivable how any knowledge should be obtained without the assistance of the eye. Didymus, like Saunderson, pursued his studies by employing persons to read for him. Sometimes, we are told, his readers would fall asleep at their task; the subject was not always so interesting to them as it was to him; but this was no inconvenience or hindrance to Didymus, for he employed the time till they awoke in meditating upon what he had been hearing, and was only the better able for the interruption to attend to and follow them when they resumed their labours. Another of his disciples, Palladius, remarks that blindness, which is to others so terrible a misfortune, was the greatest of blessings to Didymus, inasmuch as, by removing from him all objects that would have distracted his attention, it left his faculties much more at liberty than they otherwise would have been for the study of the sciences. Didymus, however, does not seem to have been himself altogether of this opinion, since we find it recorded, that when St. Anthony, who attracted by the report of his wonderful learning and sanctity, had come from the desert to pay him a visit, put to him the question, "Are you grieved that you are blind?" although it was repeated several times, Didymus could not be prevailed upon to return any other answer than that he certainly was,—greatly to the mortification of the Saint, who was astonished that a wise man should lament the loss of a faculty which we only possess, as he chose to express it, in common with the gnats and ants. The old Greek philosopher, Democritus, who is said by some authors to have actually put out his eyes in order that he might the better fit himself for the study of philosophy, would have presented a spectacle more to the taste of Anthony.

The Eusebius mentioned above is not the celebrated ecclesiastical historian, but a person of the same name described by Cassiodorus as an Asiatic, and eminent for his learning and his ability as a teacher, although he had lost his sight at five years of age, his right eye having become opaque, and his left being altogether destroyed. Nicasius de

Voerda, or of Woerden (sometimes also called Nicasius of Mechlin, or Malines), taught the canon and civil law in the University of Cologne, in the fifteenth century, and is said to have possessed extraordinary erudition both in literature and science, although he had been blind from his third year. He was wont to quote with great readiness the books of which he had acquired a knowledge only from having heard them read by others.*

To these instances we may add that of the **COUNT DE PAGAN**, who was born in the beginning of the seventeenth century, and has been accounted the father of the modern science of fortification. Having entered the army at the early age of twelve, he lost his left eye before he was seventeen, at the siege of Montauban. He still, however, pursued his profession with unabated ardour, and distinguished himself by many acts of brilliant courage. At last, when about to be sent into Portugal with the rank of Field Marshal, he was seized with an illness which deprived him of his remaining eye. He was yet only in his thirty-eighth year, and he determined that the misfortunes he had already sustained in the service of his country should not prevent him from recommencing his public career in a new character. He had always been attached to mathematics; and he now devoted himself assiduously to the prosecution of his favourite study, with a view principally to the improvement of the science of fortification, for which his great experience in the field particularly fitted him. During the twenty years after this which he passed in a state of total blindness, he gave a variety of publications to the world; among which may be mentioned, besides his well-known and largest work on Fortification, his "Geometrical Theorems," and his "Astronomical Tables." He is also the author of a rare book called "An Historical and Geographical Account of the River of the Amazons," which is remarkable as containing a chart asserted to have been made by himself after he was blind. It is said not to be very correct, although a wonderful production for such an artist.

The great **GALILEO** lost his sight three or four years before his death, from exposure to the night air while prosecuting his observations on the satellites of Jupiter; but he is rather to be reckoned on this account among the martyrs of science than as being to be noted for having con-

* It was the example of Nicasius of Woerden, or Nicaise de Vourde, as he is called by French writers, which excited another blind individual, Dr. Nicolas Bacon, to pursue the study of the law. Dr. Blacklock, in the article on the Blind which he wrote for the "Encyclopædia Britannica," informs us that he had corresponded by letter with this gentleman, who resided in the Netherlands, but was, he says, of the same family with the Lord Chancellor Bacon. He lost his sight,

when only nine years old, by a wound from an arrow; but, having recovered his health, he determined to continue his studies as before, until, as well as Nicaise, he should obtain his degree of Doctor of Laws. Accordingly, having finished his education at school, he proceeded to college, where, having greatly distinguished himself, he in due time attained the title of which he was so ambitious, and became eventually one of the most eminent advocates in the council of Brabant.

tinued his researches notwithstanding the deprivation that had befallen him. Yet, for the short time that his life was prolonged, he did not relinquish his favourite studies. The celebrated EULER, however, affords us a better instance for our present purpose. This distinguished mathematician was struck with blindness in his fifty-ninth year, his sight having fallen a sacrifice to his indefatigable application. He had literally written and calculated himself blind. Yet after this misfortune he continued to calculate, and to dictate books, at least, if not to write them, as actively as ever. His "Elements of Algebra," a work that has been translated into every language of Europe, was thus dictated by him to an amanuensis, who was only a tailor's apprentice; but who, though altogether unacquainted with algebra when he began his task, is said to have acquired a complete knowledge of that science in the course of merely taking down what Euler spoke, with such admirable clearness and simplicity is the work composed. His Algebra was followed by several other most ingenious and elaborate works, among which particularly deserve to be mentioned his "New Theory of the Moon's Motions," and the tables by which it was accompanied, the computation of which, by a person in Euler's situation, not only deprived of sight, but harassed by other misfortunes (for, while he was engaged on this work, his house was burned to the ground by a fire, from which he narrowly escaped with his life), cannot but be regarded as one of the most wonderful triumphs ever achieved by the energy of mind over the opposition of circumstances. But Euler affords us in every way the most remarkable example on record of activity in scientific labours. The mere catalogue which has been published of his works extends to fifty printed pages. "It may be asserted, without exaggeration," says Lacroix, in the "Biographie Universelle," "that he composed more than one half of the mathematical memoirs contained in the forty-six quarto volumes which the Academy of Petersburg published from 1727 to 1783; and he left at his death about a hundred memoirs ready for the press, which the same Academy inserts successively in the volumes it still continues to give to the world. In addition to this immense mass of productions, he composed various separate works, extremely important in respect of the subjects of which they treat, and many of them of considerable magnitude. He likewise greatly enriched the collections of the Academy of Berlin, during the twenty-five years which he passed in that city. He presented several memoirs to the Academy of Sciences of Paris, the prizes offered by which he ten times succeeded in carrying off or dividing; nor did he disdain to contribute to the transactions of less illustrious associations of the learned. In fine, it requires the incontrovertible evidence of facts to convince us that so many labours can all have been performed by one man, who passed the last seventeen years of his life in a state of blindness." As a proof that even this statement rather

underrates than exaggerates the amazing industry and fertility of Euler, we may just add, that, in the list of his works already referred to, there are enumerated, of separate publications alone, twenty-nine volumes quarto, and two octavo, in Latin; one volume quarto, and six octavo, in German; and five volumes octavo, in French. Euler died in 1783, at the age of seventy-six.

Dr. HENRY MOYES was born at Kirkaldy, in Fifeshire, in 1750, and lost his sight by small-pox before he was three years old, so that he scarcely retained in after life any recollection of having ever seen. Yet he used to say, that he remembered having once observed a water-mill in motion; and it is characteristic of the tendencies of his mind, that even at that early age his attention was attracted by the circumstance of the water flowing in one direction, while the wheel (being what is called an undershot wheel) turned round in the opposite, a mystery on which he reflected for some time before he could comprehend it. Blind as he was, he distinguished himself when a boy, by his proficiency in all the usual branches of a literary education. But "mechanical exercises," says Mr. Bew, who has given a short account of him in the first volume of the "Memoirs of the Literary and Philosophical Society of Manchester," "were the favourite employments of his infant years. At a very early age he made himself acquainted with the use of edged tools so perfectly, that, notwithstanding his entire blindness, he was able to make little windmills; and he even constructed a loom with his own hands, which still show the cicatrices of wounds he received in the execution of these juvenile exploits." Besides a knowledge of the ancient languages, and of music, he is stated by Mr. Bew, who became acquainted with him about the year 1782, to have made himself extensively conversant with Algebra and Geometry, and with Chemistry, Mechanics, Optics, Astronomy, and the other departments of Natural Science. At this time he was engaged in delivering lectures on Chemistry and Natural Philosophy in the different large towns throughout the country. He used to perform all his experiments, we are told, with his own hands, and with extraordinary neatness. Moyes possessed all that extreme delicacy in the senses of touch and hearing for which the blind have usually been remarkable. We have been told, that having been one day accosted in the street by a young friend whom he had not met with for a good many years, his instant remark, on hearing his voice, was, "How much taller you have grown since we last met!" When first brought into a company, his custom was to remain silent for a short time, until, by the sound of the different voices, he had made himself acquainted with the size of the room, and the number of persons in it. He was then quite at his ease, readily distinguished one speaker from another, and shone greatly himself by his powers of conversation. Although at that time not in affluent circumstances, and having indeed

nothing to depend upon except the very precarious occupation to which he had betaken himself, he was remarkable for his cheerfulness and buoyant spirits. He contrived for himself a system of palpable arithmetic, on a different principle from that of Saunderson, and superior in neatness and simplicity. An explanation of it may be found in a letter from himself, inserted in the "Encyclopædia Britannica" under the article *Blind*. Dr. Moyes, who must have been a person of extraordinary mental endowments, and who affords us certainly, next to Saunderson, the most striking example on record of attainments in mathematics, made without any assistance from the eye, received his degree from a college in America, in which country he lectured for some years. He eventually made in this way a good deal of money; and some time before his death had retired to the town of Pittenweem, not far from the place of his nativity, where his society was much courted. He survived till 1807. His lectures are said to have been well delivered, and his explanations were eminently perspicuous. It has been reported that he could distinguish colours by the touch; but, as this circumstance is not mentioned in his friend Dr. Blacklock's article just referred to, we may fairly assume that he did not himself pretend to the possession of any such power.

CHAPTER XVII.

DISTINCTION ACQUIRED BY THE BLIND IN OTHER INTELLECTUAL FIELDS:—
HOMER; MILTON; SALINAS; STANLEY; METCALF; HENRY THE MIN-
STREL; SCAPINELLI; BLACKLOCK; ANNA WILLIAMS; HUBER.

MATHEMATICAL investigation is, strictly speaking, merely a mental exercise, and it is certainly conceivable that every theorem man has yet demonstrated in *abstract science* might have been discovered by him without the aid of his external senses. But, on the other hand, every operation of mind is so greatly facilitated by the employment of sensible symbols, and especially the processes of acquiring, apprehending, and recollecting knowledge, as well as of pursuing long and intricate calculations or deductions, receive such important assistance from those lines, figures, letters, and other marks which may be made to present the record of every thought faithfully to the eye, that we are justified in quoting any remarkable case of progress, even in abstract science, attained without the aid of this invaluable organ, as a noble example of what perseverance may accomplish in the face of the most formidable difficulties. It is much even for the mind to rise superior to so crushing

a calamity as the loss of sight, and to maintain or recover its spirit of exertion under a deprivation which may be said to take from it for ever that which nature has appointed to be at once the chief helpmate and sweetener of its labours. It would seem almost as if life could scarcely continue desirable to him whose hourly thought may be expressed, in the language, familiar to all, of Milton's beautiful and pathetic lamentation:—

“ ——— with the year
Seasons return; but not to me returns
Day, or the sweet approach of even or morn,
Or sight of vernal bloom, or summer's rose,
Or flocks, or herds, or human face divine;
But cloud instead, and ever-during dark
Surrounds me, from the cheerful ways of men
Cut off, and, for the book of knowledge fair,
Presented with a universal blank
Of Nature's works, to me expunged and rased.”

What an attestation to the medicinal value of intellectual labour, that it has so often cheered even such desolation as this! and how strong must be the natural love of knowledge in the human mind, that even in the midst of such impediments to its gratification it has in so many instances so eagerly sought and so largely attained its end!

After the examples we have mentioned of individuals who in this state of blindness have distinguished themselves by their eminence in the severest exercises of the mind, it may be thought less surprising that others should, in the same condition, have devoted themselves with success to pursuits of a less laborious character, and not so rigorously taxing the attention and the memory. Poetry and music, for example, may be deemed the especially appointed occupations of the blind, as having their subject and their materials chiefly in the imagination and the affections, and being apparently better fitted to dispense with the aid of visible symbols than the intricate reasonings and calculations of science. Yet even poetry owes much of its inspiration to the eye wandering in freedom over nature; and more to that serenity and gladness of the soul, which so heavy an affliction as the loss of sight is apt to destroy or impair. Whosoever, therefore, suffering under this doom, shall not

“ ——— bate a jot
Of heart or hope; but still bear up and steer
Right onward,”

be the healing and strengthening toils in which he exercises his spirit those of science or of song, still presents us with an example of heroic wisdom well worthy of our admiration. It seems to have been the tradition of Greece, that the “*Iliad*” and “*Odyssey*” were both composed by HOMER after he was blind, although, of course, from materials which he had collected before that misfortune befell him; for it is very evident that the author of these poems must, at one time of his life, have sur-

veyed whatever was most interesting that the world had at that early age to show, with no dim or unobservant eye. But of Homer, in truth, we know nothing. The origin of the "Iliad" and the "Odyssey" is the most perplexing problem in literature; and Homer must, in all probability, ever remain to us a mere name. The poems themselves are Homer, and perhaps there never was another. But if

"Blind Thamyris, and blind Mæonides,
And Tiresias, and Phineus, prophets old,"

instead of being fablers themselves, were merely the creations of other fablers, the Poet of Paradise at least uttered his harmonious numbers in darkness,—as he himself expresses it,

"In darkness, and with dangers compassed round."

MILTON is supposed to have been in the fifty-fourth year of his age when he commenced the composition of his immortal epic, although the high theme had doubtless for some time before occupied his thoughts. At this period of his life he was quite blind, having lost his sight, which had early begun to decay, during the composition of his famous "Defence for the People of England," in answer to Salmasius. He felt the calamity that was coming upon him while occupied with this work, but the apprehension did not induce him even to relax his labours; and, after the foreseen event had occurred, we find him, in one of his majestic strains, consoling himself under the extinction of his sight by the thought of the cause in which he had sacrificed it:—

"What supports me dost thou ask?
The conscience, friend, to have lost them overplid
In liberty's defence, my noble task,
Whereof all Europe rings from side to side."

"Paradise Lost" was probably only the work of three or four years, since there is reason to believe that it was completed in 1665, although not published till 1667. But this poem, as is well known, was not the only fruit of the noble intellect of Milton, while bearing up against the accumulated pressure of disease, old age, and the "evil days" on which he had fallen. Beside a mass of philological labours of extraordinary magnitude, and several political tracts, which in eloquence and power are scarcely surpassed by anything he had written in the vigour of life and health, we owe to the blind old man the "Paradise Regained," and the "Samson Agonistes," the not unworthy companions of his grander song. We cannot mourn over the sightless orbs of Milton; he could not have done greater things than he did in his blindness:—

"—— Samson hath quit himself
Like Samson, and heroically hath finished
A life heroic.——
Nothing is here for tears, nothing to wail,
Or knock the breast; no weakness, no contempt,
Dispraise or blame; nothing but well and fair."

The Spanish musician, FRANCIS SALINAS, who flourished in the sixteenth century, was born blind. Nevertheless, he early distinguished himself by his proficiency, not only in music, but in the ancient languages and in science. This blind man eventually became Professor of Music in the University of Salamanca; and he published an able work in Latin on the theory of his favourite science. We had in later times, in our own country, an eminent example of musical attainments made in similar circumstances to those of Salinas. JOHN STANLEY was born in London in 1713, and lost his eyesight, when only two years old, by a fall. In this condition he applied himself with such extraordinary success to the study of music, that in his eleventh year he was chosen organist to the church of Allhallows, in Bread-street, and two years afterwards obtained the same situation in the church of St. Andrew, Holborn, although opposed by many other candidates. From this he went, in 1734, to the Temple Church, having already, when only sixteen, taken his degree of Bachelor of Music at Oxford. Mr. Stanley died in 1786, after having for many years stood at the head of the practitioners of sacred music in England. The names of other distinguished musical composers, who were either born blind or became so in early infancy, might be added to these.

Nor is music the only one of the fine arts in which the blind have excelled. We read of a sculptor who became blind at twenty years of age, and yet ten years afterwards made a statue of Pope Urban VIII. in clay, and another of Cosmo II. of Florence, of marble. Another blind sculptor is mentioned by Roger de Piles, in one of his works on painting; he executed a marble statue of our Charles I. with great taste and accuracy. Nor ought we to be surprised at this dexterity, if we may believe what is told us of a young French lady, who lost her sight in her second year, and of whose marvellous accomplishments we have an account in the "Annual Register" for 1762. This lady is said, notwithstanding her blindness, to have been an excellent player at cards, a ready and elegant writer, and even to have been able to read written characters. On sitting down to play at cards, she first went over the pack, marking every one of the fifty-two cards by an indentation so slight as scarcely to be perceptible to any one else on the closest inspection, yet which she herself, by the delicacy of her touch, instantly recognised. She then proceeded without difficulty, only requiring, of course, that every card should be named as it was played. In writing she used a sharp and hard-pointed pencil, which marked the paper so as to enable her to read what she had written, with her finger-ends. All this, it must be confessed, seems very like a fiction; but it is, perhaps, scarcely so wonderful as what is told of an English lady, who was examined by several eminent physicians, and among others by Sir Hans Sloane. She had been deprived by disease not only of her sight, but of her powers of

speech and hearing, so that there remained only the organs of touch, taste, and smell, by which she could hold communication with others. Deaf, dumb, and blind as she was, however, she yet in course of time learned to converse with her friends by means of an alphabet made by their hands or fingers pressed in different ways upon hers. She very soon also acquired the power of writing with great neatness and exactness, and used to sit up in bed, we are told, at any hour of the night, either to write or to work, when she felt herself indisposed to sleep. We shall feel what an invaluable possession the knowledge of writing must have been to this individual, when we reflect, that, on first being reduced to the state of deplorable helplessness which she afterwards found admitted of so many alleviations, nothing but the power she still retained of scrawling a few words, which yet she could not discern, could have enabled her to communicate her wishes or feelings to those around her. But for this power it would seem that she must have been for ever shut out from even the most imperfect intercourse with her species; for it was through it alone that she could intimate to them the meaning she wished to be given to each of the different palpable signs which constituted her alphabet. With this instrument of communication, the arrangement would be easily effected; it would otherwise, apparently, have been impracticable. We have abundant reason to set a high value on the art of writing, but to this person it was invaluable. To us it is the most useful of all the arts; to her it was the means of restoration to life from a state of exclusion, almost as complete as that of the grave.

But perhaps the most singular instance on record of a blind person triumphing over those difficulties of his situation which are apparently most insuperable, is afforded in JOHN METCALF, or, as he was commonly called, Blind Jack, a well-known character, who died not many years ago. This person was a native of Manchester or the neighbourhood, and Mr. Bew has given an account of him in the paper we have already quoted. After telling us that he became blind at a very early age, so as to be entirely ignorant of light and its various effects, the narrative proceeds as follows:—"This man passed the younger part of his life as a waggoner, and occasionally as a guide in intricate roads during the night, or when the tracks were covered with snow. Strange as this may appear to those who can see, the employment he has since undertaken is still more extraordinary; it is one of the last to which we could suppose a blind man would ever turn his attention. His present occupation is that of projector and surveyor of highways in difficult and mountainous parts. With the assistance of only a long staff, I have several times met this man traversing the roads, ascending precipices, exploring valleys, and investigating their several extents, forms, and situations, so as to answer his designs in the best manner. The plans which he designs, and the estimates he makes, are done in a method

peculiar to himself, and which he cannot well convey the meaning of to others. His abilities in this respect are nevertheless so great, that he finds constant employment. Most of the roads over the Peak in Derbyshire have been altered by his directions, particularly those in the vicinity of Buxton; and he is at this time constructing a new one betwixt Wilmslow and Congleton, with a view to open a communication to the great London road, without being obliged to pass over the mountains." Mr. Bew, in the "Memoirs of the Literary and Philosophical Society of Manchester," vol. i., adds in a note, "Since this paper was written, and had the honour of being delivered to the Society, I have met this blind projector of the roads, who was alone as usual, and, amongst other conversation, I made some inquiries concerning this new road. It was really astonishing to hear with what accuracy he described the courses and the nature of the different soils through which it was conducted. Having mentioned to him a boggy piece of ground it passed through, he observed, that that was the only place he had doubts concerning; and that he was apprehensive they had, contrary to his directions, been too sparing of their materials."

The old Scotch poet sometimes called HENRY the Minstrel, but better known as "Blind Harry," who has left a poem of great extent on the achievements of Sir William Wallace, is said to have been blind. In addition to his poetical powers, which are considerable, he seems to have possessed a knowledge of Latin and French, as well as of the principal sciences cultivated in his time. His work shows him to have had some acquaintance in particular both with divinity and astronomy, as well as with history. He flourished about the middle of the fifteenth century; and John Major, the historian, in whose youth he was still alive, tells us that he was wont to recite his verses at the feasts of the nobility, "obtaining in that manner," he adds, "his food and raiment, of which he was worthy." Henry's work long continued a popular favourite in Scotland, and is still read by the peasantry in some parts of the country in a modernized form.

The Italian poet SCAPINELLI, who was born at Modena in 1588, was also blind from his birth. He held a Professor's chair successively at Bologna, Modena, and Pisa; and, having then been recalled to occupy the place of Chief Professor of Eloquence, on which he had long set his heart, in the first of these Universities, died there in the forty-ninth year of his age. Scapinelli, besides several prose compositions, wrote verses both in Italian and Latin; and all his works are distinguished, not only by their learning, but by a purity and elegance of diction, rare at the time when he flourished. He was accounted, indeed, one of the most finished scholars of his day.

Nor should we forget the well-known name of the Rev. Dr. BLACKLOCK. He was born at the town of Annan, in Dumfriesshire, in 1721;

and when no more than six months old he was reduced to a state of complete blindness by small-pox. To one in his circumstances this was a peculiarly heavy calamity; for his father was only a poor working mason, with several other children to provide for, and but little in a condition, therefore, to sustain the burden of a son, not only left more than usually dependent upon him during childhood, but seemingly unfitted for ever taking care of himself. But never were the duties of a father more admirably fulfilled than by this excellent man in his humble estate. His poor blind boy was the object of an unceasing tenderness and care, which, not satisfied with providing for the supply of his bodily wants, left nothing undone that could contribute either to improve or amuse his mind, and so make up to him, as far as possible, for his melancholy deprivation. He delighted especially to spend his leisure hours in reading to him; and, finding him fond of poetry, he procured as many of the works of our English poets as he could, and thus nourished in him a passion which afterwards became one of the chief consolations of his life. In this way young Blacklock became a versifier himself at a very early age, some of his poems which were afterwards published being dated in his twelfth year. He had before this, however, been sent to school, where, in course of time, he became a tolerable proficient in the common branches of education, and even made considerable progress in the knowledge of the Latin language; having been very much indebted, in making these attainments, to the assistance of his schoolfellows, to all of whom his gentle and yet lively and playful disposition, as well as his helplessness, greatly endeared him. At last, however, in his nineteenth year, he lost his inestimable father. Helpless as he was, and rendered more so than he would otherwise have been from the very excess of care he had heretofore experienced, he was now left apparently without a friend on earth from whom he could expect a continuation of the attentions he so much needed; and the prospect before him was as gloomy as it is possible to imagine. He has expressed the feelings with which he looked forward to the future at this time in some very pathetic verses, which are to be found among his printed poems. He was not, however, left long without a protector. His case having reached the ear of Dr. Stephenson, one of the Medical Professors in the University of Edinburgh, that gentleman generously invited him to come to the Scottish metropolis, where he engaged to find him the means of pursuing his studies at College. Blacklock gladly accepted this liberal offer. While in Edinburgh, he availed himself with eagerness of every opportunity of improvement which presented itself. Thus, for instance, he acquired a familiarity with the French language, by conversing with a lady of his acquaintance, who was a native of France. When he had been a few years at the University, he published, at the suggestion of his friends, a volume

of poems; and this attracted to him the more general notice of the literary world. Among others whose attention was drawn to the productions of the blind poet was Mr. Spence, Professor of Poetry at Oxford, who published a critical review of them, accompanied by a sketch of their author's history, which had a great effect in making him more extensively known. In the meanwhile, Blacklock continued his studies at Edinburgh, until he had finished the usual course of education prescribed to candidates for the ministry in the Scotch Church, which occupied him ten years. In 1754 a second edition of his poems was published by subscription; and, having been a few years afterwards licensed by the Presbytery as a preacher, he was inducted to the church of Kirkcudbright, on the presentation of the Earl of Selkirk. So much opposition, however, was made by the inhabitants of the place to this arrangement for giving them a blind clergyman, that Blacklock was soon induced to resign his appointment for a small annuity. With this provision he returned to Edinburgh; and, being now married, opened an establishment for receiving boarders, whose studies he proposed to superintend. In this occupation, and in a variety of literary pursuits, he spent his remaining life, and died at Edinburgh in 1791. He had received the degree of Doctor of Divinity, in 1766, from one of the Universities of Aberdeen, and may be said to have eventually attained a highly respectable place among the literary characters of his time, although his poetry does not indicate a great deal of power. He possessed, however, we are told, wonderful facility in verse-making, and used sometimes to dictate thirty or forty verses to his friends almost as fast as they could be written down. His chief enjoyments were conversation and music; and, although not unvisited by occasional depression of spirits, he was generally cheerful, and seemed, indeed, to enjoy life as much upon the whole as any of his friends whom nature had more bountifully endowed. One of the most interesting of Dr. Blacklock's productions is his paper, to which we have already more than once referred, on the Blind, in the "Encyclopædia Britannica." He produced, also, a few other performances in prose of greater extent.

At this time, too, lived an English female poet, who was also blind, Miss ANNA WILLIAMS. This lady came to London in 1730, when only twenty-four years of age, with her father, a Welsh surgeon, who had given up his profession in consequence of imagining that he had discovered a method of finding the longitude at sea, which would make his fortune. After many efforts, however, to obtain the patronage of Government for his scheme, and having exhausted his resources, he was obliged to take refuge in the Charter-house. His daughter, who had been liberally educated, and had at first mixed in all the gaieties of the metropolis, was now obliged to support both him and herself by working at her needle. But, after struggling in this way for some years, she

lost her sight by a cataract. Her situation, it might be imagined, was now both helpless and hopeless in the extreme; but a strong mind enabled her to rise above her calamity. She not only continued the exercise of her needle, we are told, with as much activity and skill as ever, but, never suffering her spirits to droop, distinguished herself just as she had been used to do, by the neatness of her dress, and preserved all her old attachment to literature. In 1746, after she had been six years blind, she published a translation from the French of La Bleterie's "Life of the Emperor Julian." Her father having some time after this met with Dr. Johnson, told him his story, and, in mentioning his daughter, gave so interesting an account of her, that the Doctor expressed himself desirous of making her acquaintance, and eventually invited her to reside in his house as a companion to his wife. Mrs. Johnson died soon after; but Miss Williams continued to reside with the Doctor till her death, in 1783, at the age of 77. In 1752 an attempt was made to restore her sight by the operation of couching, but without success. We find her father publishing, three years later, an account of his method for discovering the longitude; and about the same time Garrick gave the daughter a benefit at Drury Lane, which produced her two hundred pounds. Miss Williams also appeared again as an authoress, in 1766, when she published a volume, entitled "Miscellanies in Prose and Verse," written partly by herself and partly by several of her friends.

One of the most ingenious and original works ever written upon the habits and natural history of insects is the "*Recherches sur les Abeilles*" of M. HUBER, of Geneva, who had been reduced to a state of complete blindness by *gutta serena*. at the age of seventeen. He was assisted in his observations by his wife, an admirable woman, who made it the business of her life to contrive the means of alleviating her husband's misfortune, and for whom, indeed, it has been said, he was indebted chiefly to his blindness; since, although an attachment had existed between them previously, the lady's friends were so much opposed to the match that she would probably have been induced to listen to the addresses of another suitor, had not Huber's helpless condition awakened a sympathy she could not resist, and determined her, at all hazards, to unite herself to him. Madame Ducrest, who, in her Memoirs of the Empress Josephine, relates this anecdote, knew M. Huber and his wife; and nothing, she assures us, could exceed either the unwearied attention of the latter to every wish and feeling of her husband, or the happiness which, notwithstanding his blindness, he seemed in consequence to enjoy. During the war, we are told, Madame Huber used to put her husband in possession of the movements of the armies by arranging squadrons of pins on a map, in such a manner as to represent the different bodies of troops. A method was also invented by which he was enabled to write; and his wife used to make plans of the towns they inhabited, in relief,

for him to study by the touch. In short, so many ways did her affection find of gladdening his darkened existence, that he was wont to declare he should be miserable were he to cease to be blind. "I should not know," said he, "to what extent a person in my situation could be beloved; besides, to me my wife is always young, fresh, and pretty, which is no light matter."*

CHAPTER XVIII.

MR. PRESCOTT; M. AUGUSTIN THIERRY; M. MARY-LAFON.

It might be thought that, of all literary performances, those of the historian, with his labours of research and continual reference to and comparison of documents, would be the most impracticable for one not having the free use of his eyes. There is no kind of writing which it is so impossible to spin merely out of the brain as history. Even the exactest and best stored memory will often find itself at fault in the minute knowledge required for the full exposition of the transactions of a distant age, or indeed of any considerable series of past events. Yet, formidable as the difficulty is, it has been in several instances both coped with and overcome. We have a History of Britain, coming down to the Norman Conquest, and extending to six books, by Milton, which seems to have been, at least in part, written after he became blind, though probably it was the loss of his sight that prevented him from going on with it. But perhaps the most remarkable instances of the ardent and successful prosecution of historic studies in the most untoward and difficult circumstances of this nature are two that belong to our own day. One is that of the distinguished American writer, Mr. William Hickling Prescott. His own account of his case is in the highest degree interesting. He is stated to have been born at Salem, Massachusetts, in 1796, and to have been a student at Harvard College,

* If it were our object to illustrate merely how wonderfully large an amount of acquaintance and communication with surrounding objects may be attained even under the all but complete deprivation of the ordinary inlets for knowledge, we might refer to several, other remarkable examples, such as those of David Gilbert Tait, related by Dr. Hibbert in his "Description of the Shetland Islands," of James Mitchell, first brought forward by Professor Dugald Stewart (and of which probably the fullest and latest account is to be found in Sir William Hamilton's edition of Mr. Stewart's "Collected Works," vol. iv. pp. 300-370; Edin. 1854), and of

Laura Bridgman, the most interesting of all, which has been made familiar to us by Mr. Dickens, the late Mr. Buckingham, and other travellers in the United States of America. We might refer also to the many curious details given in the little volume, entitled "The Lost Senses," by the late Dr. Kitto, himself a remarkable instance of eminent attainments in literature and skill in writing, acquired and exercised under disadvantages of which the complete extinction of the sense of hearing might almost be said to have been the least. See, in addition to his own account in "The Lost Senses," his "Life," by Dr. Ryland.

where he graduated in 1814, when he met with the great misfortune of his life, an accidental blow, that at once deprived him of the sight of one eye, and was soon followed by disease in the other. He had been intended for the bar; but that was now no more to be thought of. Instead of entering a profession, he repaired to Europe, and spent two years in travelling in England, France, and Italy; but, although his general health was improved, the most eminent oculists in London and Paris had been able to do nothing for his eyesight. We may gather, however, from some of his own expressions, that another sense had, as usually happens, already begun to some extent to supply the place of the lost one. It would seem, too, that the power of vision had been partially restored to him when he originally planned his first literary work, his "History of the Reign of Ferdinand and Isabella," which he gave to the world in 1837. In the Preface to the first edition of that work he says:—"I hope I shall be acquitted of egotism, although I add a few words respecting the peculiar embarrassments I have encountered in compiling this History. Soon after my arrangements were made, early in 1826, for obtaining the necessary materials from Madrid, I was deprived of the use of my eyes for all purposes of reading and writing, and had no prospect of again recovering it. This was a serious obstacle to the prosecution of a work requiring the perusal of a large mass of authorities, in various languages, the contents of which were to be carefully collated, and transferred to my own pages, verified by minute reference. Thus shut out from one sense, I was driven to rely exclusively on another, and to make the ear do the work of the eye. With the assistance of a reader—uninitiated, it may be added, in any modern language but his own—I worked my way through several venerable Castilian quartos, until I was satisfied of the practicability of the undertaking. I next procured the services of one more competent to aid me in pursuing my historical inquiries. The process was slow and irksome enough, doubtless, to both parties, at least till my ear was accommodated to foreign sounds, and an antiquated, oftentimes barbarous, phraseology, when my progress became more sensible, and I was cheered with the prospect of success. It certainly would have been a far more serious misfortune to be led thus blindfold through the pleasant paths of literature; but my track stretched, for the most part, across dreary wastes, where no beauty lurked to arrest the traveller's eye and charm his senses. After persevering in this course for some years, my eyes, by the blessing of Providence, recovered sufficient strength to allow me to use them, with tolerable freedom, in the prosecution of my labours, and in the revision of all previously written. I hope I shall not be misunderstood, as stating these circumstances to deprecate the severity of criticism, since I am inclined to think the greater circumspection I have been compelled to use has left

me, on the whole, less exposed to inaccuracies than I should have been in the ordinary mode of composition. But, as I reflect on the many sober hours I have passed in wading through black-letter tomes, and through manuscripts whose doubtful orthography and defiance of all punctuation were so many stumbling-blocks to my amanuensis, it calls up a scene of whimsical distresses, not usually encountered, on which the good-natured reader may, perhaps, allow I have some right, now that I have got the better of them, to dwell with satisfaction." In a note he quotes what Johnson says of Milton's work on English History attempted in similar circumstances:—"To compile a history from various authors, when they can only be consulted by other eyes, is not easy, nor possible but with more skilful and attentive help than can be commonly obtained;" and adds, "This remark of the great critic, which first engaged my attention in the midst of my embarrassments, although discouraging at first, in the end stimulated the desire to overcome them."

In the Preface to the first edition of "The Conquest of Mexico," which he produced in 1843, or six years later, Mr. Prescott informs us, that, owing to the state of his eyes, he had in the composition of that work been obliged to use a writing-case made for the blind, which does not permit the writer to see his own manuscript; nor had he ever corrected, or even read, his own original draught. But it is in the original Preface to his third work, "The Conquest of Peru," dated four years later, or in 1847, that he enters into the fullest details. "While at the University," he there says, "I received an injury in one of my eyes, which deprived me of the sight of it. The other soon after was attacked by inflammation so severely that for some time I lost the sight of that also; and, though it was subsequently restored, the organ was so much disordered as to remain permanently debilitated; while, twice in my life, I have been deprived of the use of it for all purposes of reading and writing for several years together. It was during one of these periods that I received from Madrid the materials for the 'History of Ferdinand and Isabella;' and, in my disabled condition, with my transatlantic treasures lying around me, I was like one pining from hunger in the midst of abundance. In this state, I resolved to make the ear, if possible, do the work of the eye. I procured the services of a secretary, who read to me the various authorities; and in time I became so far familiar with the sounds of the different foreign languages (to some of which, indeed, I had been previously accustomed by a residence abroad), that I could comprehend his reading without much difficulty. As the reading proceeded, I dictated copious notes; and, when these had swelled to a considerable amount, they were read to me repeatedly, till I had mastered their contents sufficiently for the purposes of composition. The same notes furnished an easy means of

reference to sustain the text. Still another difficulty occurred in the mechanical labour of writing, which I found a severe trial to the eye. This was remedied by means of a writing-case, such as is used by the blind, which enabled me to commit my thoughts to paper without the aid of sight, serving me equally well in the dark as in the light. The characters thus formed made a near approach to hieroglyphics, but my secretary became expert in the art of deciphering, and a fair copy—with a liberal allowance for unavoidable blunders—was transcribed for the use of the printer." He has described the process, he says, with the more minuteness, as some curiosity had been repeatedly expressed in reference to his *modus operandi* under his privations, and the knowledge of it might be of some assistance to others in similar circumstances.

"Though I was encouraged by the sensible progress of my work," the narrative goes on, "it was necessarily slow. But in time the tendency to inflammation diminished, and the strength of the eye was confirmed more and more. It was at length so far restored, that I could read for several hours of the day, though my labours in that way necessarily terminated with the daylight. Nor could I ever dispense with the services of a secretary, or with the writing-case; for, contrary to the usual experience, I have found writing a severer trial to the eye than reading—a remark, however, which does not apply to the reading of manuscript; and, to enable myself, therefore, to revise my composition more carefully, I caused a copy of the 'History of Ferdinand and Isabella' to be printed for my own inspection before it was sent to the press for publication. Such as I have described was the improved state of my health during the preparation of the 'Conquest of Mexico;' and, satisfied with being raised so nearly to a level with the rest of my species, I scarcely envied the superior good fortune of those who could prolong their studies into the evening and later hours of the night. But a change has again taken place during the last two years. The sight of my eye has become gradually dimmed, while the sensibility of the nerve has been so far increased that for several weeks of the last year I have not opened a volume, and through the whole time I have not had the use of it, on an average, for more than an hour a day. Nor can I cheer myself with the delusive expectation, that, impaired as the organ has become, from having been tasked probably beyond its strength, it can ever renew its youth, or be of much service to me hereafter in my literary researches. Whether I shall have the heart to enter, as I had proposed, on a new and more extensive field of historical labour, with these impediments, I cannot say. Perhaps long habit, and a natural desire to follow up the career which I have so long pursued, may make this, in a manner, necessary, as my past experience has already proved that it is practicable."

The courageous and yet gentle spirit of all this is as medicinal as it is beautiful. Mr. Prescott, who pursued with admirable perseverance his literary labours until his death in 1859, brought out finally the first part of a new work, his "History of the Reign of Philip the Second," in which he concludes by disclaiming the credit of having surmounted the incalculable obstacles which beset the task of historical writing by one absolutely blind. The difficulties he had to contend with, he modestly declares, to have been very far inferior. But even absolute blindness, as he observes, has been triumphed over by the eminent French historian AUGUSTIN THIERRY, the author of the "Conquest of England by the Normans." Thierry, undoubtedly one of the first of modern narrators, whatever may be thought of some of his peculiar views, died in 1856. His case has also been fully related by himself in a manly, uncomplaining way, which is extremely touching, in what he entitles "A History of his Historical Works and Theories." He was a native of Blois, and was born in 1795. For ten years of his early manhood, from 1817 to 1827, he was permitted, he gratefully sets out by stating, to pursue without interruption the course of his studies. It was in that period that he produced, among other works, his "History of the Norman Conquest." When it was at last published, in the spring of 1825, after four years and a half of unceasing toil, its success, he says surpassed his hopes; "but," he adds, "this joy, great as it was, had a sad drawback; my eyes had worn themselves out in work; I had partly lost my sight. My task ended, I listened, but too late, perhaps, to the advice to take some repose; the state of matters was urgent, for I had become perfectly incapable of reading or writing. My eyesight continued to decay, notwithstanding the use of the strongest remedies; and, as a last medical prescription, I was ordered to travel." He went first to Switzerland, and then to Provence, where an intimate friend, who had long been the companion of his studies, joined him. "Condemned to idleness," Thierry proceeds, "I followed from city to city my laborious travelling companion, and not without envy saw him scrutinize all the relics of the past, searching archives and libraries," to give the last finish to a work upon which he was engaged. For himself, nevertheless, his compulsory idleness soon became intolerable. On his return to Paris, after a few months, he at once resumed his old studies, and, almost blind as he was, began again to follow with as much zeal as ever what he considered to be his destined course of work. The necessity of reading, not with his own, but with another's eyes, and of dictating instead of writing, did not alarm him. Then he tells of various historical schemes in which he engaged. Among others was a work which he undertook to write in conjunction with his younger brother, Amédée Thierry, who still lives, and has also distinguished himself by his historical compositions. "I

experienced heartfelt pleasure," he says, "at the idea of this fraternal association. . . . My brother's portion of the work has seen the light, and has made great way in the literary world; mine remains uncompleted. I had entered with ardour into a series of researches quite new to me; had explored the collection of Byzantine historians for the history of the Goths, Huns, Vandals, and other nations that took part in the dismemberment of the Empire; when I found myself stopped by an obstacle stronger than myself. However extended these labours, my complete blindness would not have prevented my going on with them; I was resigned, as a courageous man may be, to anything; I had made friends with darkness. But other trials came: acute suffering and the decline of my strength announced a nervous disease of the most serious kind. I was obliged to confess myself conquered; and, to save, if it was still time, the last remains of my health, I gave up work, and left Paris in October 1828."

"Such," he adds, "is the history of the ten most active and laborious years of my literary life. I have never found any similar since, and have only been able to glean a few hours of work here and there amid long days of suffering." That October 1828, when he left Paris, he accounts the end of his youthful career, and the commencement of a new one, which, he says, very touchingly, he pursues "with courage, but with slow steps, much slower than formerly, though perhaps not less surely." He never, in fact, ceased to work. And in this noble strain the brave-hearted man concludes his narrative: "If, as I delight in thinking, the interest of knowledge and learning is to be counted in the number of great national interests, I have given my country all that the soldier lying mutilated on the field of battle gives her. Whatever may be the fate of my labours, this example, I hope, will not be lost. I would desire that it might serve to combat the species of moral weakness which is the disease of our present generation; to bring back into the straight road of life some of those enervated souls that complain of wanting faith, that they know not what to do, and seek everywhere, without finding it, an object for worship and admiration. Why say, with so much bitterness, that in the world, constituted as it is, there is no air for all lungs, no employment for all minds? Is not calm and seriousness there? and is not that a refuge, a hope, a field within the reach of all of us? With it, evil days are passed through without their weight being felt; every one can make his own destiny; every one can employ his life nobly. This is what I have done, and would do again if I had to recommence my career; I would choose that which has brought me where I am. Blind and suffering, without hope and almost without intermission, I may give this testimony, which from me will not appear suspicious:—there is something in the world which is better than the enjoyments of sense, better

than riches, better than health itself; it is devotion to the pursuit of knowledge.”*

It was in 1831, three years before he thus wrote, that Thierry acquired the chief blessing of his existence in his marriage. Madame Thierry, who was of a distinguished Breton family (her maiden name was Julia de Querangal), is the authoress of various contributions to the lighter literature of the day. A writer who has described a visit paid to Thierry says:—“Entering a small apartment on the ground floor, furnished with simple elegance, we were received by a lady attired in black; still young, of small stature, graceful manners, and an intellectual but pensive countenance. It was Madame Augustin Thierry, wife of the historian; she who has so appreciated the beauty and happiness of associating her name with a great name, her life with a life of glory and of suffering, of quitting the vain pleasures of the world to devote herself wholly to the noblest part in the drama of life that can be assigned to a woman, the part of a guardian angel, of a providence on earth, for a great soul imprisoned in a suffering body. Even had I not known that Madame Augustin Thierry is endowed with faculties that qualify her to take a direct and active part in all the labours of her husband, even had I not read the pieces, so remarkable for thought and for expression, that, proceeding from her pen, have appeared in the “*Revue des Deux Mondes*,” under the title of “Philippe de Morvelle,” the destiny that she has adopted would suffice in my eyes to manifest that hers is a noble heart, a noble spirit.” They were then joined by M. Amédée Thierry, described as a man of middle height, grave in speech as in countenance, wherein might be read the profound depression of his fraternal heart. “At length,” continues the account, “I heard the sound of approaching steps; a door on my right opened, and a domestic appeared, carrying on his back a man, blind, paralysed, incapable of movement. We all rose: my heart was penetrated with emotion at the sight of a being so powerful in intellect, so powerless in body. The domestic in his every motion exhibited a respectful solicitude that sensibly affected me; he seemed thoroughly to appreciate the value of him he bore. He bent gently back towards an arm-chair, in which he deposited his charge, enveloping the lower part of the motionless frame with a wrapper. This done, in an instant the scene changed. . . . It was . . . the noblest blind face that can be conceived. The head was firmly set upon broad shoulders; glossy hair, of the deepest black, carefully parted over an expansive forehead, fell in curls beside each temple; beneath their arched brows opened the dark eyes; but for the vagueness of their direction, I should have imagined them animated

* Autobiographical Preface to the “*Dix Ans d'Etudes Historiques*,” or “*Historical Essays*,” originally published in 1834. We avail ourselves of the translation given with the

“*Narratives of the Merovingian Era*” in “*Whittaker's Popular Library*,” 8vo., London, 1844, only changing a word or two here and there.

with sight; the nose was of the purest Greek form; the mouth, with lips fine, delicate, and expressive, seemed endowed with all the sensibility of which the eyes had been deprived; the finely turned chin had a slight dimple at its extremity; there was in the contour of the face, and in the general expression of the physiognomy, a remarkable combination of energy, subtileness, and sedate tranquillity; the tones of his voice were clear, well-poised, and distinct, though, from his feeble health, not sonorous; his bearing was in the highest degree elegant; the lower portion of the frame, as I have said, was paralysed, but the movement of the bust and of the arms was free; the hands, of which only the forefinger and thumb appeared capable of action, were gloved. . . . Conversation once fairly begun, that fine head seemed as it were radiant in the light of the intellect still finer within. I have been in the company of many persons who have the reputation of good talkers, and who do talk admirably, but I have perhaps never heard anything comparable with the colloquial language of M. Augustin Thierry, in facility, perspicuity, elegance. It is, doubtless, the habit of dictation that has given so much of style to his conversation; but, whatever the cause, it may indeed be said of him, that without any effort, without any affectation whatever, he really *speaks like a book*. One of our party, M. Ampère, was preparing to depart for the East; he had no sooner mentioned the circumstance than M. Augustin Thierry discoursed to us of the East in what, for thought and language, was an absolute poem. This blind man knows everything, recollects everything; that which he has not seen with the eyes of the body, he hath seen with the eyes of the spirit. Like Milton, he is acquainted with nearly all the European languages. One of his friends told me that he has sometimes heard him in the evening, seated in his garden, beneath the pale rays of the setting sun, singing, with his feeble voice, a love song in modern Greek; and at such moments, added my informant, he seemed to me finer than Homer, or than the unknown Klepht, who, himself perhaps also blind, had composed the verses he was reciting. Throughout the conversation, to which I was a silent and attentive listener, I could detect in M. Augustin Thierry not the slightest trace of selfishness, not the least self-reference. . . . At times only, when his pains are most racking, he is heard to murmur, 'Oh, that I were only blind!'"*

In no nation, it must be confessed, has the love of literature for its own sake been more frequently or more strongly exemplified than among the fellow-countrymen of M. Thierry. Perhaps a Frenchman would generally be found to work with more patient endurance, and with more untroubled self-satisfaction, in some favourite field of study, without much either of recognition or of actual product, than an Eng-

* From a Biographical Notice—whether original or translated is not stated—prefixed to the translation of Thierry's "History of the Norman Conquest," by William Hazlitt, Esq.

lishman would: we, with our more practical turn, are apt to become impatient, and to think that we are losing our time, when we see no tangible result of our labours; our brilliant neighbours across the Channel may be still fonder of glory than we are, but, even when neither that nor any other reward from without comes to them, they still believe that the future has in store what the present denies. And, comparatively indifferent to some things which are the first considerations with most Englishmen, more especially that ascendancy which attends on worldly wealth and what is called success in life—in which it is really not the man himself but his social position and his possessions that are regarded—a Frenchman devoted to intellectual pursuits can commonly, more easily than we can do, forget everything else, whether belonging to the future or to the present, in his enjoyment of that to which he has given his heart. Almost Thierry's very words are repeated by another writer, who has not indeed had to struggle with the same terrible calamities, but, on the other hand, has not had the same fame and applause to sustain him and cheer him on. M. MARY-LAFON, besides other works, in particular a "Literary History of the South of France," (*Histoire du Midi*), is the author of a very ingenious, learned, and instructive volume on the Provençal tongue,—"*Tableau Historique et Littéraire de la Langue parlée dans le Midi de la France, et connue sous le nom de langue Romano-Provençale*,"—published at Paris in 1842. Although this treatise is professedly and in its primary purpose philological, he claims for it the honour of belonging also to the grand domain of history. "The language of a people," he well observes, in the commencement of his Preface, or Introduction, "is its life, and, as it were, its soul. All that the successive generations of men leave behind them on the earth perishes or is effaced; language alone survives; and when the tomb has consumed even to the ashes of those generations, when there remains of their passage here below nothing save ruins and doubtful traces, the tongue which they spoke, for ever intact, and also for ever young, still preserves to us the immortal breath of their spirit. It appears to me that philologists have seldom comprehended all that the subject of their labours involves of the highest philosophy. In my estimation, there is none more beautiful, or that is better suited to suffice an intelligent ambition. To remount to the origin of some language which formerly expressed the whole social condition of some portion of the great human family, to follow it through its different ages, through its successive developments, through its apogee, its decline, and in many cases its fall or its transformation, this is of all historical studies the one the interest belonging to which seems to me the most real and the most continuous." But M. Mary-Lafon's resolute and enthusiastic labours had been little lightened by any even of those honorary distinctions which had fallen to the lot of many of his more fortunate contemporaries. His essay on the

Provençal tongue had in its original form failed to obtain more than a qualified approbation from the linguistic section of the Institute. Far from protesting, he says, against this judgment, he only regarded it as imposing on him the obligation of revising his work, and making it as much more perfect as he could. In the new form to which he thus brought it, it was at last *crowned*, as is the phrase, by the Institute, on the 5th of May, 1841. There is something very touching, but at the same time very inspiring too, in the terms in which he speaks of this achievement of what had been for so long his highest ambition:—"At length the Institute has been kind enough to encourage my labours by awarding to me one of its honourable recompences: at the end of twelve years of studies silently pursued from day to day, here is the first fruit that I have seen ripen. My toilsome researches have borne away with them the brightest days of my youth: the dreams of ambition, of fortune, of fame, wearied of seeing me continually in the noiseless halls of the libraries, have all vanished away. On my forehead, denuded by night-work, the white hairs announce to me that old age is already come before its time. When I return to the ancient dwelling of my mother, I shall find that many of the fields which I remember to have seen in my childhood growing yellow with such plenteous harvests, and many of the meadows in those days so green, have passed into other hands while I was exploring the vast necropolises of the past. Very well! although study has taken from me my youth, destroyed my health, and narrowed the horizon of my ancestral patrimony; although in digging the historic soil vigorously and conscientiously, I have come upon nothing for myself but a modest medal, I am happier and prouder of my losses and of my labours than others of their millions and their honours, and if I were about to recommence this existence, ungrateful and toilsome as it has been, I should embrace it, as I have done for these twelve years, with a tranquil heart and with shut eyes" (*le cœur tranquille et les yeux fermés*)—that is, apparently, with eyes closed against whatever was discouraging and repulsive in such a course of life, although the expression might almost seem to be selected not without some thought of Augustin Thierry and his actual blindness.

CHAPTER XIX.

ACCOUNT OF JAMES BRINDLEY; CANALS. OTHER EXAMPLES OF SELF-TAUGHT MECHANICIANS: — RANNEQUIN; ZABAGLIA; FERRACINO; HARRISON.

JAMES BRINDLEY, the celebrated engineer, appears to have been entirely self-taught in even the rudiments of mechanical science, although, unfor-

tunately, we are not in possession of any very minute details of the manner in which his powerful genius first found its way to the knowledge of those laws of nature of which it afterwards made so many admirable applications. He was born at Tunsted, in the parish of Wormhill, Derbyshire, in the year 1716; and all we know of the first seventeen years of his life is, that his father having reduced himself to extreme poverty by his dissipated habits, he was allowed to grow up almost totally uneducated, and from the time he was able to do anything, he was employed in the ordinary descriptions of country labour. To the end of his life this great genius was barely able to read on any very pressing occasion; for, generally speaking, he would no more have thought of looking into a book for any information he wanted than of seeking for it in the heart of a millstone: and his knowledge of the art of writing hardly extended farther than the accomplishment of signing his name. It is probable, that as he grew towards manhood he began to feel himself created for higher things than driving a cart or following a plough; and we may even venture to conjecture that the particular bias of his genius towards mechanical invention had already disclosed itself, when, at the age of seventeen, he bound himself apprentice to a person of the name of Bennet, a millwright, residing at Macclesfield, which was but a few miles from his native place. At all events, it is certain that he almost immediately displayed a wonderful natural aptitude for the profession he had chosen. "In the early part of his apprenticeship," says the writer of his life in the "Biographia Britannica," who was supplied with the materials of his article by Mr. Henshall, Brindley's brother-in-law, "he was frequently left by himself for whole weeks together, to execute works concerning which his master had given him no previous instructions. These works, therefore, he finished in his own way; and Mr. Bennet was often astonished at the improvements his apprentice from time to time introduced into the millwright business, and earnestly questioned him from whom he had gained his knowledge. He had not been long at the trade, before the millers, wherever he had been employed, always chose him again in preference to the master, or any other workman; and before the expiration of his servitude, at which time Mr. Bennet, who was advanced in years, grew unable to work, Mr. Brindley, by his ingenuity and application, kept up the business with credit, and even supported the old man and his family in a comfortable manner."

His master, indeed, from all that we hear of him, does not appear to have been very capable of teaching him much of anything; and Brindley seems to have been left to pick up his knowledge of the business in the best way he could, by his own observation and sagacity. Bennet, having been employed on one occasion, we are told, to build a paper-mill, a machine which he had never seen in his life, took a journey to a distant

part of the country, expressly for the purpose of inspecting one which might serve him for a model. However, he had made his observations, it would seem to very little purpose; for, having returned home and fallen to work, he could make nothing of the business at all, and was only bewildering himself, when a stranger, who understood something of such matters, happening one day to see what he was about, felt no scruple in remarking in the neighbourhood that the man was only throwing away his employer's money. The reports which in consequence got abroad soon reached the ears of Brindley, who had been employed on the machinery under the directions of his master. Having probably of himself begun ere this to suspect that all was not right, his suspicions were only confirmed by what he heard; but, aware how un-



JAMES BRINDLEY.

likely it was that his master would be able to explain matters, or even assist him in getting out of his difficulties, he did not apply to him. On the contrary, he said nothing to any one; but, waiting till the work of the week was over, set out by himself one Saturday evening to see the same mill which his master had already visited. He accomplished his object, and was back to his work by Monday morning, having travelled the whole journey of fifty miles on foot. Perfectly master now of the construction of the mill, he found no difficulty in going on with his undertaking, and completed the machine, indeed, not only so as perfectly to satisfy the proprietor, but with several improvements on his model of his own contrivance.

After remaining some years with Bennet, he set up in business for

himself; and with the reputation he had already acquired, his entire devotion to his profession, and the wonderful talent for mechanical invention, of which almost every piece of machinery he constructed gave evidence, he could not fail to succeed. But for some time, of course, he was known only in the neighbourhood of the place where he lived. His connections, however, gradually became more and more extensive; and at length he began to undertake engineering in all its branches. A performance by which he particularly distinguished himself was the erection, in 1752, of a water-engine for draining a coal-mine at Clifton, in Lancashire. The great difficulty in this case was to obtain a supply of water for working the engine; Brindley brought the water through a tunnel six hundred yards in length, cut in the solid rock. It would appear, however, that his genius was not yet quite appreciated as it deserved to be, even by those who employed him. He was in some sort an intruder into his present profession, for which he had not been regularly educated; and it was natural enough that, before his great powers had had an opportunity of showing themselves, and commanding the universal admiration of those best qualified to judge of them, he should have been conceived by many to be rather a merely clever workman in a few particular departments, than one who could be safely entrusted with the entire management and superintendence of a complicated design. In 1755 it was determined to erect a new silk-mill at Congleton, in Cheshire; and another person having been appointed to preside over the execution of the work, and to arrange the more intricate combinations, Brindley was engaged to fabricate the larger wheels and other coarser parts of the apparatus. It soon became manifest, however, that the superintendent was unfit for his office; and the proprietors were obliged to apply to Brindley to remedy several blunders into which he had fallen, and give his advice as to how the work should be proceeded in. Still they did not deem it proper to dismiss their incapable projector; but, the pressing difficulty overcome, would have had him by whose ingenuity they had been enabled to get over it to return to his subordinate place, and work under the directions of the same superior. This Brindley positively refused to do. He told them he was ready, if they would merely let him know what they wished the machine to perform, to apply his best endeavours to make it answer that purpose, and that he had no doubt he should succeed; but he would not submit to be superintended by a person whom he had discovered to be quite ignorant of the business he professed. This at once brought about a proper arrangement of matters. Brindley's services could not be dispensed with; those of the pretender who had been set over him might be so, without much disadvantage. The entire management of the work, therefore, was forthwith confided to the former, who completed it with his usual ability, in a superior manner. He

not only made important improvements, indeed, in many parts of the machine itself, but even in the mode of preparing the separate pieces of which it was to be composed. His ever-active genius was constantly displaying itself by the invention of the most beautiful and economical simplifications. One of these was a method which he contrived for cutting all his tooth and pinion wheels by machinery, instead of having them done by the hand, as they always till then had been. This invention enabled him to finish as much of that sort of work in one day as had formerly been accomplished in fourteen.

But the character of this man's mind was comprehensiveness and grandeur of conception; and he had not yet found any adequate field for the display of his vast ideas and almost inexhaustible powers of execution. Happily this was at last afforded him, by the commencement of a series of undertakings in his native country, which hold a very high rank among the achievements of modern enterprise and mechanical skill; and which were destined, within no long period, to change the whole aspect of the internal commerce of the island.

Artificial water-roads, or *canals*, were well known to the ancients. Without transcribing all the learning that has been collected upon the subject, and may be found in any of the common treatises, we may merely state that the Egyptians had early effected a junction by this means between the Red Sea and the Mediterranean; that nearly five centuries before the commencement of our era Xerxes, when about to invade Greece, cut a ship canal a mile and a half long, across the Isthmus of Mount Athos; and that both the Greeks and the Romans attempted to cut one across the Isthmus of Corinth. It has been supposed by some that one was actually cut by the Romans in Britain from the neighbourhood of Peterborough to that of Lincoln, some traces of which have been asserted to be still discernible. Canal navigation is also of considerable antiquity in China. The greatest work of this description in the world is the Imperial Canal of that country, which is two hundred feet broad, and, commencing at Pekin, extends southward, to the distance of about nine hundred miles. It is supposed to have been constructed about eight centuries ago; but there are a great many smaller works of the same kind in the country, many of which are undoubtedly much older. The Chinese are unacquainted, as were also the ancients, with the contrivance called a lock, by means of which different levels are connected in many of our modern European canals, and which, as probably all our readers know, is merely a small intermediate space, into which the boat is admitted by the opening of one floodgate, and from which it is let out by the opening of another after the former has been shut;—the purpose being thus attained of floating it onwards, without any greater waste of water than the quantity required to alter the level of the enclosed space. When locks are not employed, the

canal must be either of uniform level throughout, or it must consist of a succession of completely separated portions of water-way, from one to the other of which the boat is carried on an inclined plane, or by some other mechanical contrivance.

Canals have likewise been long in use in several of the countries of modern Europe, particularly in the Netherlands and in France. In the former, indeed, they used to constitute the principal means of communication between one place and another, whether for commercial or other purposes. In France, the canals of Burgundy, of Briare, of Orleans, and of Languedoc, all contribute important facilities to the commerce of the country. That of Languedoc, which unites the Mediterranean to the Atlantic, is sixty feet broad and one hundred and fifty miles in length. It was finished in 1681; having employed twelve thousand men for fifteen years, and cost twelve hundred thousand pounds sterling.

It is remarkable that, with these examples before her, England was so late in availing herself of the advantages of canal navigation. The subject, however, had not been altogether unthought of. As early as the reign of Charles the Second a scheme was in agitation for cutting a canal (which has since been made) between the Forth and the Clyde in the northern part of the kingdom; but the idea was abandoned, from the difficulty of procuring the requisite funds. A very general impression, too, seems to have been felt, in the earlier part of the last century, as to the desirableness of effecting a canal navigation between the central English counties and either the metropolis or the eastern coast.

The first modern canal actually executed in England was not begun till the year 1755, and was the result of a sudden thought on the part of its undertakers, nothing of the kind having been contemplated by them when they first engaged in the operations which led to it. They had obtained an act of parliament for rendering navigable the Sankey Brook, in Lancashire, which flows into the river Mersey, from the neighbourhood of the now flourishing town of St. Helen's, through a district abounding in valuable beds of coal. Upon surveying the ground however with more care, it was considered better to leave the natural course of the stream altogether, and to carry the intended navigation along a new line; in other words, to cut a canal. The work was accordingly commenced; and, the powers of the projectors having been enlarged by a second act of parliament, the canal was eventually extended to the length of about twelve miles. It turned out both a highly successful speculation for the proprietors, and a valuable public accommodation.

It is probable that the Sankey Canal, although it did not give birth to the first idea of the great work we are now about to describe, had at least the honour of prompting the first decided step towards its execution. Francis, Duke of Bridgewater, who, while yet much under age, had succeeded, in the year 1745, by the death of his elder brother

to the family estates, and the title, which had been first borne by his father, had a property at Worsley, about seven miles west from Manchester, extremely rich in coal mines, which, however, had hitherto been unproductive, owing to the want of any sufficiently economical means of transport. The object of supplying this defect had for some time strongly engaged the attention of the young Duke, as it had indeed done that of his father; who, in the year 1732, had obtained an act of parliament enabling him to cut a canal to Manchester, but had been deterred from commencing the work, both by the immense pecuniary outlay which it would have demanded, and the formidable natural difficulties against which at that time there was probably no engineer in the country able to contend. When the idea, however, was now revived, the extraordinary mechanical genius of Brindley had already acquired for him an extensive reputation, and he was applied to by the Duke to survey the ground through which the proposed canal would have to be carried, and to make his report upon the practicability of the scheme. New as he was to this species of engineering, Brindley, confident in his own powers, at once undertook to make the desired examination, and, having finished it, expressed his conviction that the ground presented no difficulties which might not be surmounted. On receiving this assurance, the Duke at once determined upon the undertaking; and, an act of parliament having been obtained in 1758, the powers of which were considerably extended by succeeding acts, the formation of the canal was begun that year.

From the first the Duke resolved that, without regard to expense, every part of the work should be executed in the most perfect manner. One of the chief difficulties to be surmounted was that of procuring a sufficient supply of water; and, therefore, that there might be as little of it as possible wasted, it was determined that the canal should be of uniform level throughout, and of course without locks. It had consequently to be carried in various parts of its course both under hills and over wide and deep valleys. The point, indeed, from which it took its commencement was the heart of the coal-mountain at Worsley. Here a large basin was formed, in the first place, from which a tunnel of three-quarters of a mile in length had to be cut through the hill. We may just mention, in passing, that the subterraneous course of the water beyond this basin was subsequently extended in various directions for about thirty miles. After emerging from underground, the line of the canal was carried forward, as we have stated, by the intrepid engineer, on the same undeviating level; every obstacle that presented itself being triumphed over by his admirable ingenuity, which the difficulties he had to encounter seemed only to render more fertile in happy inventions. Nor did his comprehensive mind ever neglect even the most subordinate departments of the enterprise. The operations of the workmen were

everywhere facilitated by new machines of his contrivance: and whatever could contribute to the economy with which the work was carried on was attended to only less anxiously than what was deemed essential to its completeness. Thus, for example, the materials excavated from one place were employed to form the necessary embankments at another, to which they were conveyed in boats, having bottoms which opened and at once deposited the load in the place where it was wanted. No part of his task, indeed, seemed to meet this great engineer unprepared. He made no blunders, and never had either to undo anything or to wish it undone; on the contrary, when any new difficulty occurred, it appeared almost as if he had been all along providing for it—as if his other operations had been directed from the first by his anticipation of the one now about to be undertaken.

In order to bring the canal to Manchester it was necessary to carry it across the Irwell. That river is, and was then, navigable for a considerable way above the place at which the canal comes up to it; and this circumstance interposed an additional difficulty, as, of course, in establishing the one navigation, it was indispensable that the other should not be destroyed or interfered with. But nothing could dismay the daring genius of Brindley. Thinking it, however, due to his noble employer to give him the most satisfying evidence in his power of the practicability of his design, he requested that another engineer might be called in to give his opinion before its execution should be determined on. This person Brindley carried to the spot where he proposed to rear his aqueduct, and endeavoured to explain to him how he meant to carry on the work. But the other only shook his head, and remarked, that “he had often heard of castles in the air, but never before was shown where any of them were to be erected.” The Duke, nevertheless, retained his confidence in his own engineer, and it was resolved that the work should proceed. The erection of the aqueduct, accordingly, was begun in September, 1760, and on the 17th of July following the first boat passed over it, the whole structure forming a bridge of above two hundred yards in length, supported upon three arches, of which the centre one rose nearly forty feet above the surface of the river; on which might be frequently beheld a vessel passing along, while another, with all its masts and sails standing, was holding its undisturbed way directly under its keel.

In 1762 an act of parliament was, after much opposition, obtained by the Duke, for extending a branch of his canal to Liverpool, and so uniting that town, by this method of communication, to Manchester. This portion of the canal, which is more than twenty-nine miles in length, is, like the former, without locks, and is carried by an aqueduct over the Mersey, the arch of which, however, is less lofty than that of the one over the Irwell, as the river is not navigable at the place where

it crosses. It passes also over several valleys of considerable width and depth. Before this, the usual price of the carriage of goods between Liverpool and Manchester had been twelve shillings per ton by water, and forty shillings by land; they were now conveyed by the canal, at a charge of six shillings per ton, and with all the regularity of land carriage.

In noticing this great work, we ought not to overlook the admirable manner in which the enterprising nobleman, at whose expense it was undertaken, performed his part in carrying it on. It was his determination, as we have already stated, from the first, to spare no expense on its completion. Accordingly, he devoted to it during the time of its progress nearly the whole of his revenues, denying himself, all the while, even the ordinary accommodations of his rank, and living on an income of four hundred a year. He had even great commercial difficulties to contend with in the prosecution of his schemes, being at one time unable to raise 500*l.* on his bond on the Royal Exchange; and it was a chief business of his agent, Mr. Gilbert, to ride up and down the country to raise money on his Grace's promissory notes. It is true that he was afterwards amply repaid for this outlay and temporary sacrifice; but the compensation that eventually accrued to him he never might have lived to enjoy; and at all events he acted as none but extraordinary men do, in thus voluntarily relinquishing the present for the future, and preferring to any dissipation of his wealth on passing and merely personal objects, the creation of this magnificent monument of lasting public usefulness.* Nor was it only in the liberality of his expenditure that the Duke approved himself a patron worthy of Brindley. He supported his engineer throughout the undertaking with unflinching spirit, in the face of no little outcry and ridicule, to which the imagined extravagance or impracticability of many of his plans exposed him—and that even from those who were generally accounted the most scientific judges of such matters. The success with which these plans were carried into execution is probably in no slight degree to be attributed to the perfect confidence with which their author was thus enabled to proceed.

We have entered at the greater length into the history of this undertaking, both because it was the first of a succession of works of the same

* Francis, Duke of Bridgewater, died in 1803, at the age of 67, when the ducal title became extinct, and the earldom passed to his cousin, General Egerton. The income arising from his canal property alone was understood to be, at the time of his death, between 50,000*l.* and 80,000*l.* per annum—a large revenue, but not amounting, although we add to it the rents of his other estates, to anything like that assigned to this nobleman, by the writer of his life in the "Biographie

Universelle," who informs us, that the income-tax which he paid every year amounted alone to 110,000*l.* sterling! "La somme qu'il payait, chaque année, pour sa portion dans la taxe du revenu (*income-tax*) s'élevait seule à 110,000 livres st." The fact is, that in the returns which he made under the act imposing the tax in question the Duke estimated his income at that amount. He left at his death, besides his large property in land, about 600,000*l.* in the funds.

description, in which the great engineer of whom we are speaking displayed the unrivalled hardihood, originality, and fertility of his genius, and because from it is also to be dated the commencement of that extended canal navigation, which came to form so important a part of our means of internal communication in this country. While the Bridgewater Canal was yet in progress, Mr. Brindley was engaged by Lord Gower,* and the other principal landed proprietors of Staffordshire, to survey a line for another canal, which it was proposed should pass through that county, and, by uniting the Trent and the Mersey, open for it a communication by water with both the east and west coast. Having reported favourably of the practicability of this design, and an act of parliament having been obtained in 1765 for carrying it into effect, he was appointed to conduct the work. The scheme was one which had been often thought of; but the supposed impossibility of getting across the elevated central region which has been called the Backbone of England, had hitherto prevented any attempt to execute it. This was, however, precisely such an obstacle as Brindley delighted to cope with; and he at once overcame it, by carrying a tunnel through Harecastle Hill, of two thousand eight hundred and eighty yards in length, at a depth, in some places, of more than two hundred feet below the surface of the earth. This was only one of five tunnels excavated in different parts of the canal, which extends to the length of ninety-three miles, having seventy-six locks, and passing in its course over many aqueducts. Brindley, however, did not live to execute the whole of this great work, which was finished by his brother-in-law, Mr. Henshall, in 1777, about eleven years after its commencement.

During the time that these operations, so new in this country, were in progress, the curious crowded to witness them from all quarters, and the grandeur of many of Brindley's plans seems to have made a deep impression upon even his unscientific visitors. A letter which appeared in the newspapers, while he was engaged with the Trent and Mersey Canal, gives us a lively picture of the astonishment with which the multitude viewed what he was about. The writer, it will be observed, alludes particularly to the Harecastle Tunnel, the chief difficulty in excavating which arose from the nature of the soil it had to be cut through. "Gentlemen come to view our eighth wonder of the world, the subterranean navigation which is cutting by the great Mr. Brindley, who handles rocks as easily as you would plum-pies, and makes the four elements subservient to his will. He is as plain a looking man as one of the boors of the Peak, or one of his own carters; but when he speaks, all ears listen, and every mind is filled with wonder at the

* Lord Gower married a sister of the Duke of Bridgewater; and his Grace left his canal property in Lancashire to his nephew, the first Duke of Sutherland (formerly Marquis of Stafford).

things he pronounces to be practicable. He has cut a mile through bogs, which he binds up, embanking them with stones, which he gets out of other parts of the navigation, besides about a quarter of a mile into the hill Yelden, on the side of which he has a pump, which is worked by water, and a stove, the fire of which sucks through a pipe the damp that would annoy the men who are cutting towards the centre of the hill. The clay he cuts out serves for brick to arch the subterraneous part, which we heartily wish to see finished to Wilden Ferry, when we shall be able to send coals and pots to London, and to different parts of the globe."

It would occupy too much of our space to detail, however rapidly, the history of the other undertakings of this description to which the remainder of Mr. Brindley's life was devoted. The success with which the Duke of Bridgewater's enterprising plans for the improvement of his property were rewarded, speedily prompted numerous other speculations of a similar description; and many canals were formed in different parts of the kingdom, in the execution or planning of almost all of which Brindley's services were employed. He himself had become quite an enthusiast in his new profession, as a little anecdote that has been often told of him may serve to show. Having been called on one occasion to give his evidence touching some professional point before a Committee of the House of Commons, he expressed himself, in the course of his examination, with so much contempt of rivers as means of internal navigation, that an honourable member was tempted to ask him for what purpose he conceived rivers to have been created; when Brindley, after hesitating a moment, replied, "To feed canals." His success as a builder of aqueducts would appear to have inspired him with almost as fervid a zeal in favour of bridges as of canals, if it be true, as has been asserted, that one of his favourite schemes contemplated the joining of Great Britain to Ireland by a bridge of boats extending from Portpatrick to Donaghadee. This report, however, is alleged to be without foundation by the late Earl of Bridgewater, in a curious work which he published some years ago at Paris, on the subject of his predecessor's celebrated canal.

Brindley's multiplied labours and intense application rapidly wasted his strength, and shortened his life. He died at Turnhurst, in Staffordshire, on the 27th of September, 1772, in the fifty-sixth year of his age, having suffered for some years under a hectic fever, which he had never been able to get rid of. In his case, as in that of other active spirits, the soul seems to have

"O'er-inform'd its tenement of clay;"

although the actual bodily fatigue to which his many engagements subjected him must doubtless have contributed to wear him out.

No man ever lived more for his pursuit, or less for himself, than Brindley. He had no sources of enjoyment, or even of thought, except in his profession. It is related, that having once, when in London, been prevailed upon to go to the theatre, the unusual excitement so confused and agitated him as actually to unfit him for business for several days, on which account he never could be induced to repeat his visit. His total want of education, and ignorance of literature, left his genius without any other field in which to exercise itself and spend its strength than that which the pursuit of his profession afforded it. But its power, even here, would probably not have been impaired if it could have better sought relaxation in variety; on the contrary, its spring would most likely have been all the stronger for being occasionally unbenumbed. As we have already mentioned, he was all but entirely ignorant of reading and writing. He knew something of figures, but did not avail himself much of their assistance in performing the calculations which were frequently necessary in the prosecution of his mechanical designs. On these occasions his habit was to work the question, by a method of his own, chiefly in his head, only setting down the results at particular stages of the operation; yet his conclusions were generally correct. His vigour of conception, in regard to machinery, was so great, that, however complicated might be the machine he had to execute, he never, except sometimes to satisfy his employers, made any drawing or model of it; but, having once fixed its different parts in his mind, would construct it without any difficulty, merely from the idea of which he had thus possessed himself. When much perplexed with any problem he had to solve, his practice was to take to bed, in order to study it; and he would sometimes remain, we are told, for two or three days thus fixed in meditation to his pillow.

A much more potent agency for the same purpose has since been introduced, and the great era of inland navigation has now come to a close; but it will enable us to appreciate what our commerce owes to Brindley, if we cast our eye for a moment over the map of Great Britain, and note a few of the principal canals by which the island, after he had commenced his operations, rapidly came to be intersected in all directions. First, there is the Trent and Mersey Canal, which we have already mentioned, and which was denominated by Brindley the Grand Trunk Navigation, as, in fact, uniting one side of the kingdom to the other, and therefore especially adapted to serve, as it has since actually done, by way of stem, from which other similar lines might proceed as branches to different points. By this canal, a complete water communication was established, though by a somewhat circuitous sweep, between the great ports of Liverpool on the west coast and Hull on the east. A branch from it, the Staffordshire and Worcestershire Canal, was afterwards carried to the river Severn; and thus a connection was effected

between the port of Bristol and the two already mentioned. This branch, being about forty-six miles long, was also executed by Brindley, and was completed in 1772. Similar communications were subsequently formed from other points on the south coast to the central counties. But the most important line of English canals is that which extends from the centre of the kingdom to the metropolis, and, by falling into the Grand Trunk Navigation, forms in fact a continued communication by water, all the way from London to Liverpool. Of this line, the principal part is formed by what is called the Grand Junction Canal, which, commencing at Brentford, stretches north-west till it falls into a branch of the Oxford Canal, at Brunston, in Northamptonshire, passing at one place (Blisworth) through a tunnel three thousand and eighty yards in length, eighteen feet high, and sixteen and a half wide. The Regent and Paddington Canals have since formed communications between the Grand Junction Canal and the eastern, western, and northern parts of the metropolis. The whole length of the direct waterway thus established between Liverpool and London is about two hundred and sixty-four miles; but, if the different canals which contribute to form the line be all of them measured in their entire length, the aggregate amount of the inland navigation, in this connection alone, will extend to above one thousand four hundred miles.

The oldest canal in the northern part of the kingdom is that between the Forth and Clyde, which was executed by the celebrated Smeaton, although its plan was revised by Brindley. It commences at Grangemouth, on the Carron, at a short distance from where that river falls into the Forth, and originally terminated at Port Dundas, in the neighbourhood of Glasgow, but was afterwards carried farther west to Dalmuir. The middle portion of this canal passes over an elevated level for about eighteen miles; and from this summit it descends by no fewer than twenty locks to the Forth, and by twenty-one to the Clyde. Afterwards a branch was extended from its north-eastern extremity along the south bank of the Forth as far as Edinburgh; so that the whole now forms an uninterrupted line of canal navigation from very near the west to the east coast of Scotland. The famous Caledonian Canal, in the north of Scotland, also unites the two opposite seas, but stretches less directly east and west than the line that has just been described. It was commenced in 1802, under the management of Mr. Telford, who conducted it throughout; and was first opened on the 23rd of October, 1822. The distance between the German and the Atlantic Oceans, measured in the direction of this canal, is two hundred and fifty miles; but of this nearly two hundred and thirty miles, consisting of friths and lakes, were already navigable. The canal itself, therefore, which has cost about a million of pounds sterling, is only, properly speaking, about twenty miles in length. This great national work, however, has not

proved of eminent utility. Indeed, had not steam navigation been fortunately discovered while it was in course of being cut, the Caledonian



THOMAS TELFORD.

Canal, when finished, would probably have been almost absolutely useless.

The entire length of the canal navigation in Great Britain and Ireland is not much under three thousand miles. The whole of this was the creation of about seventy years, during which period, therefore, considerably above forty miles of canal, on an average, may be said to have been produced every year—a truly extraordinary evidence of the spirit and resources of the country, which had been able to continue so large an expenditure, for so long a time, on a single object; and which, besides, had in a single year, during that period, spent almost as much money upon war as all those canals together cost for three-quarters of a century. If Brindley had never lived, we should undoubtedly have acquired much of this accommodation; for the time was ripe for its introduction, and an increasing commerce, everywhere seeking vent, could not have failed, ere long, to have struck out for itself, to a certain extent, these new facilities. But, had it not been for the example set by his adventurous genius, the progress of artificial navigation among us would probably have been timid and slow, compared to what it actually was. For a long time, in all likelihood, our only canals would have been a few small ones, cut in the more level parts of the country, like that substituted in 1755 for the Sankey Brook, the benefit of each of which would have been extremely insignificant, and confined to a very narrow neighbourhood. He did, in the very infancy of the art, what was never afterwards outdone; struggling, indeed, with such difficulties,

and triumphing over them, as could be scarcely exceeded by any his successors might have to encounter. By the boldness and success with which, in particular, he carried the Grand Trunk Navigation across the elevated ground of the midland counties, he demonstrated that there was hardly any part of the island where a canal might not be formed; and, accordingly, this very central ridge, which used to be deemed so insurmountable an obstacle to the junction of our opposite coasts, is now intersected by more than twenty canals, beside the one which he first drove through the barrier. It is in the conception and accomplishment of such grand and fortunate deviations from ordinary practice that we discern the power, and confess the value, of original genius.

The case of Brindley affords us a wonderful example of what the force of natural talent will sometimes do in attaining an acquaintance with particular departments of science, in the face of almost every conceivable disadvantage—where not only all education is wanting, but even all access to books. Nor is he the only celebrated practical mechanic that might be named, whose inventive faculties have been successfully exercised without any help from literature. The French engineer, SWALM RENKIN, or RANNEQUIN, as he is more commonly called, who, in the reign of Louis XIV., constructed the famous machine of Marli for raising the water of the Seine to the gardens of Versailles, was originally only a common carpenter at Liege, where he was born about the middle of the seventeenth century, and had no means of acquiring knowledge except in the workshop and by his own reflection. A learned contemporary writer, Professor Weidler, of Wittemberg, describes him by the Greek epithet *αναλφαβητος*—*ignorant even of the alphabet*. Yet the apparatus which he erected at Versailles, and which was of extraordinary complexity, was regarded in that age as the greatest mechanical wonder in the world. It raised water from the Seine to the height of four hundred and seventy-six feet above the level of the river. The Italian engineer, NICHOLAS ZABAGLIA, who was born at Rome in 1674, was also originally a poor working carpenter, and altogether uneducated. In this capacity he was first employed at the Vatican; and yet he was eventually appointed to preside over the building of St. Peter's, where he did not, however, confine himself to the duties of superintendence and direction, but continued to work with his own hands as before. Zabaglia was the author of many mechanical contrivances, distinguished for their simplicity and elegance. He was the contemporary of BARTHOLOMEW FERRACINO, another self-taught mechanic of great genius. Ferracino was bred a sawyer, in which occupation he was employed while very young, and when the severe labour was almost too much for his strength. He at length, however, contrived a saw which moved by the wind, and did his work for him. After this, he invented many other ingenious machines, and acquired a distinguished reputation in various depart-

ments of practical mechanics. The great clock in the Place of St. Mark, at Venice, was of his construction. But his chief work was the bridge over the Brenta, near his native town of Bassano; it has been much celebrated. Ferracino was quite ignorant of books; and, when his friends would sometimes advise him to give his great natural powers fair play by applying himself to the regular study of the principles of mechanical science, he used to say, with a laugh, which, however, may possibly have covered some misgiving and self-reproach, that nature had been a very good teacher to him, and that he had all the books he wanted in his head. Our own countryman, the celebrated JOHN HARRISON, who, in 1767, obtained the parliamentary reward of twenty thousand



JOHN HARRISON.

pounds for the invention of his admirable chronometer, or time-piece, for ascertaining the longitude at sea, may be quoted as another remarkable example of genius, in the main self-taught. He was born at Pontefract, in Yorkshire, in 1623, and was bred a carpenter; yet he very early manifested a taste for mathematical science, which is said to have been first awakened by a manuscript copy of some lectures of Saunderson (the blind mathematician), that accidentally fell into his hands; and it should seem that he was not so entirely without education as to be unable to peruse and profit by them. Before he was twenty-one, he had made two wooden clocks by himself, and without having received any instructions in the art. We have, in a former chapter, mentioned the circumstance of his having been first induced to think of applying himself to the construction of marine chronometers by living for some time

in sight of the sea. It was in 1728 that he first came up to London, in order to prosecute this object; but he had to devote to it the anxious labours of nearly forty years before his inventions were perfected, or their general merit fully recognised. The art of watchmaking owes several valuable improvements to Harrison; among which may be particularly mentioned the gridiron pendulum, and the expansion balance-wheel—the one serving to equalize the movements of a clock, and the other those of a watch, under all changes of temperature—and both depending upon the unequal stretching under change of temperature of two different metals, which are so employed to form the rod of the pendulum and the circumference of the wheel, that the contraction of the one exactly counterbalances the expansion of the other. Although, however, a most skilful and ingenious artist, Harrison never acquired any command or correct knowledge of his native language; and a little work which he published in his old age, in explanation of some of his ideas on the construction of time-pieces, is miserably ill-written. He died in London, in 1776, at the age of eighty-three.

Of these, and all such instances, it may safely be remarked that, far from proving the inutility of scientific acquirements, they only, while they show how far, in one particular line, natural genius can carry its possessors without cultivation, make us regret their having wanted those helps which, even in that line, would have carried them so much farther.

CHAPTER XX.

ACQUISITION OF LANGUAGES :—MAGLIABECCHI; HILL; WILD; ARAM;
PURVER; PENDRELL.

IF mechanical invention does not necessarily imply much study of books, and may seem, on that account, a province of intellectual exertion fitted for persons who have not enjoyed the advantages of a regular education, as being one in which natural sagacity and ingenuity, as much as literary attainments, are requisite to insure advancement, the same thing can hardly be said of another department, in which self-taught genius has frequently made extraordinary progress; we mean the study of languages. This is the sort of knowledge, indeed, which, in common parlance, is more peculiarly called learning. Its acquisition, in the circumstances alluded to, can only be the result of a love for and familiarity with books, and of what we may call the literary habit thoroughly formed. Great linguists have, indeed, been generally devourers of books, not merely as being the grand storehouses of words—the fountains from

which they draw their supplies of that knowledge to which they are especially attached,—but as constituting also an ample domain of enjoyment of which the possession of this knowledge makes them free, far beyond other men.

There are three purposes for which languages may be studied, independently of their gratifying that general desire of information which makes both the acquirement and the possession of all knowledge delightful. Speech is the most perfect and beautiful of all the creations or products of the human mind, considered merely as an instrument adapted to a certain use; and in this point of view it forms a peculiarly interesting and valuable study for the metaphysician, both as, from the extreme delicacy of its structure, recording with inimitable fidelity many of the nicest and most fugitive processes of thought and feeling, and recording them, at the same time, more imperishably, and more commodiously for deliberate examination, than if the impression of them had been taken in iron or in marble. One use, therefore, and a highly important one, to be made of the knowledge of languages, is the study of that intellectual mechanism by which they have been formed, and of which they present us, as it were, with the impress or picture. Another department of philosophy to which this knowledge is a key, is that relating to the early history of our race, and the origin of the different nations by whom the earth is peopled—a subject to many parts of which we have no other guide than the evidence of language, but upon which this evidence, skilfully interpreted, may often be made to throw considerable light. But the motive which most generally induces the student to seek an acquaintance with foreign or ancient tongues is, of course, that he may be able to read the books written in them, and thus obtain access to worlds of intellectual treasure, from which he would be otherwise entirely, or almost entirely, shut out. For no thorough knowledge of any foreign literature is to be acquired through translations. Of many works translations do not exist, or are not accessible when the original is; and of many there can be no adequate translation. The man whose knowledge of the literature of another age or country is confined to translations, is in the situation of the untravelled reader, who may, indeed, learn something of foreign lands from the descriptions of those who have visited them; but a person familiar with the language of another people has that sort of access to their literature, which one would have to the general knowledge of their country and their manners, who should be in possession of the talisman of Eastern fiction, by which he could transport himself thither at a wish.

Perhaps the greatest reader that ever lived was the famous ANTONIO MAGLIABECCHI, of whose latinized name *Antonius Magliabecchius*, some one formed the anagram,—*Is unus bibliotheca magna—Himself a great library*. He was born at Florence in 1633, and, according to one ac-

count, commenced his career as a scholar in a very curious manner; for having, it is affirmed, been apprenticed by his parents, who were extremely poor, to a seller of pot-herbs, he used to take the greatest delight, although he could not read a word, in poring over the leaves of old books in which his master wrapped his commodities; till, having been one day observed at this sort of study by a bookseller who lived in the neighbourhood, that person offered to take him into his service. The proposal was instantly accepted by Magliabecchi, who could conceive no greater happiness than an occupation which would surround him with his beloved books. So keen, it is added, was the interest which he took in his new employment, that in two or three days he knew the place of every volume in the shop, and could find any one, when asked for, more readily than his master himself. After a short time he had learned to read, and then every moment of his leisure was devoted to this new pleasure. Such is the story which Mr. Spence has told us, on the authority, as he states, of a Florentine gentleman well acquainted with Magliabecchi and his family. The Italian writer, Marmi, however, who, having been librarian to the Grand Duke of Florence, was, for many years, an intimate friend of Magliabecchi, has, in a life which he has written of him, given a different account of his early years. His mother, according to Marmi, had him instructed both in the art of design and in Latin when he was a boy, after which she apprenticed him to a goldsmith. Whether his master was a goldsmith or a bookseller, it is agreed on all hands that, during the time of his apprenticeship, Magliabecchi had already begun those extraordinary acquisitions which made him at length the most learned man of his age. The fame of his ardour for study, and extensive knowledge, at length procured him the notice of some of the Florentine literati; and, having been introduced at court, he was appointed by the Grand Duke keeper of one of his libraries. In this situation he remained till his death, in 1714, at the age of eighty-one.

Many wonderful stories are told of the extensive reading and retentive memory of Magliabecchi. It has been said, among other things, that a manuscript of a work of some length, which, at the request of the author, he had read, having been lost, was actually recovered by being taken down from his recitation. This, however, as Mr. Spence observes, is doubtless a very wild exaggeration; it amounts, evidently, if true, to nothing less than a proof that Magliabecchi's memory was such as to retain everything, without exception, to which his attention was ever called. But of what he read really worth recollecting, he undoubtedly recollected a great deal. He was, indeed, a library of reference upon all sorts of subjects for the other literary men of his time, who were wont to apply to him whenever they wanted to know what had been already written upon any matter which they were engaged in studying or

discussing. Two volumes of the "Letters of the Learned" to Magliabecchi were published at Florence in 1745, and they form but a small part of those that were addressed to him during his long life, from every part of Europe, by persons who wished to avail themselves of the aid of his universal learning. Upon almost any subject, we are told, on which he was consulted, he could not only state what any particular author had said of it, but in many cases could quote the very words employed, naming, at the same time, the volume, the page, and the column in which they were to be found. Authors and printers were generally wont to send him all the works which they published—a sure method, if they contained anything valuable, of getting them, as it were, advertised over the world of letters, since literary men were everywhere in communication with Magliabecchi, and he would not fail, if the new book deserved his recommendation, to mention its merits to such of his correspondents as it was likely to interest. He had a sort of short-hand method of reading, by which he contrived to get over a great many volumes in little time, and which every person will be in some degree able to understand who has been much in the habit of looking over new books. His way, we are told, was to look first to the title-page, then to dip into the preface, dedication, or other preliminary matter, and, finally, to go over the divisions or chapters; after which, being so completely in possession as he was of all that former writers had said upon the subject treated of, he was very nearly as much master of the contents of the new work, as if he had perused it in the ordinary fashion. Of course, if this cursory inspection gave him reason to believe that there was in any part of it matter really new and important, he would examine it more particularly before he laid it down. At all events, it is certain that, although thus expeditiously acquired, his knowledge was the very reverse of superficial. The reverence with which he was regarded by the greatest scholars of his time proves this. The dexterity, if we may so call it, which he attained in the art of acquiring such knowledge as can be communicated by books was in great part the result of the exclusiveness with which he devoted his life to that object. He might be said literally to live in his library; for in fact he both slept and took his meals in the midst of his books. Three hard eggs and a draught of water formed his common repast; and a sort of cradle, which he had made for the purpose, served him both for his elbow-chair during the day, and for a bed at night. He never travelled more than a few miles from Florence; but all the great libraries in the world were nevertheless nearly as well known to him as his own. "One day," says Mr. Spence, "the Grand Duke sent for him, after he was his librarian, to ask him whether he could get for him a book which was particularly scarce. 'No, Sir,' answered Magliabecchi, 'it is impossible, for there is but one in the world; that is in the Grand Seignor's library at Constantinople,

and is the seventh book on the second shelf, on the right hand as you go in.'” This is not to be taken as a proof of the extraordinary memory of Magliabecchi; for, the book in question being a remarkable one, it is not at all wonderful that the circumstance, which, in point of fact, principally made it so, should have been distinctly remembered by him: but the familiar style in which he alludes to the localities of the Sultan’s library—speaking of it in the easy, off-hand manner of a person in the habit of being there every day of his life—shows the hold that everything about it had taken of his fancy, and how entirely books were his world.

We are too apt, perhaps, to underrate Magliabecchi, as a mere *helluo librorum*, or book glutton. Probably few men have passed their lives with more enjoyment to themselves, and, at the same time, more serviceably in regard to others. His powers of mind, wonderful as they were in certain respects, do not seem to have been such as qualified him for profound and original thinking, or for enlarging the boundaries of human knowledge. He did what he was best fitted to do well, when he devoted himself to the accumulation of a multifarious learning for his own gratification, and the benefit of all who needed his assistance. In choosing this province for himself, he certainly chose that which no one else could have occupied so successfully.

The Rev. Joseph Spence, whom we have already mentioned more than once in these pages, has written a little volume, which he entitles, “A Parallel, in the manner of Plutarch, between a most celebrated man of Florence, and one, scarce ever heard of, in England.” The celebrated Florentine is Magliabecchi; and our obscure countryman, with whom he is compared, is a person of the name of ROBERT HILL. Hill, as Spence informs us, was born in 1699, at Miswell, near Tring, in Hertfordshire, of parents in humble life, who had scarcely been married a year when his father died. Five years after this event his mother was married a second time to a tailor at Buckingham; but upon removing to that town she left Robert at Miswell, in charge of his grandmother. The old woman herself taught him to read, and afterwards sent him to school for seven or eight weeks to learn writing, which was all the school education he ever received. He then went to reside with an uncle who lived at Tring Grove, by whom he was employed to drive the plough, and do other country work. At last, when he was about fifteen years of age, it was resolved to bind him an apprentice to his father-in-law, the tailor. With him he remained for the usual period of seven years, in which time he learned that business. In the year 1716, he chanced to get hold of an imperfect Latin Accidence and Grammar, and about three-fourths of a Littleton’s Dictionary. He had already begun to be a great reader, purchasing candles for himself with what money he could procure, and sitting up at his books a great part of the

night, the only time when he had any leisure; but these acquisitions gave additional force to a desire he had for some time felt to learn Latin, originally excited, as he declared, by some epitaphs in that language in the church, which his curiosity made him wish very much to be able to read. Next year, however, he was sent back to Tring Grove, in consequence of the small-pox raging in Buckingham; and, in the hurry of departure, he left his Latin books behind him. It was a year and a quarter before he returned to Buckingham, and during that interval he was employed in keeping his uncle's sheep, an occupation in which he said he was very happy, as, to use his own expression, "he could lie under a hedge and read all day long." The only books he had with him were the "Practice of Piety," the "Whole Duty of Man," and a French Grammar, which he read so often through, that at last he had them almost all by heart. When he got back to Buckingham; however, he found his old Latin Grammar; and this set him anew on his classical studies. Here he derived considerable assistance from some of his young companions, who were attending the Free Grammar School of the place, and whom he used to bribe to help him over his difficulties, by doing for them in return any little service in his power. He considered himself very well paid for running on a message by being told the English of some Latin word, which he had not been able to find in his dictionary. In this way he enabled himself, before the expiration of his apprenticeship, to read a great part of a Latin Testament, which he had purchased, as well as of a Cæsar, which some one had given him.

On getting over his apprenticeship, he married, and set up in business for himself. Soon after, a gentleman by whom he was employed gave him a Homer and a Greek Testament; upon which, as he could not bear to have a book in his possession which he was unable to read, he resolved to learn Greek. Accordingly he imparted his scheme to a young gentleman to whom he was known, and received from him a grammar of the language, and a promise of his assistance, Hill engaging to teach him to fish in return for his literary instructions.

His family beginning now to increase, he bethought him of adding something to his income by his book-knowledge; and in the year 1724, he opened a school for reading, writing, and arithmetic, which he continued to teach for six or seven years. By his own account, however, he was not at first very well prepared for some of the duties of his new employment. Soon after he had entered upon it, a scholar came to him wishing to receive lessons in arithmetic, who had already advanced as far as decimal fractions. Poor Hill himself had at this time got no further than what he calls "a little way into division;" and he was at first in no small consternation: however, he hit upon a plan of managing the matter which answered well enough. To consume the time, he set his pupil, by way of preliminary exercise, to copy a series of tables, which

had some apparent relation to the subject of his intended studies. They must have been tolerably voluminous, for we are told they occupied the patient writer six weeks, although it may be supposed his master was not very importunate in urging him through the task. Meanwhile, however, Hill made the best use he could of the respite he had obtained for himself by this stratagem; and by sitting up frequently nearly the whole night, after his day's work was over, he contrived, by the time the copying of the tables was finished, to be a small degree in advance of his pupil.

After he had been married for seven or eight years his wife died; but in two years he married again. This second match turned out very unfortunate; his wife, who appears to have been a worthless person, having in a short time run him so much in debt, that he found it necessary to leave the place, and thus to effect his escape at once from her and his creditors. After this he led, for several years, a wandering life; continuing, however, as he travelled through the country, both to work at his business and to pursue his studies. He was now seized with a violent desire to learn Hebrew, in consequence of meeting with some quotations in that language in a book which he was perusing; but for a long time he could not find a grammar he could make anything of, although he bought and tried a great many; and at last he got so out of humour at his ill success, that he disposed of them all again, and gave up his design. His desire to learn the language, however, soon returned; and, having bought a lot of thirteen Hebrew books for as many shillings, he was lucky enough to find among them a grammar (Stennit's) which he was able to understand; and, having in this way got over the first difficulties of the study, he went on with great ease.

It was twelve years after he parted from his wife before he returned to Buckingham, which he did at last, on hearing accidentally that she had been two or three years dead. Soon after his return, he married a third time, and once more resumed a domestic and settled life.

This was in the year 1747. Till now he had, according to his own account, concealed his literary acquirements; but about this time he attracted the notice of a clergyman in the neighbourhood of Buckingham, who had chanced to put a question to him, which he answered in such a way as to discover his scholarship. His clerical friend, some time after the commencement of their acquaintance, put into his hands Bishop Clayton's "Essay on Spirit;" and Hill, having read the book, wrote a series of remarks on it, which were published in the year 1753. This was his first attempt at authorship. He afterwards sent to the press several other productions on theological subjects, of which one entitled "Criticisms on the Book of Job," in five sheets, was the largest.

When Spence first met Hill, which was at the house of the clergyman just mentioned, he was in great poverty, and struggling hard to obtain a

subsistence for himself and his family. Bad times had made employment scarce; and "this," says Spence, "has reduced him so very low, that I have been informed that he has passed many and many whole days in this and the former year without tasting anything but water and tobacco. He has a wife and four small children, the eldest of them not above eight years old; and what bread they could get he often spared from his own hunger to help towards satisfying theirs." Spence's principal object in publishing his little work was to raise a subscription for the poor scholar who was its subject; and who, notwithstanding some errors by which part of his life was marked, appears to have been upon the whole a person of much worth of character, and well deserving of public sympathy and encouragement. It is believed that the effect of this appeal was to relieve him, for the rest of his days, from the difficulties under which he was at this time suffering. He continued to live at Buckingham for about twenty years after his remarkable acquirements had in this way been made known to the world, having died there in the year 1777.

Hill was evidently not a person of any uncommon extent of talent or quickness of apprehension; and it is this peculiarity that chiefly makes his example interesting and instructive. His story teaches us what the mere love and persevering pursuit of knowledge may accomplish, even where there is no extraordinary degree of mental power to make up for the want of a regular education. All his acquirements were made laboriously and slowly. As he himself stated, he had been seven years in learning Latin, and fourteen in learning Greek; and, although he declared he could teach any person Hebrew in six weeks, his own difficulties, we have just seen, in the acquisition of the elements of that tongue, had been far from inconsiderable. Everything yielded, however, to his invincible perseverance, and to a zeal which no labour could damp or exhaust. "When I was saying to him," writes Spence, "among other things, that I was afraid his studies must have broken in upon his other business too much, he said that sometimes they had a little; but that his usual way had been to sit up very deep into the nights, or else to rise by two or three in the morning, on purpose to get time for reading, without prejudicing himself in his trade." Although of a weakly constitution, he had in this way, we are told, accustomed himself to do very well with only two or three hours of sleep in the twenty-four, and he lived to be seventy-eight.

Nearly contemporary with Hill was HENRY WILD, another learned tailor, who had also acquired an extraordinary knowledge of languages chiefly by his own unassisted efforts. Wild, who was born in 1684, had been at the grammar-school of Norwich for several years when a boy; but, upon leaving it, was bound apprentice to a tailor in the same city, with whom he served first for seven years under his indenture, and then

for seven more as a journeyman. In the course of this protracted estrangement from literature, he almost completely forgot whatever scholarship he had at one time possessed. Having, however, been attacked by a lingering fever and ague, and obliged to discontinue working at his trade, he took to reading by way of amusing his leisure; and it was in the course of his perusal of a work of controversial divinity, that, like Hill, he met with some Hebrew quotations, which are said to have first inspired him with the resolution of endeavouring to recover his school-learning. Accordingly, by labouring hard for some time, he at last succeeded in enabling himself again to read Latin with tolerable facility: upon this he immediately proceeded to the study of Hebrew, and soon made considerable progress in that tongue also, by the aid of a dictionary, in which the words were rendered in Latin. While he was thus engaged, his health gradually improved, and he was enabled to return to his business; but he did not, for all that, neglect his studies. After working all day, his general practice was to sit up reading for a great part of the night, deeming himself far more than compensated for his labours and privations, by obtaining, even at this sacrifice, a few hours every week for the pursuits he loved; and in this manner, within seven years, he had actually made himself master of the Latin, Greek, Hebrew, Chaldee, Syriac, Arabic, and Persian languages. Yet his extraordinary attainments seem not to have been generally known till a fortunate accident introduced him to the notice of Dean Prideaux, a distinguished proficient in Oriental learning. The Dean, who also resided in Norwich, was one day shown some Arabic manuscripts in a bookseller's shop, which, upon inspecting them, he wished to purchase; but the bookseller would not dispose of them for the price he offered. Some days afterwards, regretting that he had not secured the manuscripts, he returned to the bookseller, intending to give him what he asked, when, upon making inquiry after them, he learned to his consternation that they had been sold to a tailor! Never doubting that they were destined for the scissors, if not already in shreds, he requested that the tailor, who was no other than Wild, might be instantly sent for, that they might yet, if it were possible, be saved. Upon Wild making his appearance, the Dean had the gratification of learning, in answer to his first question, that the parchments were still uninjured; but he was very much surprised when, upon expressing his wish to purchase them, Wild refused to part with them. "What can you mean to make of them?" asked the Dean. Wild told him he intended to read them; and the Dean found, upon examining him, that this was no vain boast: the manuscripts were produced, and Wild read and translated a part of them in his presence. Dr. Prideaux soon after exerted himself to raise a small subscription for this poor and meritorious scholar, by which means he was sent to Oxford, not to be entered at the University, but

that he might have access to the libraries, and find a more appropriate occupation for his talents in teaching those Oriental tongues with which he had in so wonderful a manner contrived to make himself acquainted. He came to Oxford about the year 1718, and resided in that city, where he went by the name of the Arabian Tailor, for two or three years, having been partly employed in teaching, and partly in making transcripts and translations from Oriental manuscripts in the Bodleian library. Nothing more is known of him, except that in 1720 he removed to London, where he was patronized by the celebrated Dr. Mead. The period of his death has not been ascertained; but in 1734 there appeared a translation by him of an Arabic production, entitled "Mahomet's Journey to Heaven," which is supposed, however, to have been a posthumous publication. There is a letter from Dr. Turner respecting Wild among the "Letters by Eminent Persons," published some years ago by Dr. Bliss, from which it would appear, that, in pursuing his solitary studies, he had to struggle with severe penury, as well as with other disadvantages. The letter is dated 1714, while Wild was still in Norwich; and the writer, after mentioning his extensive acquisitions, adds, "But he is very poor, and his landlord lately seized a Polyglot Bible (which he had made shift to purchase) for rent."

We may here mention the unhappy EUGENE ARAM, who was tried and convicted in 1759 for a murder committed fourteen years before—the strange circumstances that led to the discovery of which, after so long a concealment, form one of the most arresting chapters in the history of human guilt. This man, whose lot it was to come to so miserable an end, strikingly exemplified, in the previous part of his life, what resolution and perseverance may accomplish in the work of self-education. Aram, who was born in Yorkshire in the year 1704, only learned to read a little English in the school of his native village, and never afterwards had the benefit of any further instruction; yet, by his own exertions, he first qualified himself to teach all the more common branches of education, including arithmetic and mathematics, and then proceeded, with an industry that has scarcely been surpassed, to make his way to the highest departments of learning. In a letter written to a clerical friend from York Castle, after his conviction, in which he gives an account of his life, he says, referring to the period when he was first engaged in thus at the same time teaching others and himself:—"Perceiving the deficiency in my education, and sensible of my want of the learned languages, and prompted by an irresistible covetousness of knowledge, I commenced a series of studies in that way, and undertook the tediousness, intricacies, and the labours of grammar. I selected Lily from the rest, all which I got and repeated by heart. The task of repeating it all every day was impossible while I attended the school; so I divided it into portions, by which method it was pronounced thrice

every week ; and this I performed for years. Next I became acquainted with Camden's Greek Grammar, which I also repeated in the same manner, *memoriter*. Thus instructed, I entered upon the Latin classics, whose allurements repaid my assiduities and my labours. I remember to have at first hung over five lines for a whole day ; and never, in all the painful course of my reading, left any one passage but I did, or thought I did, perfectly comprehend it. After I had accurately perused every one of the Latin classics, historians, and poets, I went through the Greek Testament, first parsing every word as I proceeded : next I ventured upon Hesiod, Homer, Theocritus, Herodotus, Thucydides, and all the Greek tragedians. A tedious labour was this ; but my former acquaintance with history lessened it extremely, because it threw a light upon many passages which, without that assistance, must have appeared obscure." There was scarcely any part of literature, indeed, with which Aram was not profoundly conversant. History, antiquities, heraldry, botany, had all been elaborately and extensively studied by him : but his favourite pursuit was the investigation and comparison of languages, with a view to the determination of their origin and connection. For this purpose, in addition to the Greek, Latin, and French, he had studied with great attention several of the Oriental tongues, and all the remaining dialects of the Celtic. He had meditated, indeed, the compilation of a Dictionary of the Celtic, Hebrew, Greek, Latin, and English, in which different languages he is said to have left behind him a list of about three thousand words, which he considered them to possess in common. Some of his observations upon this subject have been printed, and are creditable both to his ingenuity and good sense. The address, we may add, which he delivered on his trial in his own defence, is an extraordinary specimen of the curious learning with which his mind seems to have been stored. But he is a mournful example of high mental powers brought low by ill-regulated passions, and of the vanity and worthlessness even of talents and knowledge, when separated from moral principle.*

There is an English translation of the Scriptures, in two volumes folio, which was published at London in 1765, and which, although not distinguished by much elegance, is held in considerable esteem for its general accuracy and closeness to the original. This was the work of a person of the name of ANTHONY PURVER, who, at the time when it appeared, was a schoolmaster at Andover, but had been almost entirely self-educated. Having been born (about the year 1702) in low life, he had been originally apprenticed to a shoemaker, by whom, however, he was employed as a shepherd, an occupation which, as in the case of Hill,

* The story of Eugene Aram has now been rendered familiar to all by having engaged the pen of a distinguished novelist. Aram's trial is in Howell's "State Trials;" but the

particulars given above are mostly from his life in the second edition of the "Biographia Britannica."

afforded him considerable leisure for reading and study. In the course of time he acquired, with scarcely any assistance, a very considerable knowledge of Latin, Greek, and Hebrew. It was the accidental perusal of a book, in which some errors were pointed out in the common translation of the Bible, that first awakened in him a desire to make himself acquainted with the two sacred tongues. Purver, who died in 1777, was a Quaker; and his version of the Scriptures, which was the labour of thirty years of his life, was published at the expense of the eminent Dr. Fothergill,* who was himself also a member of that religious body.

About thirty years ago there appeared in the newspapers an account of a scholar in humble life, who died some time before in London, and whose attainments seem to have been as extensive, and as entirely the result of his own exertions in quest of knowledge, as those of any one of the individuals we have yet mentioned. JOSEPH PENDRELL had received at school nothing more than the ordinary education in English reading and writing, and at an early age was apprenticed by his father to a shoemaker, which business he followed until his death. He had when young a great taste for books; but was first led to the more learned studies in which he eventually made so much progress, by the following accident:—Stopping at a book stall one day, he laid hold of a book of arithmetic marked fourpence; he purchased it, and availed himself of his leisure hours at home in making himself master of the subject. At the end of the volume he found a short introduction to mathematics. This stimulated him to make further purchases of scientific works; and in this way he gradually proceeded from the elements to the highest departments of mathematical learning. When a journeyman, he saved every penny he could in order to purchase books. Finding there were many valuable writers on his favourite subject in French, he determined to study that language; for which purpose he procured a grammar, a book of exercises, and a dictionary; and he persevered until he was able to read the French writers with ease. In the same manner he proceeded to acquire the Latin and Greek languages, of the latter of which he made himself master so far as to have little difficulty in reading the Septuagint, or any other common prose work. He had formed a large collection of classical books, many of which he purchased at the auction-rooms, in King-street, Covent-garden, formerly belonging to Paterson, the celebrated book auctioneer (*see* p. 128), in whose time they formed a favourite resort of literary men. Pendrell did not, however, avail himself of any opportunity of becoming known to the literary characters he was accustomed to meet here. On the contrary, he always shunned notice, and made it a practice invariably to conceal his name when a lot

* Dr. Fothergill gave Purver 1000*l.* for the manuscript of his translation (an attempt had before been made to publish it in numbers), and also carried it, at his own expense,

through the press. Purver afterwards revised the work for a second edition, which, however, has never appeared.—*See* Chalmers's "Biographical Dictionary."

was knocked down to him. He had often in these rooms got into talk with the learned Bishop Lowth, when they chanced to meet before the sale began. The Bishop was much pleased with his conversation, and one day asked Paterson who he was, on which Paterson took the first opportunity to inquire his name, acquainting him, at the same time, who the person was that felt interested in his favour. The poor shoemaker, however, from extreme diffidence, declined telling Paterson his name, although the introduction to the Bishop, of which an opportunity was thus given him, might probably have drawn him from obscurity, and led to some improvement of his humble circumstances. Pendrell's knowledge of mathematical science is described as having been profound and extensive, embracing fortification, navigation, astronomy, and all the different departments of natural philosophy; and he is stated to have been also very well acquainted with most of our English writers in poetry and the *belles lettres*. He resided for several years before his death in Gray's-buildings, Duke-street, Manchester-square, and attained the age of seventy-five. It is supposed that this modest, self-taught scholar was descended from, or at least of the same family with, the Pendrell who concealed Charles II. after the battle of Worcester.

CHAPTER XXI.

DR. ALEXANDER MURRAY.

WITH the exception of Magliabecchi, the names we have as yet mentioned under our present head have been those of persons whose acquirements, although most honourable to themselves, and well entitled to our admiration when the circumstances in which they were made are considered, have yet hardly been such as to secure for their possessors any permanent place in the annals of the learned. They are remembered not so much on account of what they accomplished as on account of the disadvantages under which they accomplished it. But he whom we are now to introduce, while the narrative of his progress from obscurity to distinction presents to us as praiseworthy a struggle with adverse circumstances as is anywhere else recorded, had taken his rank, even before his premature death, among the scholars of his time; and, although suddenly arrested when in the full speed of his career, has bequeathed something of himself in his works to posterity. We speak of the late DR. ALEXANDER MURRAY, the celebrated Orientalist; nor are there many more interesting histories than his in the whole range of literary biography. Happily the earlier portion of it, with

which we have principally to do, has been sketched by his own pen* with characteristic *naïveté*; and we are thus in possession both of a very full and of a perfectly trustworthy detail of everything we can desire to know respecting him. This piece of autobiography, which is prefixed to Dr. Murray's posthumous work, "The History of European Languages," is, we believe, comparatively but little known to ordinary readers; and both for that reason, and from its value as an illustration of our subject, we shall allot as much space as can be afforded to an abstract of it. And we shall also occasionally refer to one or two other sources, from which a few additional particulars with regard to Dr. Murray are to be gathered.

He was born in the parish of Minnigaff, in the shire of Kirkcubright, on the 22nd of October, 1775. His father was at this time nearly seventy years of age, and had been a shepherd all his life, as his own father, and probably his ancestors for many generations, had also been. Alexander's mother was also the daughter of a shepherd, and was the old man's second wife; several sons, whom he had by a former marriage, being all brought up to the same primitive occupation. This modern patriarch died in the year 1797, at the age of ninety-one; and he appears to have been a man of considerable natural sagacity, and possessed at least of the simple scholarship of which the Scottish peasant is rarely destitute.

It was from his father that Alexander received his first lessons in reading. This was in his sixth year; and he gives an amusing account of the process. The old man, he tells us, bought him a Catechism (which in Scotland is generally printed with a copy of the alphabet, in a large type, prefixed); but "as it was too good a book," he proceeds, "for me to handle at all times, it was generally locked up, and he, throughout the winter, drew the figures of the letters to me, in his *written* hand, on the board of an old *wool-card*, with the black end of an extinguished heather stem or root, snatched from the fire. I soon learned all the alphabet in this form, and became *writer* as well as *reader*. I wrought with the *board* and *brand* continually. Then the Catechism was presented, and in a month or two I could read the easier parts of it. I daily amused myself with copying, as above, the printed letters. In May, 1782, he gave me a small Psalm-book, for which I totally abandoned the Catechism, which I did not like, and which I tore into two pieces, and concealed in a hole of a dyke. I soon got many psalms by memory, and longed for a new book. Here difficulties rose. The Bible, used every night in the family, I was not permitted to open or touch. The rest of the books were put up in chests. I at length

* In a letter to the Reverend Mr. Maitland, minister of Minnigaff, written in 1812,—evidently a hasty composition, and intended only for the eye of a friend, but more beau-

tiful and touching in its unlaboured, and sometimes even incorrect, simplicity of phrase and manner than any less natural eloquence could have made it.

got a New Testament, and read the historical parts with great curiosity and ardour. But I longed to read the Bible, which seemed to me a much more pleasant book; and I actually went to where I knew an old loose-leaved Bible lay, and carried it away in piecemeal. I perfectly remember the strange pleasure I felt in reading the histories of Abraham and David. I liked mournful narratives; and greatly admired Jeremiah, Ezekiel, and the Lamentations. I pored on these pieces of the Bible in secret for many months, but I durst not show them openly; and, as I read constantly and remembered well, I soon astonished all our honest neighbours with the large passages of Scripture I repeated before them. I have forgot too much of my biblical knowledge, but I can still rehearse all the names of the Patriarchs from Adam to Christ, and various other narratives seldom committed to memory."

His father's whole property consisted only of two or three scores of sheep, and four muirland cows. "He had no debts," says his son, "and no money." As all his other sons were shepherds, it was with him a matter of course that Alexander should be brought up to the same employment; and, accordingly, as soon as he had strength for anything, that is, when he was about seven or eight years of age, he was sent to the hills with the sheep. However, from the first he gave no promise of making a good shepherd, and he was often blamed by his father as lazy and useless. The truth is he was not stout, and was likewise short-sighted,* which his father did not know. Besides, "I was sedentary," says he, "indolent, and given to books, and writing on boards with coals." But his father was too poor to send him to school, his attendance upon which, indeed, would have been scarcely practicable, unless he could have been boarded in the village, from which their cottage, situated in a wild and sequestered glen, was five or six miles distant. About this time, however (in May, 1784), a brother of his mother's, who had made a little money, came to pay them a visit; and hearing such accounts of the genius of his nephew, whose fame was now the discourse of the whole glen, he offered to be at the expense of boarding him for a short time in New Galloway, and keeping him at school there. Our home-taught, and mostly self-taught scholar, as he tells us himself, made at first a somewhat awkward figure on this new scene. "My pronunciation of words," says he, "was laughed at, and my whole speech was a subject of fun." "But," he adds, "I soon gained impudence; and before the vacation in August I often stood *dux* of the Bible class. I was, in the mean time, taught to write copies, and use paper and ink. But I both wrote and printed, that is, imitated printed letters, when out of school."

* This defect, according to his namesake, the author of the "Literary History of Galloway," who has given a sketch of Dr. Murray's life, made his father often think that his

son wilfully deceived him by the incorrect account he gave of the sheep, when sent to observe in what directions they were straying.

His attendance at school, however, had scarcely lasted for three months, when the poor boy fell into ill-health, and was obliged to return home. For nearly five years after this he was left again to be his own instructor, with no assistance whatever from any one. He soon recovered his health; but during the long period we have mentioned he looked in vain for the means of again pursuing his studies under the advantages he had for so short a time enjoyed. As soon as he became sufficiently well he was put to his old employment of assisting the rest of the family as a shepherd boy. "I was still," he says, however, "attached to reading, printing of words, and getting by heart ballads, of which I procured several. . . . About this time, and for years after, I spent every sixpence that friends or strangers gave me on ballads and penny histories. I carried bundles of these in my pockets, and read them when sent to look for cattle on the banks of Loch Greanoch, and on the wild hills in its neighbourhood." And thus passed away about three years of his life. All this time the Bible and these ballads seem to have formed almost his only reading; yet even with this scanty library he contrived to acquire among the simple inhabitants of the glen a reputation for unrivalled erudition. "My fame," he tells us, "for reading and *a memory* was loud, and several said that I was 'a living miracle.' I puzzled the honest elders of the church with recitals of Scripture, and discourses about Jerusalem, &c., &c." Towards the close of the year 1787, he borrowed from a friend L'Estrange's translation of Josephus, and Salmon's "Geographical Grammar." This last work, in particular, as we shall see immediately, had no little share in determining the direction and character of the studies of his future life. Referring, however, merely to the new information of which it put him immediately in possession, he says, "I got immense benefit from Salmon's book. It gave me an idea of geography and universal history, and I actually recollect at this day almost everything it contains." A Grammar of Geography was also one of the first books that Ferguson studied; although the minds of the two students, differing as they did in original character, were attracted by different parts of their common manual; the one pondering its description of the artificial sphere, the other musing over its accounts of foreign lands, and of the history and languages of the nations inhabiting them. Murray, however, learned also to copy the maps which he found in the book; and, indeed, carried his study of practical geography so far as to make similar delineations of his native glen and its neighbourhood.

He was now twelve years of age; and, as there seemed to be no likelihood that he would ever be able to gain his bread as a shepherd, his parents were probably anxious that he should attempt something in another way to help to maintain himself. Accordingly, in the latter part of the year 1787, he engaged as teacher in the families of two of

the neighbouring farmers; for his services in which capacity, throughout the winter, he was remunerated with the sum of sixteen shillings! He had probably, however, his board free in addition to his salary, of which he immediately laid out a part in the purchase of books. One of these was Cocker's Arithmetic, "the plainest," says he, "of all books, from which, in two or three months, I learned the four principal rules of arithmetic, and even advanced to the Rule of Three, with no additional assistance except the use of an old copy-book of examples made by some boy at school, and a few verbal directions from my brother Robert, the only one of all my father's sons by his first marriage that remained with us." He borrowed, about the same time, some old magazines from a country acquaintance. "My memory now," says he, "contained a very large mass of historical facts and ballad poetry, which I repeated with pleasure to myself and the astonished approbation of the peasants around me."

At last, his father having been employed to *herd* on another farm, which brought them nearer the village, Alexander was once more permitted to go to school at Minnigaff for three days in the week. "I made the most," says he, "of these days; I came about an hour before the school met; I pored on my arithmetic, in which I am still a proficient; and I regularly opened and read all the English books, such as the 'Spectator,' 'World,' &c. &c., brought by the children to school. I seldom joined in any play at the usual hours, but read constantly." "It occurred to me," he adds, "that I might get qualified for a merchant's clerk. I, therefore, cast a sharp look towards the method of book-keeping, and got some idea of its forms by reading 'Hutton' in the school, and by glancing at the books of other scholars." This second period of his attendance at school, however, did not last even so long as the former. It terminated at the autumn vacation, that is to say, in about six weeks; and the winter was again devoted to teaching the children of a few of the neighbouring farmers.

In 1790, he again attended school during the summer for about three months and a half. It seems to have been about this time that his taste for learning foreign languages first began to develope itself, having been excited, as he tells us, by his study of Salmon's Geography. "I had," he writes, "in 1787 and 1788 often admired and mused on the specimens of the Lord's Prayer, in every language, found in Salmon's Grammar. I had read in the magazines and 'Spectator' that Homer, Virgil, Milton, Shakespeare, and Newton were the greatest of mankind. I had been early informed that Hebrew was the first language by some *elders* and good religious people. In 1789, at Drigmore, an old woman who lived near showed me her Psalm-book, which was printed with a large type, had notes on each page, and, likewise, what I discovered to be the Hebrew alphabet, marked letter after letter, in the 119th Psalm.

I took a copy of these letters, by printing them off in my old way, and kept them." Meantime, as he still entertained the notion of going out as a clerk to the West Indies, he took advantage of the few weeks he was to be at school to begin the study of the French language. Not satisfied, however, with learning merely the task set him by his master, he used to remain in the school, during the middle of the day, while his companions were at play, and compare together the different grammars used in the class. But we must allow him to tell in his own way the manner in which his French studies introduced him by accident to the Latin tongue also:—

"About the 15th of June, Kerr [one of his class-fellows] told me that he had once learned Latin for a fortnight, but had not liked it, and still had the Rudiments beside him. I said, 'Do lend me them; I wish to see what the nouns and verbs are like, and whether they resemble our French.' He gave me the book. I examined it for four or five days, and found that the nouns had changes on the last syllable, and looked very singular. I used to repeat a lesson from the French Rudiments every forenoon in school. On the morning of the midsummer fair of Newton Stewart I set out for school, and accidentally put into my pocket the Latin Grammar instead of the French Rudiments. On an ordinary day, Mr. Cramond would have chid me for this; but on that festive morning he was *mellow*, and in excellent spirits—a state not good for a teacher, but always desired in him by me, for he was then very communicative. With great glee he replied, when I told him my mistake, and showed him the Rudiments, 'Gad, Sandy, I shall try thee with Latin;' and, accordingly, read over to me no less than two of the declensions. It was his custom with me to permit me to get as long lessons as I pleased, and never to fetter me by joining me to a class. There was at that time in the school a class of four boys, advanced as far as the pronouns in Latin grammar. They ridiculed my separated condition. But before the vacation in August I had reached the end of the Rudiments, knew a good deal more than they, by reading at home the notes on the foot of each page, and was so greatly improved in French, that I could read almost any French book at opening of it. I compared French and Latin, and riveted the words of both in my memory by this practice. When proceeding with the Latin verbs, I often sat in the school all mid-day, and pored on the first page of Robert Cooper's [another of his schoolfellows] Greek grammar—the only one I had ever seen. He was then reading Livy, and learning Greek. By help of his book I mastered the letters; but I saw the sense of the Latin rules in a very indistinct manner. Some boy lent me an old Corderius, and a friend made me a present of Eutropius. I got a common vocabulary from my companion Kerr. I read to my teacher a number of colloquies, and before the end of July was per-

mitted to take lessons in Eutropius. There was a copy of Eutropius in the school that had a literal translation. I studied this last with great attention, and compared the English and Latin. When my lesson was prepared, I always made an excursion into the rest of every book; and my books were not, like those of other schoolboys, opened only in one place, and where the lesson lay."

All this was the work of about two months and a half before the vacation and a fortnight after it. During the winter he was as usual employed in teaching; but he continued to pursue his own studies in private. Having stated that he had bought an old copy of Ainsworth's Dictionary for eighteen-pence, and been lucky enough to find a few other Latin books in the possession of some of his friends, he proceeds:—"I employed every spare moment in pondering upon these books. I literally read the Dictionary throughout. My method was to revolve the leaves of the letter A, to notice all the principal words and their Greek synonymes, not omitting a glance at the Hebrew; to do the same by B, and so on through the book. I then returned from x and z to A; and in these winter months I amassed a large stock of Latin and Greek vocables. From this exercise I took to Eutropius, Ovid, and Cæsar, or at times to Ruddiman's Grammar. The inverted order often perplexed me; and I frequently mistook, but also frequently discerned, the sense. The wild fictions of Ovid have had charms for me ever since. I was not a judge of simple and elegant composition; but when any passage contained wild, sublime, pathetic, or singular expressions, I both felt and tenaciously remembered them. Here I got another book which, from that time, has influenced and inflamed my imagination. This was 'Paradise Lost,'—of which I had heard, and which I was eager to see. . . . I cannot describe to you the ardour, or various feelings, with which I read, studied, and admired this *first-rate* work. I found it as difficult to understand as Latin, and soon saw that it required to be *parsed*, like that language. . . . I account my first acquaintance with 'Paradise Lost' an era in my reading."

The following summer, that of the year 1791, appears to have been spent by this indefatigable student still more laboriously than any of the preceding; and the advancement he made is a surprising evidence of what diligence may accomplish. He again attended school for about three months, where he found a class reading Ovid and Cæsar, and afterwards Virgil. "I laughed," says he, "at the difficulty with which they prepared their lessons; and often obliged them by reading them over, to assist the work of preparation." In addition to the tasks of the school, he read with avidity by himself whatever books, in English, Latin, or Greek, he could anywhere borrow. Besides remaining in the school, according to his old custom, at the hours of play, when his amusement was to read the books belonging to the other scholars,

he employed his time at home in almost incessant study. "My practice was," he says, "to lay down a new and difficult book after it had wearied me; to take up another—then a third—and to resume this rotation frequently and laboriously. I always strove to seize the sense; but, when I supposed that I had succeeded, I did not weary myself with analyzing every sentence." Having introduced himself to Mr. Maitland, the clergyman of the parish, by writing letters to him in Latin and Greek, he got from that gentleman a number of books, and these, which included Homer, Longinus, the *Œdipus Tyrannus* of Sophocles, a volume of Cicero's Orations, &c., he read and studied with great diligence. Nor were his studies confined to the classic tongues. Having purchased a copy of Robertson's Hebrew Grammar, he got through it, with all the intricacies of the doctrine of the points, of which the author is an uncompromising champion, in a month. He was soon after fortunate enough to procure a dictionary of this language, from an old man living in the neighbourhood, whose son had been educated for the Church;* and, as the volume happened to contain the whole of the Book of Ruth in the original, he considered it an invaluable acquisition. But a still greater prize than this was a copy of the entire Bible in Hebrew, which was lent to him for a few months by a woman, with whom it had been left by her brother, a clergyman in Ireland. "I made good use," says he, "of this loan; I read it throughout, and many passages and books of it a number of times." This summer must, indeed, to use his own words, have been "devoted to hard and continued reading." He had, in fact, it would appear, actually made himself familiar, and that chiefly by his own unassisted exertions, with the French, Latin, Greek, and Hebrew languages, and perused several of the principal authors in all of them, within about a year and a half from the time when they were all entirely unknown to him; for it was at the end of May, 1790, that he commenced, as we have seen, the study of French, and all this work had been done by the end of November in the year following. There is not, perhaps, on record a more extraordinary instance of youthful ardour and perseverance. It shows what is possible to be accomplished.

He was again engaged in teaching during the winter, and received, as he states, for his labours about thirty-five or forty shillings. "I devoted, however," he says, "as usual, every spare hour to study. French, Latin, Greek, and Hebrew occupied all my leisure time." In the summer of 1792 he returned to school for the last time, remaining for about three months and a half. The different periods of his school

* This was the father of Robert Heron, a laborious literary character, who died in London a few years after the commencement of the present century, and of whom an account may be found in Mr. D'Israeli's "*Cala-*

mities of Authors." There was a relationship, as we are informed by the author of "*The Literary History of Galloway,*" between Heron's family and that of Murray.

attendance, added together, make about thirteen months, scattered over the space of nearly eight years. From November, 1792, till the March following he was once more employed in teaching the children of one of the farmers, at a salary of thirty shillings. This winter a friend lent him a copy of Bailey's Dictionary, from which he learned, he informs us, a vast variety of useful matters. Among other things, it put him in possession of the Anglo-Saxon alphabet and Pater Noster, as well as of a great many words in the same dialect. This was his introduction to the study of the northern languages. There chanced, also, to fall into his hands about the same time a small religious treatise in Welsh, a language of which he had neither dictionary nor grammar. "I mused, however," says he, "a good deal on the quotations of Scripture that abounded in it, and got acquainted with many Welsh words and sentences. If I had a copy of the Bible in any language of which I knew the alphabet, I could make considerable progress in learning it, without grammar or dictionary. This is done by minute observation and comparison of words, terminations, and phrases. It is the method dictated by necessity, in the absence of all assistance." About this time, too, he made himself acquainted with the Abyssinian alphabet, from an inaccurate copy of it which he found in an odd volume of the "Universal History." The Arabic letters he had learned before, from Robertson's Hebrew Grammar.

"In the autumn of 1792," he says, "I had, in the hour of ignorance and ambition, believed myself capable of writing an epic poem." So ardent, indeed, was his poetical enthusiasm at this period, that, having obtained the loan of a volume of Ossian for four days, he had actually transcribed, for his own use, the whole of "Fingal." During the ensuing winter he wrote several thousand lines of his poem, which was in blank verse, and its subject the exploits of Prince Arthur. "The poem of 'Arthur,'" says he, "was, so far as I remember, a very noisy, bombastic, wild, and incorrect performance. It was not without obligations to Ossian, Milton, and Homer. But I had completed the seventh book before I discerned that my predecessors were far superior to me in everything. The beauties of the first book of 'Paradise Lost,' overwhelmed me, and I began to flag in the *executive department*. My companions, young and ignorant like myself, applauded my verses, but I perceived they were mistaken; for my rule of judgment proceeded from comparison in another school of criticism." The unfinished epic accordingly was thrown into the fire. But poor Murray, in truth, now in his nineteenth year, was looking around him, in all directions, for the means of obtaining an object on which he had set his heart; and he had probably at one time indulged the dream of reaching it through the publication of this poem. His most intimate school companion had, the year before, gone to the University, for which Murray, no doubt, felt that he himself

was infinitely better qualified, if his utter want of resources had not, at least for the present, opposed an insurmountable barrier to his ambition. But it was not unnatural for him to hope that the successful exertion of his talents in the way of authorship might perchance enable him to gratify his wishes. So, after destroying his epic, he bethought him of what he should substitute in its place. He had happened to purchase a volume of the manuscript lectures of a German professor on Roman literature. They were written in Latin, and he determined to translate them, and offer them to the world in their English dress. Accordingly, having finished his task, he took the work to Dumfries, in the early part of the year 1794; but neither of the two booksellers of the place would publish it. He had brought with him also a quantity of verse, chiefly in the Scottish dialect; and, the other speculation having failed, he resolved to publish these poems by subscription. Fortunately he was saved from this folly by the judicious counsel of one best of all entitled to advise him here. "During the visit to Dumfries," says he, "I was introduced to Robert Burns, who treated me with great kindness, and told me that, if I could get out to College, without publishing my poems, it would be much better, as my taste was young and not formed, and I would be ashamed of my productions when I could write and judge better. I understood this, and resolved to make publication my last resource."

At this place, the narrative, as written by Murray himself, terminates; the part of his history that immediately followed being merely alluded to as well known to the person to whom the letter is addressed. All unheard-of as our poor scholar was by the wealthy and powerful, he had a friend in the same sphere of life in which he himself moved, who became the means of at last procuring for him the opportunity, which he so greatly desired, of prosecuting his studies. This was an itinerant tea-merchant, of the name of M'Harg. He knew Murray well, and had formed so high an idea of his genius and learning, that he was in the habit of sounding his fame wherever he went. Among others to whom he spoke of him, was Mr. James Kinneir, of Edinburgh, then a journeyman printer in the king's printing-office. Mr. Kinneir, with a zeal in behalf of unfriended merit which does him infinite honour, immediately suggested that Murray should transmit an account of himself, and some evidences of his attainments, to Edinburgh, which he undertook to lay before some of the literary characters of that city. This plan was adopted; and the result was, that the young man, having come up to town, was examined by the Principal, and several professors of the University, and so surprised them by the extent and accuracy of his acquaintance with French, Latin, Greek, and Hebrew, that measures were immediately taken for having the classes thrown open to him, and his maintenance secured while attending them. These arrangements,

it would be unjust not to mention, were chiefly effected through the exertions of Principal Baird, who procured for him an exhibition, or bursary, as it is called; and whose ardent and most efficient patronage of one thus recommended to him only by his deserts, and his need of patronage, entitles him to the lasting gratitude of the commonwealth of learning. Murray, indeed, did not long stand in need of the aid of any patron. He was very soon able to support himself by the employment which he obtained as a teacher, and by his literary labours. All his difficulties might be said to be over as soon as he had found his way to the University; and his talents had thus been transferred to a theatre where they were sure to acquire him distinction.

For the next ten or twelve years of his life he resided principally in Edinburgh. During that time, beside passing through the course of education necessary to qualify him for the ministry of the Scottish church, he continued to devote himself with all his old enthusiasm to the study of languages, in which he was so admirably qualified to excel. He prosecuted this branch of learning to an extent, which, up to that time, had been rarely, if ever, surpassed or equalled. By the end of his short life, scarcely one of either the Oriental or the Northern tongues remained uninvestigated by him, in so far as it was possible to acquire the knowledge of it from sources then accessible in this country. Of the six or seven dialects of the Abyssinian or Ethiopic language, in particular, he had made himself certainly much more completely master than any European had ever been before; and this led to his being selected by the booksellers in 1802 to prepare a new edition of Bruce's Travels, which appeared in seven volumes octavo three years after, and at once placed him in the first rank of the Oriental scholars of the age.

In 1806 he left Edinburgh, having been presented to the church of Urr, in Dumfriesshire; and here he remained pursuing his favourite studies for six years. "He devoted his leisure moments while at Urr," says a writer to whom he was known,* "to the composition of his stupendous work on the languages of Europe, without communicating his design almost to a single individual; and a person might have spent whole weeks in his company without hearing a word of his favourite pursuits, or of the extent to which, in the department of philology, he had carried his researches." Events, however, at last called him forth from this retirement, to win and for a short time to occupy a more conspicuous station.

In 1812 the professorship of Oriental languages in the University of Edinburgh became vacant; and Murray's friends immediately seized the opportunity of endeavouring to obtain for him the situation of all others which he seemed especially formed and endowed to fill. Three

* T. Murray: "Literary History of Galloway," p. 320.

other candidates, however, also advanced their pretensions; and, as the result of the election depended upon the votes of the members of the town council, or city corporation, a body consisting of thirty-three individuals, the contest soon became a keen and doubtful one. It was eventually carried on between Murray and a single opponent, one of the other candidates having in the most handsome manner withdrawn as soon as he learned that Murray had come forward, and another having found it impossible to command any interest which gave him a chance of success. A full account of this election, the progress of which was watched by the friends of learning with the deepest anxiety, is given in the "Scots' Magazine" for July, 1812. Murray's friends, with Principal Baird at their head, submitted a multitude of testimonials of his qualifications for the vacant chair, as honourable as ever were given to any candidate, whether we look to the decided terms in which they were expressed, or to the authority of the writers. One was from Mr. Hamilton, the very eminent professor of Oriental languages in the East India College at Haileybury, in which that gentleman says of Murray:—"I happened last week to meet with him in Galloway, and found his acquisitions in Oriental literature and languages so extensive and various as greatly to exceed my power to appreciate them accurately. With the few languages in which I am conversant he discovered an acquaintance that surprised me exceedingly; but the range of his studies included many of which I am completely ignorant." Another was from Mr. Salt, one of the most distinguished of modern Orientalists. "My acquaintance with Mr. Murray," says he, "originated in my admiration of the deep erudition and extensive research displayed in his edition of Mr. Bruce's 'Travels in Abyssinia.' Having twice visited that country, I was led to pay particular attention to its history and literature, and in these pursuits I received so much assistance from Mr. Murray's labours, that I took an early opportunity, on my return to England in February, 1811, from the mission to Abyssinia in which I had been engaged, to recommend him to the Marquis Wellesley as the only person in the British dominions, in my opinion, adequate to translate an Ethiopic letter which I had brought from Ras Willida Selasé, addressed to the king. My recommendation was attended to, and Mr. Murray finished the translation in the most satisfactory way."* There were others, from a host of distinguished names—among which may be mentioned Dr. James Gregory, Mr. (afterwards Sir John) Leslie, Mr. (afterwards Lord) Jeffrey, † Sir Walter Scott, Professors Playfair and Dugald Stewart, &c.

* After Dr. Murray's death, a pension of 80*l.* a year was bestowed upon his widow by the king, in acknowledgment of this service.

† Mr. Jeffrey, in his letter, mentions several articles in the earlier numbers of the "Edinburgh Review," of which Mr. Murray was the

writer. Among these is one (in No. 3) on General Vallancey's "Prospectus of an Irish Dictionary," some of the opinions expressed in which, it is curious to remark, are very much opposed to those adopted by the author on more mature consideration, and advocated in his great work on language. Mr. Jeffrey

—all bearing warm testimony to the general talents and worth of the candidate, even when there was no pretension to be able to appreciate his peculiar scholarship. Well was Murray entitled to say, as he did in a letter written from Urr to one of his most zealous supporters on the day after the election, but before he had learned its result, borrowing the noble words of the prayer of Achilles in Homer:—"If your efforts have been exerted for an unsuccessful candidate, they will not be forgotten, *for we have perished in light!*"

He was elected on the 8th of July by a majority of two votes,* and a few days after, the Senate of the University unanimously passed a vote of thanks to Dr. Baird for bringing his pretensions before the patrons, conferring at the same time the degree of Doctor of Divinity upon their new associate. But all these honours came only to make more radiant the setting of the luminary. On the 31st of October Dr. Murray entered upon the discharge of his public duties, in a weak state of health, but with an ardour in which all weakness was forgotten. Although declining in strength every day, he continued to teach his classes during the winter, persevering in the preparation and delivery of a course of most learned lectures on Oriental literature, which were attended by crowded and admiring audiences, and even carrying an elementary work through the press for the use of his students. A new impression of his edition of Bruce's "Travels" also appeared in the beginning of February. Engaged in these labours, he could not be persuaded that he was so ill as he really was; and when Mrs. Murray, who had been left behind him at Urr, urged him to permit her to come to town, it was with difficulty that he was at last brought to consent to her joining him by the 16th of April. Fortunately her affection and her fears impelled her to set out on her journey a few days earlier than the appointed time, and she arrived in Edinburgh on the 13th. She found her husband surrounded by his books and papers, and even engaged in dictating to an amanuensis. But life was now ebbing rapidly. He retired that evening to the bed from which he never rose; and before the close of another day he was among the dead.

Thus perished in his thirty-eighth year, one who, if he had lived longer, would probably have reared for himself many trophies, and largely extended the bounds of human knowledge. His ambition had always been to perform in the field to which he more especially dedicated his powers something worthy of remembrance; and his latter years had been given to the composition of a work—his "History of European Languages," already mentioned—which, if time had been

noticed also a very learned article which he received from Murray on Horne Tooke's "Diversions of Purley," which was never printed, and which he believed to be still in his possession. Even now, if this paper could be recovered, it might probably be found to

be worth giving to the world—along with any other remains that may exist of the labours of so rare a scholar.

* Of twenty-eight members of the town council who voted, fifteen voted for Murray and thirteen for his opponent.

allowed to finish it, would unquestionably have formed a splendid monument of his ingenuity and learning. It has been published since his death, in so far as it could be recovered from his manuscripts; and, although probably very far from what it would have been had he lived to arrange and complete it, is still a remarkable display of erudition and ingenious speculation. With all its defects, it formed at the time when it appeared an important contribution to philological literature.

Of Murray's short life, scarcely half was passed amidst those opportunities which usually lead to study and the acquisition of knowledge. The earlier portion of it was a continued struggle with everything that tends most to repress intellectual exertion and to extinguish the very desire of learning. Yet, in all the poverty and the many other difficulties and discouragements with which he had for his first eighteen years to contend, he went on pursuing his work of self-cultivation, not only as eagerly and steadily, but almost as successfully, as he afterwards did when surrounded by all the accommodations of study. It is a lesson that ought to teach us how independent the mind really is of circumstances, which tyrannize over us chiefly through our habits of submission, and by terrifying us with a mere show of unconquerable resistance. The worst are generally more formidable in their appearance than in their reality, and when courageously attacked are more than half overcome. Had there been any obstacles of a nature sufficient to check the onward course of this enterprising and extraordinary boy, how often would he have been turned back in the noble career upon which he had entered. But, one after another, as they met him, he set his foot upon them and crushed them; and at last, after years of patient, solitary, unremitting labour, and of hoping as it were against hope, he was rewarded with all he had wished and toiled for.

CHAPTER XXII.

SELF-TUITION OF POETS:—SHAKESPEARE; BURNS.

IT is an interesting train of reflection which is excited by the fact, first noticed by Mr. Malone, that the father of SHAKESPEARE could not write his own name, a cross remaining to this day as his mark or signature in the records of the town of Stratford-upon-Avon, of which he was an alderman. Had the great dramatist himself been born half a century earlier, a few rudely scrawled crosses might have been the only efforts in the art of writing of that hand to which we owe so many an immortal page. That Shakespeare's own education, however, embraced not only English reading and writing, but also something of Latin, there can

scarcely be a doubt. Dr. Farmer, in a well-known essay, has attempted to show that he never had acquired any knowledge of the ancient languages, and owed his acquaintance with classical literature entirely to translations. This is not a fair representation of the case. Shakespeare was evidently a great reader; his poetry abounds with allusions, more or less accurate, to all the learning of his age, of which not even the most curious and abstruse departments seem to have escaped his attention. Of this any one may convince himself merely by perusing a few pages of the elaborate commentaries that have been written upon his works, and observing how the erudition of succeeding times has exhausted itself, sometimes in vain, in attempting to pursue the excursive range of his memory and his fancy. It may be conceded, however, that his native tongue was probably the only one which he read with much facility, and that to it he was indebted for most of what he knew. And it is not to be overlooked, that, in writing his plays in particular, it was probably deliberately, and upon system, that he preferred taking his version of the ancient story rather from the English translation than from the original author. In those days translations from the ancient tongues appear to have formed in this country, no small part of the reading of the people, as the numerous performances of this kind which were produced within a few years, some of them by the ablest writers of the time, and the rapid succession of editions of several of them with which the press teemed, may serve to testify. Now it would seem to have been a maxim with Shakespeare always, so far as possible, to give his auditors a story that was familiar to them, and with which they had been long acquainted, rather than one, the novelty of which they would not so easily comprehend, or with which their old impressions and affections were not so likely to sympathize. Hence, although the most original of all writers in everything else, he seldom has recourse to his own invention for the plot or story of his drama, but seizes merely upon the popular tale. And several peculiarities in his style seem clearly to show that he possessed a fair knowledge of the vocabulary of the Latin language, and its common forms of phraseology; or about as much as is retained of their school learning by the greater number of those who study the ancient tongues in their youth. This perhaps is, after all, the view of the matter most consistent with the expression of his friend, Ben Jonson, who, in the verses he has written to his memory, represents him, not as entirely ignorant of ancient literature, but only as having had "small Latin, and less Greek."

But, however this may be, he must have taken to literature as a profession entirely of his own accord, and commenced and pursued the business of cultivating his powers by study, in the midst of circumstances very unfavourable to the prosecution of such an aim. Imperfect and uncertain as are the accounts we have of his early years, tradition is

uniform in representing him to have led for some time an unsettled life. He has been supposed, when very young, to have been for a short period in the office of a country attorney; but it is certain that he left his native place, and came up to London, with nothing but chance and his talents to depend upon, when he was about twenty-two years of age, having already a wife, to whom he had been married four or five years before, and several children. He gradually raised himself by his own exertions, till, from an actor he became a theatrical proprietor; when, after having spent about twenty-six years in London, he returned to his native place, and purchased an estate, where he resided in affluence and respectability till his death.

Unfortunately, we know nothing of his studies, except by their imperishable produce. But, judging from his works, it seems plain that he must have been, as we have already said, an ardent and unwearied reader, a student both of the world of men and of the world of books. Indeed, when he first appeared in London, whatever his mere school education had been, his acquaintance with literature, owing to the nature of his subsequent pursuits and his scanty opportunities, could not but have been exceedingly circumscribed, and he must have made himself all that he afterwards became. His whole history, in so far as we know it, goes to prove him to have been, in his maturer days, a person of even and regular habits of life; first accumulating what was in those times an ample fortune by the sedulous exertions of many years, and then, as soon as he had acquired this competency, wisely bidding adieu to the contests and fatigues of ambition, and retiring from the town and from fame to the country to enjoy it. Nor shall we arrive at a different conclusion with regard to his diligence and application, from a considerate examination of those matchless creations of his fancy, which he has been ignorantly assumed to have thrown off with a careless and random precipitancy. That a mind so rich and plastic as his, formed and gave forth its conceptions with a facility such as slower powers may not emulate, may be easily believed; but, although very probably a rapid, he was certainly not a careless writer. It is curious enough that Jonson himself, to whom has been attributed the expression of a wish that his deceased friend had blotted much of what he has allowed to remain in his compositions, speaks in the poem already quoted, of his

— “well-turned and true-filed lines;”

an expression which seems to impute to him rather consummate elaboration than inattention or slovenliness as a writer. The truth may probably be best gathered from the words of the address to the reader, prefixed to the first folio edition of the plays, in which his theatrical associates Heminge and Condell say, or are made to say, of him:—“Who, as he was a happy imitator of nature, was a most gentle

expresser of it. His mind and hand went together; and what he thought, he uttered with that easiness, that we have scarce received from him a blot in his papers."

Abundant examples confute the common imagination that anything like regularity or diligence is either impracticable to high genius, or unfavourable to its growth and exercise. Perfect self-control is the crowning attribute of the very highest genius, which so far, therefore, from unfitting its possessor to submit, either in the management of his time or the direction of his thoughts, to the restraints of arrangement and system, enables him, on the contrary, to yield to them as if he felt them not; and which, by exerting this supremacy over itself, achieves, in fact, its greatest triumphs. It is true that its far-seeing eye will often discern the error or inadequacy of theories and rules of discipline, which to a narrower vision may seem perfect and incontrovertible, and will violate them, accordingly, with sufficient audacity. But, when it does so, it is out of no spirit of wanton outrage, or from any inaptitude to take upon itself the obligations of a law; but merely because it must of necessity reject the law that is attempted to be imposed upon it, in order to be enabled to obey a higher and more comprehensive law of its own. It would be well if those would think of this, who, feeling within themselves merely a certain excitement and turbulence of spirit, the token, it may be, of awakening powers, but as certainly the evidence of their immaturity and weakness, mistake their feverish volatility and unsettledness of purpose for what they have been taught to call the lawlessness of genius; and thereupon fancy it is incumbent upon them to fly from all manner of restraint as perilous to their high prerogative. Genius is neither above law, nor opposed to it; but, provided only that the law to which it is sought to subject it be one worthy of its obedience, finds its best strength, as well as its most appropriate embellishment, in wearing its fetters. Art, which is the manifestation of genius, is equally the manifestation of judgment; which, instead, therefore, of being something irreconcilable with genius, may, from this truth, be discerned to be not only its most natural ally, but, in all its highest creations, its indispensable associate and fellow-labourer.

The name of Shakespeare naturally recalls that of BURNS, the next greatest poet (unless we reckon Homer in that list) that ever was formed merely or chiefly by the discipline of self-tuition; and also, considered without reference to his poetical powers, another striking example of what a man may do in educating himself, and acquiring an extensive acquaintance with literature, while occupying a very humble rank in society, and even struggling with the miseries of the most cruel indigence. Burns has himself given us a sketch of his early life in a letter to Dr. Moore. His father, a man of a decidedly superior mind, and with even

something of literary acquirement beyond his station, had led a life of hard labour and poverty; and at the time of his son Robert's birth was employed as gardener by a gentleman in the neighbourhood of the town of Ayr. A few years afterwards, he took a small farm, on which, however, his utmost exertions, and those of the members of his family who were of an age to give him any assistance, seemed to have hardly sufficed to enable him to earn a subsistence without running in debt. "The farm," says his son, "proved a ruinous bargain. . . . My father was advanced in life when he married: I was the eldest of seven children; and he, worn out by early hardships, was unfit for labour. My father's spirit was soon irritated, but not easily broken. There was a freedom in his lease in two years more; and to weather these two years we retrenched our expenses. We lived very poorly. I was a dexterous ploughman for my age; and the next eldest to me was a brother (Gilbert), who could drive the plough very well, and help me to thresh the corn. . . . This kind of life—the cheerless gloom of a hermit, with the unceasing moil of a galley-slave—brought me to my sixteenth year."

On the expiration of this lease, his father took another farm. "For four years," continues Burns, "we lived comfortably here; but a difference commencing between him and his landlord as to terms, after three years' tossing and whirling in the vortex of litigation, my father was just saved from the horrors of a jail by a consumption, which, after two years' promises, kindly stepped in, and carried him away to *where the wicked cease from troubling, and the weary are at rest.*" Yet it was during this time that the future poet made his first important acquisitions in literature. "I was, at the beginning of this period," says he, "perhaps the most ungainly, awkward boy in the parish;—no *solitaire* was less acquainted with the ways of the world. What I knew of ancient story was gathered from Salmon's and Guthrie's Geographical Grammars; and the ideas I had formed of modern manners, of literature, and criticism, I got from the 'Spectator.'" He then goes on to enumerate the other books to which his reading extended. The whole formed a sufficiently miscellaneous collection, although not very numerous; the principal being Pope's Works, some Plays of Shakespeare, Locke's "Essay on the Human Understanding," Stackhouse's "History of the Bible," Allan Ramsay's Works, and a collection of English songs. "The collection of songs," he adds, "was my *vade mecum*. I pored over them driving my cart, or walking to labour, song by song, verse by verse, carefully noting the true tender or sublime, from affectation and fustian. I am convinced I owe to this practice much of my critic craft, such as it is."

He afterwards went for a few weeks to a village school, where he obtained some acquaintance with the elements of geometry, and the

practical sciences of mensuration, surveying, and dialling. His reading, too, gradually enlarged, as accident threw new books in his way. He mentions, in particular, among those he met with, Thomson's and Shennstone's Works; "and I engaged," says he, "several of my schoolfellows to keep up a literary correspondence with me. This improved me in composition. I had met with a collection of letters by the wits of Queen Anne's reign, and I pored over them most devoutly. I kept copies of any of my own letters that pleased me; and a comparison between them and the compositions of most of my correspondents flattered my vanity."

In a letter from Gilbert Burns, which Dr. Currie has published, we have a still more particular account of the manner in which the father of this humble family struggled, in all his difficulties, to procure education for his children; from which, as interestingly illustrative of the extent to which the poorest have it in their power to discharge this most important parental duty, we shall here transcribe a few sentences. "There being no school near us," says the writer, "and our little services being useful on the farm, my father undertook to teach us arithmetic in the winter evenings, by candlelight; and in this way my two eldest sisters got all the education they received. . . . My father was for some time almost the only companion we had. He conversed familiarly on all subjects with us, as if we had been men; and was at great pains, while we accompanied him in the labours of the farm, to lead the conversation to such subjects as might tend to increase our knowledge, or confirm us in virtuous habits. He borrowed Salmon's 'Geographical Grammar' for us, and endeavoured to make us acquainted with the situation and history of the different countries in the world; while from a book society in Ayr he procured for us the reading of Derham's 'Physico and Astro Theology,' and Ray's 'Wisdom of God in the Creation,' to give us some idea of astronomy and natural history." Gilbert also gives us, in this letter, a more particular account of his brother's early reading. "Robert," he proceeds, "read all these books with an avidity and industry scarcely to be equalled. My father had been a subscriber to Stackhouse's 'History of the Bible,' then lately published by James Meuross, in Kilmarnock: from this Robert collected a competent knowledge of ancient history; for no book was so voluminous as to slacken his industry, or so antiquated as to damp his researches. A brother of my mother, who had lived with us some time, and had learnt some arithmetic by our winter evening's candle, went into a bookseller's shop in Ayr to purchase the 'Ready Reckoner, or Tradesman's Sure Guide,' and a book to teach him to write letters. Luckily, in place of the 'Complete Letter Writer,' he got by mistake a small collection of letters by the most eminent writers, with a few sensible directions for attaining an easy epistolary style. This book was to Robert of the greatest conse-

quence. It inspired him with a strong desire to excel in letter-writing, while it furnished him with models by some of the first writers in our language."

After mentioning the manner in which his brother obtained a few of his other books, Gilbert goes on to state that a teacher in Ayr, of the name of Murdoch, to whom he was sent for two or three weeks by his father, to improve his writing, being himself engaged at the time in learning French, communicated the instructions he received to his ardent and persevering pupil, who, when he returned home, brought with him a French dictionary and grammar, and a copy of "Telemachus." "In a little while," continues the writer, "by the assistance of these books, he had acquired such a knowledge of the language as to read and understand any French author in prose." He afterwards attempted to learn Latin, but did not prosecute the study so long as to make much progress. All this while the misfortunes and sufferings of this admirable father and his poor family continued to increase every day. Gilbert's picture of their condition is touching in the extreme. "To the buffetings of misfortune," says he, "we could only oppose hard labour, and the most rigid economy. We lived very sparing. For several years butcher's meat was a stranger in the house; while all the members of the family exerted themselves to the utmost of their strength, and rather beyond it, in the labours of the farm. My brother, at the age of thirteen, assisted in threshing the crop of corn, and at fifteen was the principal labourer on the farm, for we had no hired servant, male or female. The anguish of mind we felt at our tender years, under these straits and difficulties, was very great. To think of our father growing old (for he was now above fifty), broken down with the long-continued fatigues of his life, with a wife and five other children, and in a declining state of circumstances, these reflections produced in my brother's mind and mine sensations of the deepest distress. I doubt not but the hard labour and sorrow of this period of his life was, in a great measure, the cause of that depression of spirits with which Robert was so often afflicted through his whole life afterwards. At this time he was almost constantly afflicted in the evenings with a dull headache, which at a future period of his life was exchanged for a palpitation of the heart, and a threatening of fainting and suffocation in his bed in the night time."

Murdoch, Burns's English master, although not a man of great learning, appears to have been a judicious elementary instructor, as well as to have possessed, in a remarkable degree, that zeal for the improvement of his pupils, and delight in witnessing their progress, which do more, perhaps, than anything else, to render a teacher's efforts successful. In a letter addressed to Mr. Walker, and written some years after the death of the poet, this person says, "Upon this little farm (the first which

Burns's father had) was erected an humble dwelling, of which William Burns was the architect. It was, with the exception of a little straw, literally a tabernacle of clay. In this mean cottage, of which I myself was at times an inhabitant, I really believe there dwelt a larger portion of content than in any palace in Europe." In noticing, afterwards, the ease with which his young pupils (Robert being then about six or seven years of age) learned their tasks, he remarks, "This facility was partly owing to the method pursued by their father and me in instructing them, which was, to make them thoroughly acquainted with the meaning of every word in each sentence that was to be committed to memory. By-the-bye, this may be easier done, and at an earlier period, than is generally thought. As soon as they were capable of it, I taught them to turn verse into its natural prose order; sometimes to substitute synonymous expressions for poetical words, and to supply all the ellipses. These, you know, are the means of knowing that the pupil understands his author. These are excellent helps to the arrangement of words in sentences, as well as to a variety of expression." In the remainder of the letter the writer gives a very interesting account of the manner in which he and his pupil, at a future period, commenced and carried on their French studies. When Robert Burns was about thirteen years of age, Murdoch had been appointed parish schoolmaster of Ayr, upon which, as we have already mentioned, Burns was sent for a few weeks to attend his school. "He was now with me," says Murdoch, "day and night, in school, at all meals, and in all my walks. At the end of one week I told him, that, as he was now pretty much master of the parts of speech, &c., I should like to teach him something of French pronunciation; that, when he should meet with the name of a French town, ship, officer, or the like, in the newspapers, he might be able to pronounce it something like a French word. Robert was glad to hear this proposal, and immediately we attacked the French with great courage. Now there was little else to be heard but the declension of nouns, the conjugation of verbs, &c. When walking together, and even at meals, I was constantly telling him the names of different objects, as they presented themselves, in French; so that he was hourly laying in a stock of words, and sometimes little phrases. In short, he took such pleasure in learning, and I in teaching, that it was difficult to say which of the two was most zealous in the business; and about the end of the second week of our study of the French, we began to read a little of the 'Adventures of Telemachus,' in Fénelon's own words."

Another week, however, was hardly over, when the young student was obliged to leave school for the labours of the harvest. "I did not, however," says Murdoch, "lose sight of him, but was a frequent visitant at his father's house when I had my half-holiday; and very often went, accompanied by one or two persons more intelligent than myself, that

good William Burns might enjoy a mental feast. Then the labouring oar was shifted to some other hand. The father and the son sat down with us, when we enjoyed a conversation, wherein solid reasoning, sensible remark, and a moderate seasoning of jocularly, were so nicely blended, as to render it palatable to all parties. Robert had a hundred questions to ask me about the French, &c.; and the father, who had always rational information in view, had still some question to propose to my more learned friends upon moral or natural philosophy, or some such interesting subject." It is delightful to contemplate such scenes of humble life as these—showing us, as they do, what the desire of intellectual cultivation may accomplish in any circumstances, and with how much genuine happiness it will irradiate the gloom even of the severest poverty.

We shall not pursue further the history of Robert Burns. All know his sudden blaze of popularity—the misfortunes and errors of his short life—and the immortality which he has won by his genius. It is plain, from the details that we have given, that, even had he never been a poet, he would have grown up to be no common man. Whatever he owed to nature, it was to his admirable father, and his own zealous exertions, that he was indebted at least for that education of his powers, and that storing of his mind with knowledge, which, in so great a degree, contributed to make him what he afterwards became. It is an error to regard either Burns or Shakespeare as simply a poet of Nature's making. If learning be taken to include knowledge in general, instead of being restricted merely to an acquaintance with the ancient languages, it may be rather said that they were both learned poets—as, indeed, every great poet must be. Their minds, that of Shakespeare especially, were full of multifarious knowledge, which was the fruit both of vigilant observation and extensive reading, and was perpetually entering into, and, in some degree, regulating the spirit or form of their poetry. The wonder in the case of each was, not that he produced poetical compositions of transcendent excellence without any acquaintance with literature, but that he acquired his literary knowledge in the face of difficulties which would have discouraged most men from making the attempt to gain it. Such minds, too, learn a great deal from a few books, drawing both information and rules of taste from the writer they peruse, with a rapidity and felicity of apprehension which people of inferior endowments cannot comprehend.

GILBERT BURNS, the younger brother of Robert, had no turn for poetry; but he, too, derived infinite benefit from those studies which were intermixed, as we have seen, with the labours of his early days. To this excellent man, who died in 1827, literature was the solace of a life of hardships. He never became a scholar, in the ordinary sense of the word; his situation, that of a small farmer, did not require that

he should give himself to the study of Greek or Latin; but he obtained an extensive acquaintance with the best books in his native language, and learned to write English in a manner that would not have done discredit to a scholar. Some of his letters, indeed, which Dr. Currie has printed, would be ornaments to any collection of epistolary compositions—especially a long one, dated October, 1800, which appeared first in Dr. Currie's second edition of the poet's works; and which contains a disquisition on the education of the working classes, abounding in valuable remarks, and characterized by no ordinary powers both of expression and thought.

CHAPTER XXIII.

GIFFORD; HOLCROFT.

AMONG narratives which illustrate the power of the Love of Knowledge in overcoming the opposition of circumstances, there are few more interesting than that which has been given us of his early life by the late WILLIAM GIFFORD. Mr. Gifford was born in 1755, at Ashburton, in Devonshire. His father, although the descendant of a respectable and even wealthy family, had early ruined himself by his wildness and prodigality; and even after he was married had run off to sea, where he remained serving on board a man-of-war for eight or nine years. On his return home, with about a hundred pounds of prize-money, he attempted to obtain a living as a glazier, having before apprenticed himself to that business; but in a few years he died of a broken-down constitution before he was forty, leaving his wife with two children, the youngest only about eight months old, and with no means of support except what she might make by continuing the business, of which she was quite ignorant. In about a twelvemonth she followed her husband to the grave. "I was not quite thirteen," says her son, "when this happened; my little brother was hardly two; and we had not a relation nor a friend in the world."

His brother was now sent to the workhouse, and he was himself taken home to the house of a person named Carlile, who was his godfather, and had seized upon whatever his mother had left, under pretence of repaying himself for money which he had advanced to her. By this person, William, who had before learned reading, writing, and a little arithmetic, was sent again to school, and was beginning to make considerable progress in the last branch of study; but in about three months his patron grew tired of the expense, and took him home, with the view of employing him as a ploughboy. An injury, however, which

he had received some years before, on his breast, was found to unfit him for this species of labour; and it was next resolved that he should be sent out to Newfoundland to assist in a storehouse. But, upon being presented to the person who had agreed to fit him out, he was declared to be "too small,"—and this scheme also had to be abandoned. "My godfather," says he, "had now humbler views for me, and I had little heart to resist anything. He proposed to send me on board one of the Torbay fishing-boats: I ventured, however, to remonstrate against this, and the matter was compromised by my consenting to go on board a coaster. A coaster was speedily found for me at Brixham, and thither I went when little more than thirteen."

In this vessel he remained for nearly a twelvemonth. "It will be easily conceived," he remarks, "that my life was a life of hardship. I was not only 'a ship-boy on the high and giddy mast,' but also in the cabin, where every menial office fell to my lot; yet, if I was restless and discontented, I can safely say it was not so much on account of this, as of my being precluded from all possibility of reading; as my master did not possess, nor do I recollect seeing during the whole time of my abode with him, a single book of any description, except the 'Coasting Pilot.'"

While in this humble situation, however, and seeming to himself almost an outcast from the world, he was not altogether forgotten. He had broken off all connection with Ashburton, where his godfather lived; but "the women of Brixham," he says, "who travelled to Ashburton twice a-week with fish, and who had known my parents, did not see me without kind concern running about the beach in a ragged jacket and trousers." They often mentioned him to their acquaintances at Ashburton; and the tale excited so much commiseration in the place, that his godfather at last found himself obliged to send for him home. At this time he wanted some months of fourteen. He proceeds with his own story as follows:—

"After the holidays I returned to my darling pursuit—arithmetic: my progress was now so rapid that in a few months I was at the head of the school, and qualified to assist my master (Mr. E. Furlong) on any extraordinary emergency. As he usually gave me a trifle on these occasions, it raised a thought in me that, by engaging with him as a regular assistant, and undertaking the instruction of a few evening scholars, I might, with a little additional aid, be enabled to support myself. God knows, my ideas of support at this time were of no very extravagant nature. I had, besides, another object in view. Mr. Hugh Smerdon (my first master) was now grown old and infirm: it seemed unlikely that he should hold out above three or four years; and I fondly flattered myself that, notwithstanding my youth, I might possibly be appointed to succeed him. I was in my fifteenth year when I built

these castles; a storm, however, was collecting, which unexpectedly burst upon me, and swept them all away.

“On mentioning my little plan to Carlile, he treated it with the utmost contempt; and told me, in his turn, that, as I had learned enough, and more than enough, at school, he must be considered as having fairly discharged his duty (so, indeed, he had); he added, that he had been negotiating with his cousin, a shoemaker of some respectability, who had liberally agreed to take me without a fee as an apprentice. I was so shocked at this intelligence that I did not remonstrate; but went in sullenness and silence to my new master, to whom I was soon after bound, till I should attain the age of twenty-one. My indenture, which now lies before me, is dated the 1st of January, 1772.”

Up to this period his reading had been very limited, the only books he had perused, beside the Bible, with which he was well acquainted, having been a black-letter romance, called “*Parismus and Parismenes*,” a few old magazines, and the “*Imitation*” of Thomas à Kempis. “As I hated my new profession,” he continues, “with a perfect hatred, I made no progress in it; and was consequently little regarded in the family, of which I sank by degrees into the common drudge: this did not much disquiet me, for my spirits were now humbled. I did not, however, quite resign my hope of one day succeeding to Mr. Hugh Smerdon, and therefore secretly prosecuted my favourite study at every interval of leisure. These intervals were not very frequent; and, when the use I made of them was found out, they were rendered still less so. I could not guess the motives for this at first; but at length I discovered that my master destined his youngest son for the situation to which I aspired.”

“I possessed at this time but one book in the world: it was a treatise on algebra, given to me by a young woman, who had found it in a lodging-house. I considered it as a treasure; but it was a treasure locked up, for it supposed the reader to be well acquainted with simple equations, and I knew nothing of the matter. My master’s son had purchased ‘*Fenning’s Introduction*’: this was precisely what I wanted—but he carefully concealed it from me, and I was indebted to chance alone for stumbling upon his hiding-place. I sat up for the greatest part of several nights successively, and, before he suspected that his treatise was discovered, had completely mastered it. I could now enter upon my own; and that carried me pretty far into the science. This was not done without difficulty. I had not a farthing on earth, nor a friend to give me one; pen, ink, and paper, therefore (in despite of the flippant remark of Lord Orford), were, for the most part, as completely out of my reach as a crown and sceptre. There was, indeed, a resource; but the utmost caution and secrecy were necessary in applying to it. I beat out pieces of leather as smooth as possible, and wrought my pro-

blems on them with a blunted awl; for the rest, my memory was tenacious, and I could multiply and divide by it to a great extent."

No situation, it will be admitted, could be more unfavourable for study than this; and yet we see how the eager student succeeded in triumphing over its disadvantages, contriving to write and calculate even without paper, pens, or ink, by the aid of a piece of leather and a blunted awl. Where there is a strong determination to attain an object, it is generally sufficient of itself to create the means; and almost any means are sufficient. We are apt to suppose that there is only one way of doing a thing, namely, that in which it is commonly done. But, whenever we have to prove it, we find how rich in resources is Necessity; and how seldom it is that, in the absence of the ordinary instrument, she has not some new invention to supply its place. This is a truth which studious poverty has often had experience of, and been all the better for experiencing; for difficulties so encountered and subdued not only whet ingenuity, but strengthen a man's whole intellectual and moral character, and fit him for struggles and achievements in after life, from which other spirits less hardily trained turn away in despair.

At last, however, Gifford obtained some alleviation of his extreme penury. He had scarcely, he tells us, known poetry even by name, when some verses, composed by one of his acquaintances, tempted him to try what he could do in the same style, and he succeeded in producing a few rhymes. As successive little incidents inspired his humble muse, he produced several more compositions of a similar description, till he had got together about a dozen of them. "Certainly," says he, "nothing on earth was ever so deplorable;" but, such as they were, they procured him not a little fame among his associates, and he began at last to be sometimes invited to repeat them to other circles. "The repetitions of which I speak," he continues, "were always attended with applause, and sometimes with favours more substantial; little collections were now and then made, and I have received sixpence in an evening. To one who had long lived in the absolute want of money, such a resource seemed a Peruvian mine. I furnished myself by degrees with paper, &c., and, what was of more importance, with books of geometry and of the higher branches of algebra, which I cautiously concealed. Poetry, even at this time, was no amusement of mine: it was subservient to other purposes; and I only had recourse to it when I wanted money for my mathematical pursuits."

But even this resource was soon taken from him. His master, having heard of his verse-making, was so incensed at what he deemed the idleness of the occupation, and especially at some satirical allusions to himself, or his customers, upon which the young poet had unwisely ventured, that he seized upon and carried away all his books and papers, and even strictly prohibited him from ever again repeating a line of his composi-

tions. This severe stroke was followed by another, which reduced him to utter despair. The master of the free-school, to whom he had never resigned the hope of succeeding, died, and another person was appointed to the situation not much older than Gifford, and who, he says, was certainly not so well qualified for it as himself. "I look back," he proceeds, "on that part of my life which immediately followed this event with little satisfaction; it was a period of gloom, and savage unsociability: by degrees I sunk into a kind of corporeal torpor; or, if roused into activity by the spirit of youth, wasted the exertion in splenetic and vexatious tricks, which alienated the few acquaintances which compassion had yet left me."

His despondency and discontent, however, seem to have gradually given way to the natural buoyancy of his disposition; some evidences of kindly feeling from those around him tended a good deal to mitigate his recklessness; and, especially as the term of his apprenticeship drew towards a close, his former aspirations and hopes began to return to him. But he had spent nearly six years at his uncongenial employment before any decided prospect of deliverance opened upon him. "In this humble and obscure state," he says, "poor beyond the common lot, yet flattering my ambition with day-dreams which perhaps would never have been realized, I was found, in the twentieth year of my age, by Mr. William Cookesley,—a name never to be pronounced by me without veneration. The lamentable doggrel which I have already mentioned, and which had passed from mouth to mouth among people of my own degree, had by some accident or other reached his ear, and given him a curiosity to inquire after the author." Mr. Cookesley, who was a surgeon, and not rich, having learnt Gifford's history from himself, became so much interested in his favour, that he determined to rescue him from his obscurity. "The plan," says Gifford, "that occurred to him was naturally that which had so often suggested itself to me. There were, indeed, several obstacles to be overcome. My handwriting was bad, and my language very incorrect; but nothing could slacken the zeal of this excellent man. He procured a few of my poor attempts at rhyme, dispersed them amongst his friends and acquaintance, and, when my name was become somewhat familiar to them, set on foot a subscription for my relief. I still preserve the original paper; its title was not very magnificent, though it exceeded the most sanguine wishes of my heart. It ran thus: 'A subscription for purchasing the remainder of the time of William Gifford, and for enabling him to improve himself in writing and English grammar.' Few contributed more than five shillings, and none went beyond ten and sixpence,—enough, however, was collected to free me from my apprenticeship,* and to maintain me for a few months, during which I assiduously attended the Rev. Thomas Smerdon."

* "The sum my master received was six pounds."

The rest of the story may be very compendiously told. The difficulties of the poor scholar were now over, for his patrons were so much pleased with the progress he made during this short period, that, upon its expiration, they renewed their bounty, and maintained him at school for another year. "Such liberality," he remarks, "was not lost upon me; I grew anxious to make the best return in my power, and I redoubled my diligence. Now that I am sunk into indolence, I look back with some degree of scepticism to the exertions of that period." In two years and two months from what he calls the day of his emancipation, he was pronounced by his master to be fit for the University: and, a small office having been obtained for him by Mr. Cookesley's exertions at Oxford, he was entered of Exeter College, that gentleman undertaking to provide the additional means necessary to enable him to live till he should take his degree. Mr. Gifford's first patron died before his protégé had time to fulfil the good man's fond anticipations of his future celebrity; but he afterwards found in the first Earl Grosvenor, grandfather of the present Marquis of Westminster, another much more able, though it was impossible that any other could have shown more zeal, to advance his interests. A long and prosperous life, during which he acquired a distinguished name in the literary world, was the ample compensation for the humiliation and hardships of his youth. He was the editor, for many years, of the "Quarterly Review," which was placed under his management at its commencement in 1809; and which attained the most distinguished success in a great degree through his judicious and careful attention to its conduct. The interesting narrative from which we have extracted the preceding pages is prefixed to his English version of Juvenal, the first edition of which appeared in 1802. He had before this acquired great celebrity by his two poetical satires, entitled "The Baviad" and "The Mæviad;" and his editions of our old dramatists, Massinger, Ben Jonson, Ford, and Shirley, have also placed his name high as an acute and learned critic. Mr. Gifford died in London on the 31st of December, 1826, in the seventy-first year of his age. It is a beautiful circumstance in his history, and one which shows how a generous act sometimes receives a worldly reward, that he left the bulk of his fortune to the son of his first most kind and disinterested patron, Mr. Cookesley.

Similar in some respects to Gifford's early history is that of his contemporary THOMAS HOLCROFT, the author of "Hugh Trevor," and many other well-known productions in light literature. Holcroft has also left us part of a memoir of his own life, the composition of which, however, he commenced too late to live to finish. "How much he had it at heart," says the editor of the manuscript (the late Mr. Hazlitt), which was given to the world some years after the death of the author, "may, however, be inferred from the extraordinary pains he then took to make

some progress in it. He told his physicians that he did not care what severity of treatment he was subjected to, provided he could live six months longer to complete what he had begun. By dictating a word at a time, he succeeded in bringing it down to his fifteenth year. When the clearness, minuteness, and vividness of what he thus wrote, are compared with the feeble, half-convulsed state in which it was written, it will be difficult to bring a stronger instance of the exertion of resolution and firmness of mind under such circumstances."

Holcroft was born in London in the year 1745, at which time his father worked as a shoemaker, and his mother dealt in greens and oysters. His father, who seems to have been a person of unsettled habits, though a well-meaning and upright man, knew very little of his business, to which he had not been regularly bred, and, in spite of the exertions both of himself and his wife, his affairs did not prosper. When young Holcroft was about six years old, the family were suddenly removed from London to a place in Berkshire, beyond Ascot Heath, where they remained for about twelve months. Thomas had as yet only been for a short time at a school where children were sent rather to keep them out of harm's way than to learn anything, and to which he used to be carried by an apprentice of his father. This lad afterwards gained his warmest gratitude by making him a present of the first two books he ever possessed, the one being the "History of Parismus and Parismenes," already mentioned as one of Gifford's early literary companions, and the other the "Seven Champions of Christendom." It was while they resided in Berkshire that his father began teaching him to read. "The task," he says, "at first I found difficult, till the idea one day suddenly seized me, of catching all the sounds I had been taught from the arrangement of the letters; and my joy at this discovery was so great, that the recollection of it has never been effaced. After that my progress was so rapid that it astonished my father. He boasted of me to everybody; and, that I might lose no time, the task he set me was eleven chapters a day in the Old Testament. I might, indeed, have deceived my father by skipping some of the chapters, but a dawning regard for truth, aided by the love I had of reading, and the wonderful histories I sometimes found in the Sacred Writings, generally induced me to go through the whole of my task. One day, as I was sitting at the gate with my Bible in my hand, a neighbouring farmer, coming to see my father, asked me if I could read the Bible already. I answered, yes; and he desired me to let him hear me. I began at the place where the book was open, read fluently, and afterwards told him, that, if he pleased, he should hear the tenth chapter of Nehemiah. At this he seemed still more amazed, and, wishing to be convinced, bade me read. After listening till he found I could really pronounce the uncouth Hebrew names so much better, and more easily, than he supposed to be within the power

of so young a child, he patted my head, gave me a penny, and said I was an uncommon boy. It would be hard to say whether his praise or his gift was most flattering to me. Soon after, my father's apprentice, the kind-hearted Dick, who came backward and forward to my father on his affairs, brought me the two delightful histories I have above mentioned, which were among those then called Chapman's Books. It was scarcely possible for anything to have been more grateful to me than this present. 'Parismus and Parismenes,' with all the adventures detailed in the 'Seven Champions of Christendom,' were soon as familiar to me as my catechism, or the daily prayers I repeated kneeling before my father."

On leaving their house in Berkshire, the family were obliged to adopt a wandering life, the mother turning pedlar, and hawking her wares through the outskirts and neighbourhood of London, while her son trotted after her, and the father, after a vain attempt to obtain some regular employment, in a short time joining the party, who now extended their peregrinations to remote parts of the country. While leading this life, they endured the greatest hardships. Upon one occasion they were so severely pressed, that Thomas was sent to beg from house to house in a village where they happened to be. At length the father managed to buy two or three asses, which he loaded with hampers of apples and pears, and drove about through the country. But this apparent improvement in their circumstances afforded no alleviation to the sufferings of the poor boy. "The bad nourishment I met with," he says, "the cold and wretched manner in which I was clothed, and the excessive weariness I endured in following these animals day after day, and being obliged to drive creatures perhaps still more weary than myself, were miseries much too great, and loaded my little heart with sorrows far too pungent ever to be forgotten. By-roads and high-roads were alike to be traversed, but the former far the oftenest, for they were then almost innumerable, and the state of them in winter would scarcely at present be believed." Once, he tells us, he travelled on foot thirty miles in one day; and he was then only a child of about ten years old. During all this time, he made little or no progress in reading:—"I was too much pressed," he says, "by fatigue, hunger, cold, and nakedness." Yet as he continued to repeat his prayers and catechism morning and evening, and to read the Prayer-book and Bible on Sundays, he at least did not forget what he had formerly learned. On one occasion, too, he states, the ballad of "Chevy Chase" having fallen into his hands, his father, who was very proud of what he conceived to be his son's talents, and particularly of his memory, set him to get by heart the whole song, by way of task, which he performed, in the midst of his toils, in three days. His father gave him a halfpenny for the achievement, which made him think himself at the time quite a rich man.

When in his eleventh or twelfth year, having been present at the Nottingham races, he was so much struck by the contrast between his own mean and ragged condition, and that of the clean, well-fed, and well-clothed stable-boys, that he determined to try if he could not find a master to engage him in that capacity at Newmarket. After much perseverance, and being turned off after a short trial, first by one master and then by another, from the little knowledge he was found to have of riding, he was at last taken into the service of a person who was considerate enough not to expect him to be a finished groom almost before he could have ever mounted a horse. He very soon began to distinguish himself by his expertness in his new occupation; and the language in which he speaks of his change of circumstances forcibly paints his sense of the miseries from which he had been extricated. Alluding to the hearty meal which he and his companions were wont to make every morning at nine o'clock, after four hours' exercise of their horses, he says, "Nothing, perhaps, can exceed the enjoyment of a stable-boy's breakfast: what, then, may not be said of mine, who had so long been used to suffer hunger, and so seldom found the means of satisfying it?" "For my own part," he adds, "so total and striking was the change which had taken place in my situation, that I could not but feel it very sensibly. I was more conscious of it than most boys would have been, and therefore not a little satisfied. The former part of my life had most of it been spent in turmoil, and often in singular wretchedness. I had been exposed to every want, every weariness, and every occasion of despondency, except that such poor sufferers become reconciled to, and almost insensible of, suffering; and boyhood and beggary are fortunately not prone to despond. Happy had been the meal where I had enough; rich to me was the rag that kept me warm; and heavenly the pillow, no matter what, or how hard, on which I could lay my head to sleep. Now I was warmly clothed, nay gorgeously; for I was proud of my new livery, and never suspected that there was disgrace in it; I fed voluptuously, not a prince on earth perhaps with half the appetite, and never-failing relish; and, instead of being obliged to drag through the dirt after the most sluggish, obstinate, and despised among our animals, I was mounted on the noblest that the earth contains, had him under my care, and was borne by him over hill and dale, far outstripping the wings of the wind. Was not this a change such as might excite reflection even in the mind of a boy?"

We must, however, pass over the account which he gives of his life as a stable-boy, interesting as many of the details are into which he enters. During his wanderings through the country with his father, as has been already mentioned, he had scarcely had any opportunity of extending his knowledge of books; the Bible, and such old ballads as he met with by chance on the walls of cottages and ale-houses, constituting all his

reading. "Books were not then," he remarks, "as they fortunately are now, great or small, on this subject or on that, to be found in almost every house. A book, except of prayers, or of daily religious use, was scarcely to be seen but among the opulent, or in the possession of the studious; and by the opulent they were often disregarded with a degree of neglect which would now be almost disgraceful." For some time after his arrival at Newmarket, he was not much better off. In about half a year, however, his father followed him to that place, where he at first found a little employment at his old trade of making shoes; and one of his shopmates, who happened to be fond of books, and to be in possession of a few, occasionally lent young Holcroft a volume from his collection. Among other works, this person put into his hand's "Gulliver's Travels" and the "Spectator," with which, the former especially, he was much delighted. He mentions, also, the "Whole Duty of Man," the "Pilgrim's Progress," and other religious books, as at this time among his chief favourites. As he was one day passing the church, he heard some voices singing, and was immediately seized with a strong desire to learn the art. Having approached the church door, he found the persons within engaged in singing in four parts, under the direction of a Mr. Langham. They asked him to join them, and, his voice and ear being pronounced good, it was agreed that he should be taken into the class; the master offering to give up the entrance-money of five shillings in consideration of his being but a boy, whose wages could not be great, and the others agreeing to let him sing out of their books. "From the little," he proceeds, "I that day learned, and from another lesson or two, I obtained a tolerable conception of striking intervals upwards or downwards, such as the third, the fourth, and the remainder of the octave, the chief feature in which I soon understood; but of course I found most difficulty in the third, sixth, and seventh. Previously, however, to any great progress, I was obliged to purchase 'Arnold's Psalmody;' and, studious over this divine treasure, I passed many a forenoon extended in the hay-loft. My chief, and almost my only difficulty, lay in the impenetrable obscurity of such technical words as were not explained either by their own nature, or by the author in other language. I was illiterate; I knew the language of the vulgar well, but little more. Perhaps no words ever puzzled poor mortal more than I was puzzled by the words *major* and *minor keys*. I think it a duty, which no one who writes an elementary book ought to neglect, to give a vocabulary of all the words which are not in common use, in the language in which he writes, and to explain them by the simplest terms in that language; or, if that cannot be done, by a clear and easy paraphrase. The hours I spent by myself in mastering whatever belonged to notation, and in learning the intervals, occasioned my progress to be so very different from that of the others, that it excited the admiration of them all: and

Mr. Langham, the great man whom I then looked up to, declared it was surprising. If any part was out, I heard it immediately, and often struck the note for them—getting the start of Mr. Langham. If he should happen to be absent, he said that I could set them all right; so that by this, and the clearness of my voice, I obtained the nickname of ‘The sweet singer of Israel.’”

His wages were four pounds a year, and he paid five shillings a quarter to his singing-master; and, upon Mr. Langham offering to give him lessons in arithmetic also for as much more, he agreed to the proposal, and attended him daily for three months. In that time he got so far as Practice and the Rule-of-Three. “Except what I have already related,” he says, “these three months, as far as others were concerned, may be truly called my course of education. At the age of two or three and thirty, indeed, when I was endeavouring to acquire the French language, I paid a Monsieur Raymond twenty shillings for a few lessons, but the good he did me was so little that it was money thrown away. At Newmarket I was so intent on studying arithmetic, that for want of better apparatus I have often got an old nail and cast up sums on the paling of the stable-yard.” This will remind the reader of Gifford, with his leather for paper, and his blunted awl for a pen.

Holcroft continued at Newmarket for about two years and a half, when he determined to go to London once more to join his father, who now kept a cobbler’s stall in South Audley Street. “My mind,” he says, “having its own somewhat peculiar bias, circumstances had rather concurred to disgust me than to invite my stay. I despised my companions for the grossness of their ideas, and the total absence of every pursuit in which the mind appeared to have any share. It was even with sneers of contempt that they saw me intent on acquiring some small portion of knowledge, so that I was far from having any prompter either as a friend or a rival.” He was at this time nearly sixteen. For some years he continued to make shoes with his father, and at last became an able workman. But he grew every day fonder of reading, and, whenever he had a shilling to spare, spent it in purchasing books. In 1765, having married, he attempted to open a school for teaching children to read at Liverpool, but was obliged to abandon the project in about a year, when he returned to town, and resumed his trade of a shoemaker. Beside his dislike to this occupation, however, on other accounts, it brought back an asthmatic complaint he had had when a boy, and every consideration made him resolve to endeavour to escape from it. Even at this time he had become a writer for the newspapers, the editor of the “Whitehall Evening Post” giving him five shillings a column for some essays which he sent to that journal. He again attempted to open a school in the neighbourhood of London; but after living for three months on potatoes and butter-milk, and obtaining only one scholar he

gave up the experiment, and returned to the heart of the town. Having acquired some notions of elocution at a debating club which he had been in the habit of attending, he next thought of going on the stage, and obtained an engagement from the manager of the Dublin theatre, at a poor salary, which was very ill paid. He was so ill treated, indeed, in this situation, that he was obliged to leave it in about half a year. He then joined a strolling company in the north of England, and wandered about as an itinerant actor for seven years, during which time he suffered a great deal of misery, and was often reduced almost to starving. In the midst of all his sufferings, however, he retained his love of books, and had made himself extensively conversant with English literature. At last, in the end of the year 1777, he came back to London, and, by means of an introduction to Mr. Sheridan, obtained an engagement in a subordinate capacity at Drury Lane. He had just before this, as a desperate resource, sat down to compose a farce, which he called "The Crisis," and this turned out the commencement of a busy and extended literary career. The farce, although only acted once, was well received, and it soon encouraged him to new efforts of the same kind; yet he continued for many years involved in difficulties, from which it required all his exertions to extricate himself. The remainder of Mr. Holcroft's history, with the exception of a short but stormy period, during which he was subjected to very severe usage on account of certain political opinions which he was supposed to hold, is merely that of a life of authorship. He never became a good actor, and after some time dedicated himself entirely to literary occupation. His industry in his new profession is abundantly evidenced by the long list of his works, which comprise several of high talent and established popularity. In his maturer years, beside many other acquirements, he made himself master of the French and German languages, from both of which he executed several well-known translations.

Mr. Holcroft died in 1809. His life is in many respects admirably calculated to answer the design which he had in view, he tells us, in writing the account of the early part of it, namely:—"To excite an ardent emulation in the breasts of youthful readers, by showing them how difficulties may be endured, how they may be overcome, and how they may at last contribute, as a school of instruction, to bring forth hidden talent."

CHAPTER XXIV.

ENJOYMENT ATTENDING THE PURSUIT OF KNOWLEDGE. PURSUIT OF KNOWLEDGE BY PERSONS OF RANK OR WEALTH:—DEMOCRITUS; ANAXAGORAS; NICEPHORUS ALPHERY; MARCUS AURELIUS; JULIAN; CHARLEMAGNE; ALFRED; JAMES I. OF SCOTLAND; ELIZABETH; ALPHONSO X.

MANY of the examples we have given show that the Pursuit of Knowledge does much more than merely exercise and enrich the intellect. The moral habits which it has a tendency to create and foster form one of its chief recommendations. Knowledge is, essentially and directly, power; but it is also, indirectly, virtue. And this it is in two ways. It can hardly be acquired without the exertion of several moral qualities of high value; and, having been acquired, it nurtures tastes, and supplies sources of enjoyment, admirably adapted to withdraw the mind from unprofitable and corrupting pleasures. Some distinguished scholars, no doubt, have been bad men; but we cannot tell how much worse they might have been but for their love of learning, which, to the extent it did operate upon their characters, could not have been otherwise than beneficial. A genuine relish for intellectual enjoyments is naturally as inconsistent with a devotion to the coarser gratifications of sense, as the habit of assiduous study is with that dissipation of time, of thought, and of faculty, which a life of vicious pleasure implies.

But Knowledge is also happiness, as well as power and virtue;—happiness both in the acquisition and in the possession. And, were the pursuit of it nothing better than a mere amusement, it would deserve the preference over all other amusements on many accounts. Of these, indeed, the chief is, that it must almost of necessity become something better than an amusement,—must invigorate the mind as well as entertain it, and refine and elevate the character while it supplies to listlessness and weariness their most agreeable excitement and relaxation. But, omitting this consideration, it is still of all amusements the best, for other reasons. So far from losing any part of its zest with time, the longer it is known the better it is loved. There is no other pastime that can be compared with it in variety. Even to him who has been longest conversant with it, it has still as much novelty to offer as at first. It may be resorted to by all, in all circumstances:—by both sexes; by the young and the old; in town or in the country; by him who has only his stolen half hour to give to it, and by him who can allow it nearly his whole day; in company with others, or in solitude, which it converts into the most delightful society. Above all, it is the cheapest of all

amusements, and consequently the most universally accessible. A book is emphatically the poor man's luxury, for it is of all luxuries that which can be obtained at the least cost. By means of itinerating libraries for the country, and stationary collections for each of our larger towns, almost every individual of the population might be enabled to secure access for himself to an inexhaustible store of intellectual amusement and instruction, at an expense which even the poorest would scarcely feel.

As yet, however, these advantages have been chiefly in the possession of the middle classes, to whom they have been a source not more of enjoyment than of intelligence and influence. Among the highest orders of society, the very cheapness of literary pleasures has probably had the effect of making them to be less in fashion than others, of which wealth can command a more exclusive enjoyment. Even such distinction as eminence in intellectual pursuits can confer must be shared with many of obscure birth and low station, and on that account alone has doubtless seemed often the less worthy of ambition to those who were already raised above the crowd by the accidents of fortune. Yet, whatever enjoyment there may really be in such pursuits will not, of course, be the less to any one because he happens to be a person of wealth or rank. On the contrary, these advantages are perhaps on no other account more valuable, than for the power which they give their possessor of prosecuting the work of mental cultivation to a greater extent than others. He can command, if he chooses, a degree of leisure, and freedom from interruption, greatly exceeding what the generality of men enjoy. Others have seldom more than the mere fragments of the day to give to study, after the bulk of it has been consumed in procuring merely the bread that perisheth; he may make literature and philosophy the vocation of his life. To be enabled to do this, or to do it only in small part, many have willingly embraced comparative poverty in preference to riches. Even in modern times, Alfieri, the great Italian dramatist, gave up his estate to his sister, that he might devote himself the more freely to his poetical studies. Among the philosophers of the ancient world, some are said to have spontaneously disencumbered themselves of their inheritances, that the cares of managing their property might not interrupt their philosophic pursuits. Crates, Thales, Democritus, Anaxagoras are particularly mentioned as having made this sacrifice. But in those days, it is to be remembered, knowledge was chiefly to be obtained by travelling into foreign countries, and those who sought it were therefore obliged, before setting out on the search, either to relinquish altogether the possessions they had at home, or to leave them in charge of trustees, who generally took advantage of their stewardship to embezzle or squander them. Doubtless no one of the celebrated persons we have enumerated would have thrown away his

patrimony, if he could have retained it with as little inconvenience as such an encumbrance can possibly occasion a philosopher in our own times. The only worldly imprudence even of which they can be fairly accused, is that of having preferred knowledge to wealth when it was necessary to make a choice between the two; or that of having allowed themselves to be too easily cheated of the latter, in their enthusiastic devotion to the former. Bayle, who had himself a strong sympathy with this love of a quiet in preference to a splendid life, states the matter correctly in the case of DEMOCRITUS, when he says, in his article on that great father of natural philosophy:—"The spirit of a great traveller reigned in him; he journeyed to the heart of India in quest of the riches of learning, and bestowed but little thought on those other treasures which he had almost at his door." ANAXAGORAS, in like manner, although he did not travel so far from home as Democritus, still owed the loss of his property to his being obliged to leave it in the hands of others. This ingenious but somewhat fanciful speculator, the master of Socrates and Euripides, and the honoured friend of Pericles, was a native of Clazomenæ in Ionia, and the descendant of noble and wealthy ancestors, whose lands he inherited; but, determining to devote his life to philosophy, he did not hesitate, when only about twenty years of age, to bid adieu to his fair possessions, and, crossing the Ægean, to repair to Athens, where he continued to pursue his studies while his estate was running to waste, and at last maintained himself by giving lessons to others. Cicero mentions Anaxagoras, along with Pythagoras and Democritus, as having declined those public honours, and that share in the management of affairs, to which his birth and qualifications entitled him to aspire, "for the sake," as he expresses it, "of tranquillity, and for the sake of the sweetness of knowledge, than which nothing is to man more delightful,"—*propter tranquillitatem, et propter ipsius scientiæ suavitatem, qua nihil est hominibus jucundius.*—De Oratore, lib. iii. This is the testimony of one who had himself tasted the charms of political power as well as those of philosophy.

We may here notice the singular story of MIKEPHER (or NICEPHORUS) ALPHERY, as related in the "Biographia Britannica." Alphery was born in Russia about the close of the sixteenth century, of the family of the Czars. He was, we suppose, of the ancient race of Ruric, which, after occupying the throne for nearly eight centuries, gave place to a new dynasty on the death of Feodore Iwanovitch, commonly called Feodore I., in 1598. This event, which was immediately followed by the usurpation of Boris Godunow, after he had caused Feodore's only brother, Demetrius, the heir to the crown, to be assassinated, was the occasion of protracted troubles to Russia. It appears to have been about the commencement of these convulsions that Alphery and his two brothers were sent by their friends for safety to England, and intrusted to the care

of a merchant, connected by commercial relations with their native country. Their protector gave them a liberal education, and at the proper age they were all entered of the University of Oxford. Soon after this, however, two of them were attacked by small-pox, and died. Nicephorus, the survivor, now resolved to take orders in the English church, and accordingly, having been ordained, he was appointed in 1618 to the living of Wooley, in Huntingdonshire, the income of which was barely sufficient to afford him a maintenance. By this time the throne of his ancestors was in the possession of Michael Fedrowitch Romanow, who was the son of a patriarch of the Greek church, and had, in 1613, when only sixteen years of age, obtained the imperial crown, which has ever since been worn by his descendants. Thus, while on the one hand the church had received into her ranks the heir of an empire, that empire on the other hand received a sovereign from the church. The disturbances that had so long distracted Russia, however, were not settled by the accession of Michael; and it is asserted that subsequently to this period Nicephorus was actually twice invited to return to his native country, and put himself at the head of a powerful party who desired to place him on the throne. But, with a want of ambition which many will despise, although its wisdom might perhaps be defended, he preferred on both occasions his humble parsonage to this splendid temptation. Never having obtained any additional preferment, he long made himself happy by the discharge of his duties in the lowly condition he had embraced; and his meek spirit was probably but rarely troubled even by a thought of the exalted station which he might possibly have attained. After settling at Wooley he married, and had a family. Alphy was not destined, however, even by his relinquishment of the rights of his birth, to escape the storms of political commotion; for, on the ascendancy of the republican party after the civil wars, he was deprived of his living, and, with his wife and children, compelled to wander about for some time without a home; nor did he recover his benefice till the Restoration. By this time the infirmities of advanced age had left him but little strength for the performance of his clerical duties; and, leaving his parish in charge of a curate, he soon after retired to Hammersmith, to the house of one of his sons who was settled there. In this retreat he lived for some years, unnoticed, but not unhappy; and when his death took place at last, his singular fortunes had been so much forgotten by all the world, that nobody has recorded the date of the event.

We do not read of any remarkable acquirements in literature made by this individual; but, if moderation of desires be a quality of the philosophic spirit, he is entitled to be regarded as no ordinary philosopher. Many others, however, might be enumerated, who, even on a throne, have cultivated science and letters, and intermingled the occupa-

tions of study with those of sovereignty. We may mention among the Roman emperors the excellent MARCUS AURELIUS, a prince who, with



COIN OF AURELIUS.

some failings, manifested many virtues that have rarely adorned in the same degree either a public or a private station. Called to the imperial dignity contrary to his own wishes, Aurelius, who had been a philosopher before his exaltation, remained the same in character, and as far as possible in habits, after he became the master of the world; and he is at least one instance of a naturally good disposition which power the most unbounded was unable to corrupt. To our common notions, or prejudices, his giving his attendance, when nearly sixty years of age, to a course of philosophical lectures may seem to savour something of pedantic display: but kings have often been worse employed; and it is at any rate delightful to find this good and enlightened emperor, after his victorious campaigns, repairing, ere he returned home to receive the congratulations of his impatient Romans, to the mother-city of philosophy, learning, art, and freedom, the subjugated but still illustrious Athens, and there examining the trophies of her old glory, mixing in her religious processions and ceremonies, rebuilding and re-endowing her schools, bestowing new honours and privileges on the teachers, and neglecting nothing that could make her once more the metropolis of the world of letters. Marcus Aurelius is said to have written several books; but only one work, commonly known as his "Meditations," composed in Greek, has come down to us. How happy would nations be, this prince was wont to exclaim in the words of Plato, if the philosophers were their kings, or their kings were philosophers! And he afforded in himself, equally able as was his administration of affairs at home and abroad, in peace and in war, at least one splendid exemplification of the truth of his favourite remark—which yet might not be found to hold generally good, unless philosophy were to include, as it did in him, practice as well as speculation. The Emperor JULIAN, in a later age, though perhaps equalling Marcus Aurelius in literary talents and accomplishments, and endowed also with many great qualities by nature, does not

exhibit to us quite so beautiful a picture of philosophy on a throne. He had neither the simplicity, sincerity, and perfect truthfulness of his predecessor's moral character, nor the unimpassioned sagacity and clearness of vision which distinguished his understanding; and he is chargeable indeed with acting in many respects in a spirit of affectation and blind prejudice, anything but creditable to a philosopher. Yet, during his short reign of little more than a year and a half, Julian proved himself both an able monarch and a man possessed of great virtues. In war his valour was only equalled by his clemency. An enemy to all luxury and excess, he did everything in his power, by his authority and his example, to repress the growing extravagances and debaucheries of the times, and abolished many customs of the imperial court which he considered only occasions of expense and effeminate indulgence. Much of his time was spent in conversing with learned men, much in solitary study; indeed, from a very early hour in the night, till morning, was generally devoted by him, even during his campaigns, to reading and writing. He has left several works, all written in Greek, which was then the language of the court.

In a more recent but much darker age, we find literature cultivated with zeal by the emperor CHARLEMAGNE, when there were few other individuals to whom it was at all an object of attention throughout his vast dominions. This great conqueror, whose life was spent in almost incessant wars, was yet wont to give whatever leisure he could spare to reading, writing, and the converse of the learned; and several of his letters and other compositions are still extant. Even when confined to bed by sickness, he was accustomed to amuse himself, we are told by his biographer and contemporary Eginhard, in attempting to imitate the elaborately ornamented characters common in the books of that age,—a statement which has been erroneously interpreted as importing that all his progress in the art of writing consisted merely in these ineffectual essays. It can scarcely be doubted, from other circumstances, that he was familiar with this art. The greatest service, however, which Charlemagne rendered to learning was his munificent patronage of its professors, and the readiness and zeal with which he lent himself to various schemes for its restoration and diffusion. The University of Paris is commonly supposed to have sprung from a seminary which he established in his palace (hence called the Palatine school), and in the institution of which his principal adviser and assistant was our countryman, the able and accomplished Alcuin. This school appears to have been opened about the year 780, while its projector was yet in the very midst of his wars. While letters, long forgotten both in courts and general society, were thus enjoying the protection of Charlemagne in the West, the famous Haroun Al Raschid (or the Just), whose name the *Arabian Nights'* Entertainments have made so familiar to every reader,

and whose extensive dominions entitled him to be regarded as the proper Emperor of the East, was affording them equal encouragement in that quarter of the globe. Haroun was himself, indeed, an excellent poet, and distinguished for his proficiency in various branches of learning. But at this time the Mahometan world was very considerably ahead of the nations of Christendom in civilization and the knowledge of the arts. The two great potentates we have mentioned, between whom so large a portion of the earth was divided, are recorded to have corresponded with each other; and in the year 807 an ambassador from the Caliph arrived in France, bringing with him various presents for Charlemagne, among them a clepsydra, or water-clock, which excited especial admiration as a contrivance beyond anything which ingenuity had yet invented in Europe. Another of Haroun's presents was a set of chess-men, some of which are still preserved in the Royal Library at Paris. Charlemagne reigned from the year 768 to 814, when he died at the age of seventy-one; and Haroun Al Raschid died at the age of forty-seven in 809, after a reign of twenty-three years.

But our own ALFRED, whose attainments in learning, made in the latter portion of a short and very busy life, we have already briefly noticed, does much more honour by his literary performances to the ninth century, than Charlemagne and the Caliph Haroun do to the eighth. Alfred, born in the year 849, succeeded to the crown in 871, and his reign extended to the close of the century. Even the unusual lateness of the period at which his acquaintance with books commenced, was but the least of the untoward circumstances with which this wonderful man had to contend in his pursuit of knowledge. Born, as he was, the son of a king, how scanty were the means of education of which he had it in his power to avail himself, compared with those which, in our happier days, are within the reach of the poorest peasant! In that age it demanded the price of a goodly estate to purchase a book; and, in England especially, teachers were so scarce, that Alfred, so long as he continued merely a prince dependent upon his father or his elder brothers, actually seems to have been without the requisite resources to procure their services. Nothing, as his biographer, Asser, informs us, was a more frequent subject of regret with him, than that, during the only time of his life when he had either health or leisure for study, he had thus been left utterly without the means of obtaining instruction. For as soon almost as he had passed his boyhood, he was obliged to engage in active duty as a soldier; and the incessant toils of a military life, in the course of which he is recorded to have fought no fewer than fifty battles, as well as to have undergone a succession of hardships and sufferings under which an ordinary mind would have broken down in despair, consumed not a few of the best of his succeeding years. And even after he succeeded to the throne, when we consider that, in addition

to the extensive literary labours which he accomplished, he not only attended to his multifarious public duties with a punctuality that has never been surpassed, but notwithstanding his harassing bodily ailments, signalized himself by his prowess and dexterity in every manly exercise, we may well ask by what mysterious art did he find time for all this variety of occupation? The answer is, that he found time by never losing it. Time is the only gift or commodity of which every man who lives has just the same share. The passing day is exactly of the same dimensions to each of us, and by no contrivance can any one of us extend its duration by so much as a minute or a second. It is not like a sum of money, which we can employ in trade, or put out to interest, and thereby add to or multiply its amount. Its amount is unalterable. We cannot "make it breed;" we cannot even keep it by us. Whether we will or no, we must spend it; and all our power over it, therefore, consists in the manner in which we spend it. Part with it we must; but we may give it either for something or for nothing. Its mode of escaping from us, however, being very subtle and silent, we are exceedingly apt, because we do not feel it passing out of our hands like so much told coin, to forget that we are parting with it at all; and thus, from mere heedlessness, the precious possession is allowed to flow away as if it were a thing of no value. The first and principal rule, therefore, in regard to the economizing and right employment of time, is to habituate ourselves to watch it. Alfred knew this well; and he adopted a method of his own to measure the passing hours, in his want of those more artificial time-pieces which we possess. Having made his chaplains, as Asser in his simple narrative informs us, procure the necessary quantity of wax, he ordered six candles to be prepared, each of twelve inches long, which he had found would together burn for four and twenty hours. Having marked the inches on them, therefore, he ordered that they should be lighted in succession, and each three inches that were consumed he considered as recording the flight of an hour. "But finding," continues his biographer, "that the candles burned away more quickly at one time than at another, on account of the rushing violence of the winds, which sometimes would blow night and day without intermission through the doors and windows, the numerous chinks in the walls, or the slender covering of the tents, he bethought him how he might prevent this inconvenience; and, having contrived artfully and wisely, he ordered that a lanthorn should be fairly fashioned of wood and horn; for white horn, when scraped thin, allows the light to pass through even like glass. The candle, therefore, being placed in the lanthorn, thus wonderfully constructed, as we have said, of wood and horn, was both protected from the wind, and shone during the night as luminously without as within." Every heart will acknowledge that there is something not a little interesting, and even touching, in these

homely details, which paint to us so graphically the poor accommodations of every kind in the midst of which Alfred had to pursue his studies, and the humble matters with which his great mind was often obliged to occupy itself in contriving the means of gratifying its noble aspirations. This illustrious man, indeed, seems almost to have lifted himself quite above the tyranny of circumstances; realizing, in the most disadvantageous, nearly all that could be expected or desired in the most favourable. The difficulties with which he had to contend, in truth, formed the very soil out of which no small portion of his greatness grew. Among kings he is not only the Great, but the very greatest. If we look merely to his zeal and services in behalf of literature, it is impossible to name any royal personage that can be compared with him either in classic antiquity or in modern times. A genuine love for letters, and a proficiency in them, in the possessor of a throne, is worthy of our admiration, in whatever age or country the phenomenon may be recorded to have been witnessed; because it must always be considered as a striking example of a triumph over seductions that are generally, of all others, found the most difficult to resist, and have, accordingly, been of all others the most seldom resisted. But of the other learned kings of whom we read in history, some were literary in a literary age; others, naturally unfitted for the more active duties of their station, took to philosophy, or pedantry, as a refuge from insignificance; some had caught the love and the habit of study before they had mounted a throne, or had dreamed of mounting one; above all, most, if not all of them, had been carefully educated and trained to letters in their youth. But it is told only of Alfred, that, without an example to look to, without even the advantages of the very scantiest education, in an unlearned age, and a still more unlearned country, he, who had been only a soldier from his youth upwards, withdrew himself of his own accord from the rude and merely sensual enjoyments of all his predecessors and all his contemporaries, to devote himself to intellectual pursuits, and to seek to intertwine with the martial laurels that already bound his brow, the more honourable wreath of literary distinction.

Of the royal personages of our own country who have distinguished themselves by their love and cultivation of letters, the most eminent, next to Alfred, is JAMES I. of Scotland, whose poem, entitled the "King's Quhair," composed by him during his imprisonment in Windsor Castle, we have already mentioned. James was born in 1394, but, having been captured at sea on his way to France, by a vessel of the king of England, in 1405, was detained in that country, for the greater part of the time in close confinement, till his thirtieth year; after which, having been allowed to return to Scotland, he reigned for thirteen years, and was at last cruelly assassinated in the Carthusian monastery at Perth, on the 20th of February, 1437, by a faction of his nobles, whom his attempted

reforms dissatisfied. Literature had been the principal solace of James's long imprisonment, and he brought with him to the throne the tastes which he had acquired in his exile. He certainly contributed very essentially, even during his short reign, to promote the civilization of his native country. Nothing can exceed the warmth of the admiration with which all the old historians speak of his genius and accomplishments, and of the effect which his example had in diffusing among his people that spirit of literary cultivation, and love for all elegant and intellectual accomplishments, by which he was himself distinguished. He was a proficient, we are told, in the Latin language, and, some authorities add, even in the Greek, although this last statement must be regarded as apocryphal, all things considered. His mastery over his native tongue was, at all events, his most remarkable endowment. The songs and other metrical pieces which he composed in the Scottish dialect, though now probably all lost, are said to have long continued to be the delight of all classes of his countrymen; and to their influence we are, in all probability, to trace much of that universal sensibility to poetry which has ever since distinguished the Scottish peasantry, and which has displayed itself in the creation of a body of traditionary verse of wonderful extent and richness. Give me, some one has said, the making of a people's ballads, and I care not who has the making of their laws. If the opinion conveyed in this remark be correct, James I. perhaps influenced the character of his countrymen quite as much as any of their legislators. Some authorities also claim for this prince the honour of being the father of the peculiar music of his country. He is recorded by our old chroniclers to have been eminently skilled both in vocal and instrumental music, and to have performed on no less than eight different instruments, the harp being the one on which he most excelled. At any rate, from the time of James we may date the proper commencement of the literature of Scotland, to which, indeed, he seems to have also given not a little of the peculiar character that long distinguished it. His own writings, as has been stated, were poetical compositions, in the style that had been so recently introduced by Chaucer, whom, in his "Quhair," he expressly mentions as his master. The "Quhair" is an elegant poem, displaying considerable descriptive talent; but the tradition respecting some of James's more popular poetical compositions is that they evinced powers of humour of the very highest order. Before his day, Fordun had written, in Latin prose, his Chronicle of Scottish kings, and Barbour his metrical work in the vernacular tongue entitled "The Bruce;" but these, notwithstanding some passages of vivid description in the latter, which certainly give its author considerable pre-eminence among the class to which he belongs, were merely such works as have been produced among every people having the use of letters, as soon as they have acquired for themselves what may be called

a history ; and indicate not so much that a national literature has taken root among them, as simply that they have reached a certain antiquity, and have a past national existence to look back upon. That which alone we can properly call the authorship of Scotland commences with the works of King James, and is continued by those of Dunbar, Gavin Douglas, and Sir David Lyndsay, who may all in some sort be considered as his imitators, or at least as having, like himself, taken their inspiration from that new-born poetry of England with which he, there can be little doubt, was the first to make his countrymen acquainted.

Few kings, therefore, in spite of the failure of many of his projected political reforms, have done more for their subjects than James did for his. He regenerated them by means more powerful than any merely political contrivances, when he exhibited before them for the first time the graces and attractions of intellectual cultivation, and gradually seduced them by the charm of his example to the love of the arts and elegancies of civilized life. Laws and institutions are, after all, in themselves, but the dead skeleton of society, and can only derive their life and efficiency from the spirit breathed into them by the character and moral condition of the people. They are the body ; this is the animating soul. In giving, therefore, to his countrymen the first impulses of literary refinement, he gave them something better even than good laws, because it was that which, while it would eventually enable them to secure good laws for themselves, at the same time could alone fit them for their enjoyment. His life, not less than his death, was a sacrifice to his zeal for their improvement ; for, with tastes and habits that tended to separate him so completely from his subjects, his residence, even as a king, in Scotland must have been felt by him as far more truly exile than even his previous imprisonment. Yet we have no reason to think that, although his days were spent first in durance abroad, and then in worse than durance at home, he ever indulged in any weak or undutiful murmuring at his fate. On the contrary, we gather from all that is related of him, that, during the short period of his life when he was permitted to mix with the world, he showed himself of a cheerful and even joyous spirit, and found the means of making himself happy even in the midst of the hardest fortune that was dealt out to him. With his intellectual endowments and his love of letters, he had sources of happiness which few in his station have ever enjoyed, and these were blessings which the vicissitudes of outward fortune had but little power to affect.

We might add several other names to the list of learned kings, even from the monarchs of our own country. HENRY I., in the early part of the twelfth century, obtained the surname of *Beauclerc*, or the Learned, from his proficiency in the literature of the times. During the sixteenth century, classical and theological erudition was so much in fashion, that persons of the very highest rank, and of both sexes, very generally

received what is called a learned education. It is related of the emperor Charles V., that, having been upon one occasion addressed by an ambassador in a Latin oration, he was so much affected at finding himself unable perfectly to follow the speaker, that he publicly reproached himself for his inattention, when a boy, to the instructions of his tutor, who afterwards became Pope, under the title of Adrian VI. (*see* page 177), who, he remarked had often warned him, that a day would come when he would regret his negligence. So universally in those days was this sort of learning expected in crowned heads. Accordingly, we find almost all our sovereigns of that age proficient in the ancient languages, and adepts in polemical divinity.



EDWARD VI.

Henry VIII. disputed, through the press, with Luther, in Latin. His son, Edward VI., had he lived, would probably have given proofs of still greater accomplishments in the same department of scholar-

ship. One of his tutors was Sir John Cheke, of whom Milton speaks, in a well-known sonnet, as having taught "Cambridge, and King Edward, Greek;" and it is a curious illustration of the times, that this learned individual was soon after selected to fill the office of Secretary of State. Queen ELIZABETH, we need hardly remark, is famous as a learned princess. She also, like her royal predecessor, King Alfred, completed an English translation of Boethius's "Consolations of Philosophy"—a work which, in addition to having been thus rendered into



ELIZABETH.

the vernacular tongue by two of the greatest of our monarchs, had the honour of receiving the same service from Chaucer, the father of our poetry.* Elizabeth's successor, JAMES, had more learning than good sense, and was a pedant rather than a scholar; but with less learning, he certainly would not have been a wiser king. He is the instance,

* The original copy of Queen Elizabeth's translation of Boethius, partly in her majesty's handwriting, and partly in that of her

secretary, was discovered some years ago, in the State-Paper Office.

however, that has perhaps contributed more than any other to confirm the common prejudice, that a taste for letters is, after all, no very desirable quality in the possessor of a throne. If it be meant that literary kings have generally been bad kings, the notion is certainly not borne out by the facts of history. It may be asserted with much greater truth that, in all of those who, notwithstanding their scholarship, have shown themselves unworthy of their high station, that scholarship has yet been a redeeming quality, both in itself, and in its effects. If, again, all that is meant be only that learning has some tendency to become pedantic on a throne, this may be admitted; for it is a natural consequence of the possession being so unusual: but even this result, where it has happened, has, in by far the majority of cases, formed but a very trifling drawback upon the good with which it was connected. James, certainly, has not gained much credit to his name by his authorship; though it deserves to be remarked, that it is posterity that has been least indulgent to his pretensions. In his own day his learning procured him great admiration, not only from the mere courtly flatterers of the time, but from many of its most distinguished scholars—for evidence of which, we need go no further than to the dedication of their work addressed to him by the authors of our admirable translation of the Bible, and still commonly printed at its head. The natural character of the man, the species and quality of the learning which he had acquired, and, above all, the spirit of the age, had more share in making James the pedant that he was, than any disadvantage under which his station placed him.

Another name, which is sometime quoted as that of a king to whom learning was a misfortune rather than a blessing, is that of the celebrated ALPHONSO X., king of Castile and Leon, commonly called the *Wise*. This prince, who lived in the thirteenth century, was certainly unlucky in his schemes of political ambition; and the vain attempt he made to obtain possession of the imperial crown involved him in a series of calamities, and eventually led to his dethronement. But it does not appear that his literary and scientific acquirements, so extraordinary for his age, had anything to do in occasioning the errors to which he owed his ruin, or that, with less learning, he would have been either more prudent, or more fortunate. As it was, Alphonso, notwithstanding the troubles in which his reign was passed, conferred such services, both upon his own country and upon the world at large, as few royal names have to boast of. Spain owes to him, not only her earliest national history and translation of the Scriptures, but the restoration of her principal University, the introduction of the vernacular tongue in public proceedings and documents, and the promulgation of an admirable code of laws; and science is indebted to this monarch for the celebrated astronomical tables known by his name, the earliest which were compiled subsequently to those given in the "*Almagest*" of Ptolemy, who flourished in

the second century. According to some accounts, Alphonso spent the large sum of 400,000 crowns on the preparation of these tables, in which he was assisted by others of the most learned astronomers of the time. They went through several editions, even after the invention of printing, and continued, indeed, to be generally used by astronomers till the commencement of the sixteenth century.

CHAPTER XXV.

PETER THE GREAT, CZAR OF RUSSIA.

BUT the Pursuit of Knowledge is not necessarily confined to the study of books; and, therefore, although we pass over many other names that might be here introduced, we must not omit that of a sovereign who distinguished himself by his ardour in this pursuit in a variety of ways, and was in all respects one of the most extraordinary men that ever lived—the Czar PETER I. of Russia.

Peter was born in 1672, and at ten years of age found himself in nominal possession of the throne; although, for some time, all the actual power of the state remained in the hands of his sister, the Princess Sophia, who was about five years older than himself. But his boyhood was scarcely expired, when he gave proof of the energy of his character by ridding himself of this domination; and in 1689 the princess was already removed from the government, and immured in a monastery. From this moment the young Czar, now absolute in reality as well as in name, directed his whole efforts to the most extraordinary enterprise in which a sovereign ever engaged; being nothing less than to change entirely the most settled habits and prejudices of his subjects, and not so much to reform them, as to transform them, almost by main force, from barbarians into a civilized people. For the Russians at this time—not much more than a century and a half ago—were, in truth, little better than a nation of savages. Nay, Peter himself was born and reared a savage; and to his last days the passions and propensities of his original condition remained strong in his nature. It speaks the more for his wonderful genius that, throughout his whole history, he forces us to feel that we are reading the adventures of the chief of a barbarous country, struggling to civilize himself as well as his people. And, undoubtedly, we do not follow his progress with the less interest on that account. Nothing, in fact, in his proceedings or his character so much engages our curiosity, as to watch the astonishment with which his own ignorance was struck, on the first view of those arts of civilized life

which he was so anxious to introduce among his less ambitious, but hardly more ignorant, subjects. It is exactly the case of a strong-minded and enterprising leader of some tribe of wild Americans or South Sea islanders, setting out to see with his own eyes the wonders of those distant lands of which his white visitors have told him, and, after all, viewing the scenes which civilization presents to him with an intoxication of surprise, which shows how imperfectly even his excited fancy had anticipated their actual nature.

But, however he was at first struck with what he beheld, Peter did not continue long lost in mere amazement. The story which is told of the occasion which awakened him to the ambition of creating a Russian navy is very illustrative of his character. While looking about one day among some old stores and other neglected effects, he chanced to cast his eye upon the hulk of a small English sloop, with its sailing tackle, lying among the rest of the lumber, and fast going to decay. This vessel had been imported many years before by his father, Alexis Michelovitch, also a prince of distinguished talents, and one who had nourished many schemes for the regeneration of his country; but it had long been forgotten by everybody, as well as the object which it was designed to promote. No sooner, however, was it observed by Peter than it fixed his attention. He made inquiries of some of the foreigners by whom he was surrounded as to the use of the mast and sails, even the general purposes of which he did not know; and the explanations which he received made him look on the old hulk with new interest. It immediately became, in his imagination, the germ of a magnificent national marine; and he could take no rest till he had made arrangements for having it repaired and set afloat. With some difficulty the Dutch pilot was found out whom Alexis had procured at the same time with the sloop to teach his subjects the method of managing it; the man, like the vessel of which he was to have the charge, had long been forgotten by all the world. Once more, however, brought out of his obscurity, he soon refitted the sloop; and the Czar was gratified beyond measure by at length beholding it, with its mast replaced and its sails in order, moving on its proper element. Delighted as he was, he went himself on board, and was not long before he became a sufficiently expert seaman to take the place of his Dutch pilot. For several years after this his chief attention was given to maritime affairs; although his first ships were all of foreign construction, and it was a considerable time before any issued from his own docks. From so small a beginning as has been described, Russia has since become one of the great naval powers of the world.*

* The most detailed version we have met with of the story told in the text, is one preserved among the MSS. of Sir Hans Sloane,

in the British Museum (No. 3168). It appears to have been written shortly after the death of Peter the Great, and by a person who

But the most extraordinary of the plans which Peter adopted in order to obtain an acquaintance with the arts of civilized life, was that which he put in execution in 1697, when he set out in the suite of his own ambassador to visit the other countries of Europe. On this occasion, passing through Prussia, he directed his course to Holland, and at last arrived at the city of Amsterdam. His embassy was here received by the government of the United Provinces with all manner of honour and distinction; but he himself refused to be recognized in any other character than that of a private individual. The first days of his visit were spent in perambulating the different streets of the city, the various wonders of which were probably never viewed by any eye with more astonishment and gratification than they excited in this illustrious stranger. The whole scene was nearly as new to him, and as much beyond anything by which he had ever before been surrounded, as if he had come from another world. The different arts and trades which he saw exercised, and the productions of which met him, wherever he turned, in such surprising profusion, were all attentively examined. But what especially attracted his attention was the great East India dockyard in the village of Saardam (situated a few miles from Amsterdam), which was then the principal establishment of this description in Holland. Here he actually took the singular resolution of entering himself as a working carpenter; and, accordingly, giving in to the superintendent the simple name of *Peter Michaelof*,* he took his place among the other workmen, and became in all respects one of them, even wearing the same dress, eating the same sort of food, and inhabiting equally humble lodgings. The hut in which he lived is still shown at Saardam. When he first made his appearance in the dockyard nobody knew who he was, and he of course attracted no notice; but, even after his true quality was discovered, he would suffer none of the observances usual to persons of his rank to be paid to him, repelling every attempt of the

was either a native of Russia, or had resided in that country. According to this authority, the incident took place in the flax-yard, at Ishmaeloff, an old seat of the royal family, near Moscow. The writer gives us also an account of a great naval show, at which he himself was present, in honour of this celebrated vessel, which took place, by the emperor's command, at St. Petersburg, on the 12th of August, 1723. On this occasion, the sloop, or ship's boat, as it is here called, having been repaired and beautified, was received by about 200 yachts, and, having advanced to the harbour, attended by that numerous convoy, was then saluted by a general volley from the twenty-two men-of-war, which might be considered as forming its progeny. The emperor, of course, was present, and the day was, altogether, one of the greatest festivals that

had been known in Petersburg. "A few days after," it is added, "the boat was brought to Petersburg, and laid up in the castle, where she is to be taken the greatest care of."

* That is, Peter, the grandson of Michael, according to the manner of forming the surname in Russia among the lower orders. His majesty's proper designation was Peter Alexovitch, or, the son of Alexis *of*, or *ow*, as it is pronounced, and often written, seems to be the same with the Celtic *O*, still used as a prefix to proper names in Ireland, and the Scottish *oe* or *oy*, which generally signifies a grandchild, but in some districts a nephew, having been applied originally, in all probability, to any near descendant, direct or collateral. *Vitch*, again, is the Norman, or old French, *Fitz*, now *Fils*, a son.

kind with evident displeasure. And in this way of life he passed several months, during which time he bore a considerable part in the building of a vessel, which, when completed, was named the *St. Peter*, and was purchased by the royal person whose hands had thus helped to put its timbers together. But, while thus employed, the Czar did not neglect his duties and appropriate occupations as a sovereign. After the labours of the day were over, his evenings were generally employed either in writing despatches to the ministers whom he had left in charge of affairs at home; or in holding consultations with his ambassador regarding the negotiation pending with the Dutch government, in which he took the most anxious interest, as having for its object the procuring of a supply of vessels and seamen from that power to aid his favourite scheme of forming a navy for Russia. In this application, however, he was unsuccessful.

On leaving Holland, Peter proceeded to England in a vessel sent to convey him by the government. But on his arrival in London he insisted upon still being treated only as a private individual. Here he spent his time at first as he had done in Holland, examining the many interesting objects that everywhere met his view. Among other places he went to see the Tower, where he was much delighted with the armoury, and the coining of money in the Mint. He was taken also to see the two Houses of Parliament when sitting; and he appeared twice or thrice at the play, but did not seem to have much relish for that species of amusement. He was very fond, however, of visiting the churches; and was so anxious to learn the mode of worship observed by the different denominations of Dissenters, that he attended several of their chapels. On one occasion he was present at a Quakers' meeting. He paid one visit to Oxford, to see the University; and another to Portsmouth, where he was greatly entertained by a mock sea-fight that was exhibited to him. On this occasion he declared that he considered an English admiral a happier man than a Czar of Muscovy.* He also applied himself with zeal and diligence to learn whatever he deemed useful, without regarding the humble nature of any of the handicrafts in which he wished to become a proficient. With these views he did not scruple to work as a common labourer in paper-mills, saw-mills, rope-yards, and other establishments of a similar kind. Voltaire mentions, "*Histoire de Russie*," i. 159, that he studied with particular attention the art of watchmaking. His first residence was a house appointed for his reception by government below York buildings, in the neighbourhood of Westminster bridge; but he found this both a very noisy place of abode and not conveniently situated for the object on account of which principally he had come to England—his improvement in the art of ship-building. After a short time, therefore, he removed to Deptford; and here he

* Motley's "*Life of Peter the Great.*"

spent several months in the dockyard, employing himself in the same manner as he had done in that of Saardam. He was so much pleased, it is said, with the superior method of working which he found pursued here, that he used to declare that he never should have known his trade had he not come to England. While at Deptford he lodged in the house of the celebrated John Evelyn, author of the "*Sylva*," which stood on the site now occupied by the workhouse of the parish of St. Nicholas. The circumstance is noticed in Evelyn's Diary, under the date of 30th January, 1698: "The Czar of Muscovy being come to England, and having a mind to see the building of ships, hired my house at Say's Court, and made it his court and palace, new furnished for him by the king." He remained here till the 21st of April. Some notion of his manner of living may be obtained from a letter written during this time to Evelyn by his servant: "There is a house full of people, and right nasty. The Czar lies next your library, and dines in the parlour next your study. He dines at ten o'clock and six at night, is very seldom at home a whole day, very often in the king's yard or by water, dressed in several dresses. The king is expected there this day; the best parlour is pretty clean for him to be entertained in. The king pays for all he has." (Bray's "*Memoirs of Evelyn*," ii. 60.)

While the dockyard, however, was the place in which the Czar spent the greater part of the day, he employed many of his leisure hours in taking lessons in mathematics, navigation, and even anatomy, which he had begun to study while in Holland under the instruction of the eminent professor Frederick Ruysch, whose museum he afterwards purchased for the sum of thirty thousand florins. Peter, indeed, neglected no opportunity during his travels, of forming the acquaintance of distinguished individuals; and both in Holland and England many of the ablest men of the time were introduced to him, some of whom he persuaded to accompany him home to Russia. He also expended considerable sums in purchasing such curious productions of art as he conceived might best excite the emulation of his subjects.

Among other persons who were made known to him when in England was Bishop Burnet, who does not seem, however, to have quite comprehended the character of the extraordinary man with whom he was on this occasion brought into contact. In the "*History of his Own Time*" he tells us the impression the Czar made upon him: "He wants not capacity," he says, "and has a larger measure of knowledge than might be expected from his education, which was very indifferent;" but immediately after he adds that he "seems designed by nature rather to be a ship-carpenter than a prince." He did not at that time appear to the bishop to be capable of conducting so great a design as the attack upon the Turkish empire, which he was understood to be meditating; although it is acknowledged that he afterwards displayed a greater

genius for warlike operations than the writer then imagined him to possess. Burnet had a good deal of conversation with him upon religious matters, and remarks that "he was desirous to understand our doctrine, but he did not seem disposed to mend matters in Muscovy." He allows however, that he was "resolved to encourage learning, and to polish his people by sending some of them to travel in other countries, and to draw strangers to come and live among them." The learned prelate concludes his account by the following curious reflection: "After I had seen him often, and had conversed much with him, I could not but adore the depth of the providence of God, that had raised up such a furious man to so absolute an authority over so great a part of the world."

We cannot enter into any detail of the various reforms in the customs of his people, which this extraordinary man proceeded to introduce on his return to his own dominions, with the view of assimilating them more to those which he had found prevailing in the other countries of Europe. Suffice it to say, that, by a series of the most energetic and frequently violent measures, he succeeded in effecting a complete change in some of the oldest institutions of his empire, and even commenced a revolution in the habits and manners of general society, which, from that beginning, has since gone on till it has established, in what was before almost a barbarous country, all the benefits of a flourishing civilization. Peter may be said, indeed, to have given to his subjects nearly every art of civilized life of which they are now in possession. He taught them navigation, commerce, and even agriculture and the management of flocks, having imported from Saxony and Silesia both herds of sheep and shepherds to take care of them. He called to him artists of all descriptions from other countries, and employed them in contriving each in his appropriate department, how best to bring into development the natural resources of the country. He built a new capital, the first truly European city that had been seen in Russia, on a site which did not form part of the empire at his accession. Finally, he founded schools, academies, colleges, libraries, and museums, and thus laid the surest of all foundations for the permanent and progressive improvement of his people.

A college of physicians, a dispensary, an observatory, and a botanical garden, were among the establishments with which he adorned his two capitals.* The art of printing had been introduced into Russia about the middle of the sixteenth century; but this early press seems to have hardly left any trace of its operations, and Peter, at his accession, found his country without books. To supply this deficiency, he had some scientific works translated into Russian; and, when he was in Amsterdam, he employed a printer of that city to print them, giving him a

* *Eloge de Pierre le Grand, par Fontenelle.*

monopoly for the sale of them in Russia. His majesty himself, some time after this, remodelled the alphabet of his native language, considerably simplifying the forms of the characters, and established several printing-houses in Petersburg, at which various elementary works were thrown off, mostly translated from foreign tongues. From this beginning the literature of Russia has so much increased, that in M. Sopikof's "Essai de Bibliographie Russe," no fewer than thirteen thousand two hundred and forty-nine works are enumerated as having appeared in the native language up to the year 1813. In the three years from 1822 to 1824 inclusive, there appeared two hundred and seventy-five translations from French, German, English, Greek, Latin, Italian, Slavonic, Dutch, Danish, and Armenian, and five hundred and fifty-eight original works; in all eight hundred and thirty-three publications, besides works in foreign languages.*

In 1717, the Czar set out on a second foreign tour, attended on this occasion as became his rank. In the course of his progress he visited successively Hamburg, Berlin, Amsterdam, and Paris; in the last of which cities especially, he found all that the arts had yet contrived for the use and enjoyment of man, in the highest state of advancement. He no longer now applied his hand to the practice of the different crafts which he inspected; his days of apprenticeship were over; but he was not on that account less diligent in visiting every workshop and manufactory in which anything novel or curious was to be seen. He went also to see the observatory, the libraries, and the different learned institutions; and was present at a sitting of the Academy of Sciences, which admitted him one of its members.

This great man's education in his youth had been worse than neglected. His sister and her counsellors had even surrounded him with every seduction most calculated to deprave both his moral and intellectual nature, and to stifle in him the desire of knowledge. The bad parts of his character were, undoubtedly, in a great measure, the result of the manner in which he was treated at this time of his life. Yet, violent and ungovernable as his passions continued to be, in some respects, to the last, making him act often with a ferocity unsurpassed by anything that is told of the excesses of infuriated savages, he succeeded in completely overcoming that one of his evil habits which he found would have interfered most with the conduct of his great schemes. In his youth he was a slave to the love of ardent spirits; but he had weaned himself entirely, in his maturer days, from that destructive vice. Nor was he insensible to the other defects of his original character which he had failed to correct. "Alas!" he would sometimes exclaim, on recovering from one of those paroxysms of rage by which he was liable to be

* These particulars are extracted from the "Aperçu sur la Littérature Russe," at the end of M. Balbi's "Introduction à l'Atlas Ethnographique."

carried away, "I have reformed my people, but have not been able to reform myself." Perhaps, however, no man in any station ever did more than this illustrious monarch to repair the mischievous consequences of a neglected youth, as far as intellectual acquirements are concerned. In addition to a competent knowledge of mathematics, mechanics, navigation, medicine, and anatomy, he appears to have made himself master of more than one of the modern languages of Europe. He translated several works from the French, the manuscripts of which are still preserved at Petersburg. He had even made himself familiar with the Latin tongue, if we are to believe one anecdote told by M. Stählin, of his detection, upon one occasion, of the inaccuracies of a monk whom he had employed to translate a work written in that language into Russian. But as the original of the work in question, "Puffendorff's Introduction to the History of Europe," is in fact not in Latin, but in German, it is probable that it was by his acquaintance with the latter tongue, or with the French, into which the book had also been translated, that Peter was enabled to discover the defects of the Russian version. M. Stählin tells another anecdote, which shows how fully his majesty understood the value of that early instruction which he had not himself enjoyed. Finding two of his daughters one day reading a French author, he desired one of them to translate the passage before her into Russian,—when, struck with the facility with which the task was performed, he exclaimed, "Ah, my children, how happy are you, who are thus taught to read in your youth, and enjoy all the advantages of an education which I totally wanted!" He used often to say that he would willingly have lost one of his fingers to have had a good education in his youth.

When he began at last to educate himself, he did not neglect even the more elegant and ornamental acquirements. During his first visit to Holland, he had an opportunity of seeing many good pictures; and this gave him a taste for painting, to which he was ever afterwards much devoted. Even while at Amsterdam, many of his hours were spent in the working-rooms of the eminent artists who then resided in that city, some of whom he engaged to accompany him to Russia. He afterwards expended very considerable sums in the purchase both of pictures and sculptures; and commenced the formation of a gallery of these works of art at Petersburg. He also formed a valuable collection of medals. Every department of liberal knowledge, indeed, found in Peter a munificent patron, and, so far as his leisure and opportunities permitted, even an ardent cultivator. When passing through any country interesting from its historical recollections, were he even conducting his army on a warlike expedition, he would go many miles out of his way to examine a celebrated ruin, or to tread a spot that fame had consecrated. In the same spirit, he was especially solicitous for the preservation of the old

historic memorials of his own country. While travelling, his constant habit was to obtain as much information as he could beforehand with regard to every place he was about to visit; and, even when he approached the smallest village, he would inquire if it contained anything remarkable. If those about him told him it did not, he would reply "Who knows? If it be not so to you, perhaps it is to me; let me see all." When setting out on his investigations, on such occasions, he carried his tablets in his hand; and whatever he deemed worthy of remembrance was carefully noted down. He would often even leave his carriage, if he saw the country people at work by the wayside as he passed along, and not only enter into conversation with them on agricultural affairs, but accompany them to their houses, examine their furniture, and take drawings of their implements of husbandry. He obtained in this manner much minute and correct knowledge, which he could scarcely have acquired by any other means, and which he afterwards turned to admirable profit in the improvement of his own country.

M. Stählin, whose notices are in general well authenticated, and may be depended on except where it is likely that his authority was deceived, relates some curious anecdotes in illustration of the Czar's predilection for operations in surgery, which show at least that he had made no inconsiderable proficiency in the art. He was rarely absent when a dissection took place in Petersburg; and occasionally he assisted as one of the operators. He let blood and extracted teeth with great expertness; and he is recorded to have once tapped a patient for dropsy. These may not seem the most appropriate accomplishments for a king; but we must remember the peculiar circumstances of Russia during the reign of this great author of her civilization. On the one hand, the simplicity of the national manners was such, that it was not held at all indecorous for the emperor to mix in the domestic circles of his subjects, almost as one of themselves; and, on the other, the prejudices of the people were so strong, and their aversion to innovation so bigoted, that probably nothing less than the actual example of their sovereign would have roused them to take any interest in the new arts he wished to introduce among them. Peter, therefore, rightly felt that the consideration of the undignified nature of some of the occupations in which he engaged, was far more than overbalanced by the advantages that his personal exertions gave him, in overcoming the inertness and positive opposition, on the part of his countrymen, which his reforms had to encounter.

This must be his apology also (if the case shall be thought to require any) for certain other labours to which he was sometimes wont to apply his hand. He once passed a month, M. Stählin tells us, at Müller's ironworks at Istia, about seventy miles from Moscow, during which

time he employed himself in learning the business of a blacksmith; and so much progress did he make, that on one of the last days of his stay he forged, with his own hand, 720 pounds of iron, making his mark on each bar. On his return to Moscow he proceeded to Müller's house, and, having received from that gentleman the same pay for his labour which would have been allowed to any other workman, about two shillings of our money, he immediately went and purchased a pair of shoes with it, which he ever afterwards took great pleasure in showing. One of the bars he forged on this occasion is still to be seen at Istia. He was also accustomed, according to Voltaire, "*Histoire de Russie*," ii. 186, to take his place sometimes among the men employed in cutting *cahals*, a species of public labour on which he expended large sums, in order to encourage and animate them in the more difficult part of their work. But his favourite art was that of ship-building, his lessons in which, learned in Holland and England, he took care not to forget on his return home. The writer of the manuscript narrative in the British Museum, to which we have referred in a note on a former page, gives us some curious information in relation to this matter. The Czar, he tells us, as soon as he got back from England, went down to Veronez, whither he carried two English builders, named Dean and Noy, whom he had brought out with him. Of these, however, "the first," the narrative continues, "soon after desired a discharge, which was granted, without giving any proof of his art. The Czar himself and Joseph Noy received orders from the Lord High Admiral, Theodore Alexowitz Golovin, to build each of them a man-of-war. The Czar, having taken upon himself the title of a master ship-builder, was pleased to subject himself to the condition of that character; and, in compliance with that order, gave the first proof of his skill in the art which he had learned abroad; and continued afterwards to bear that title, and had, at all times, notwithstanding his great engagements in many other affairs, one ship upon the stocks; and at his death left one ship half built, one of the largest in Europe, 180 feet long upon the deck, 51 broad, and 21 deep, and mounts 110 guns, and is by relation one of the finest bodies that has ever been seen; as were, indeed, all the rest he built. He himself drew the draught of this great ship at Riga, where was no master ship-builder but himself; and, when he returned to Petersburg, he gave the surveyor an account that he had drawn his draught of the great ship which he had orders to build from the surveyor's office, and, according to the regulations of the navy, presented his draught to be examined."

The emperor, this writer adds, collected the results of his experience and reading upon the subject of shipbuilding, and formed them into a regular treatise on the art. This work, however, has not been published, although it is probably preserved, with the other literary productions of the writer, in the Imperial Library at Petersburg. The only work

from the hand of Peter the Great which has been printed is his Journal from 1698 to the Peace of Neustadt in 1721. Of this document, which is almost entirely occupied with military transactions, a French translation by M. Formey was published at Berlin in 1773, in one volume quarto.

Peter died in 1725, in the fifty-third year of his age. His history presents us with, perhaps, as remarkable a case of the conquest of difficulties in the pursuit of knowledge as it would be possible to quote. In his noble resolution to educate not only himself but his country, he had to contend with obstacles at every step, which nothing could have overcome but that determination to succeed which overcomes all things. Few monarchs have better deserved the epithet of Great, if he is to be appreciated either by the great powers of mind he displayed, or the great effects he accomplished. And of these last it is to be remarked that none have passed away; all have been permanent and productive. Compare Peter the Great, in this respect, with many other characters who during their time have filled the earth with the noise of their exploits; and how high must he be placed above them! Alexander's mighty empire fell to pieces as soon as his own hand had resigned its sceptre; so did that of Charlemagne; so did that of Buonaparte. These all, after moving everything, established almost nothing. But whatever the Russian planted still grows and flourishes, and bears fruit more plentifully every year. The reason is, that, while other builders up of empires have trusted, for the support of their institutions, alone or chiefly, to the sword, he based his on the moral strength of knowledge and civilization.

CHAPTER XXVI.

ADVANTAGES OF WEALTH IN THE PURSUIT OF KNOWLEDGE:—NAPIER.

NOTWITHSTANDING the honourable reputation which the princes we have named, and others whom we have not room to notice, have acquired by their devotion to intellectual pursuits, it must be admitted that science and literature have been much more indebted to the example and patronage, than to the actual performances, of the royal personages who are to be counted among their friends. No great discovery or immortal composition claims a king as its author. When the genius that might have accomplished such has been found on a throne, it has been otherwise occupied than with the quiet but divine pleasures of learning and philosophy. And, doubtless, this is only as it should be. Men have not crowns put upon their heads that they may write books or spend their lives in constructing philosophical theories. Every station has its

peculiar duties, which must first be attended to, even before the pursuit of knowledge; and those of sovereigns are sufficiently arduous to make it impossible, when they are fully performed, that this pursuit can be anything more than the avocation of their leisure. To this extent only, therefore, it is desirable that they should devote themselves to it. But, if so, it cannot be expected that this class of persons should contribute many, or even any, names of first-rate distinction to the history of literature or science. It were not fitting, indeed, that the same individual should have supremacy at once in two worlds so entirely different and unconnected as that of political dignity and that of genius. All, therefore, we repeat, that philosophy and the arts usually have to ask of kings is, their protection and countenance, and an example which may at least evidence an attachment to intellectual pursuits, even while duties of another sort demand their chief attention. Whether letters, generally speaking, flourish best with or without the patronage of courts, we do not here stop to inquire. It is, at all events, certain, that in some cases the literary progress of a country has been greatly indebted to a love of literature in its sovereign. Thus it was that Alfred imported civilization into England, James I. into Scotland, and Peter the Great into Russia.

But other individuals in possession of wealth or rank are differently situated from kings. They have often no public duties to perform, or none from which they may not disengage themselves, in so far at least as they would interfere with the closest application to intellectual pursuits. In most countries, indeed, they are not called upon to take a part in the management of affairs, in ordinary circumstances, by any need that the state has of their services so much as by their own ambition for political distinction; and so numerous are almost always the competitors here, that an individual who chooses to withdraw from the throng will rarely have cause to reproach himself with having deserted a post which there are not a hundred others ready, and as well qualified, to occupy. We would neither condemn nor depreciate any path of honourable enterprise; doubtless it is the duty of every man, who believes that he can most benefit his country by his political services, to endeavour to do so. But this is at least an ambition by which many are apt to be seduced, who look rather to its glittering prizes than to their own qualifications; and it is also undeniably one in which something else than merit often contributes to success. There can be no danger, therefore, of too many persons deserting politics for philosophy. There will always be a sufficient number of our men of wealth and rank to serve the state, and contend for her honours and her offices, although as many leave the crowd as the love of study and speculation can possibly withdraw.

But political ambition, in truth, is not the seduction by which persons

of this description are most apt to be enthralled. The besetting temptations attendant upon the possession of wealth and leisure (which, rightly employed, constitute such inestimable advantages) are the facilities which they afford to the indulgence of mere indolence and love of pleasure. A rich man, who can live without exertion of any kind, is apt to lose the power even of that degree of exertion which is necessary for the acquisition of knowledge. Besides, his money provides him with other enjoyments; and he often never even acquires a taste for those of an intellectual kind. A defective or misdirected education too frequently only prepares him the better for yielding to the unfortunate influences of his position; and the habits and prejudices of society come also to assist their force and confirm their dominion. When an individual thus circumstanced, therefore, betakes himself in good earnest to the pursuit of knowledge, he also is entitled to be regarded as one who has exhibited much energy of character, and conquered many difficulties, as well as he who has had to struggle with poverty, or an uncongenial occupation, in his attempts to obtain an acquaintance with books. The impediments which have lain in the way of the former are different from those that have beset the path of the latter; but they may not have been less difficult to overcome. The fact, at all events, is, that the temptations of wealth have often exerted as fatal an influence in repressing all ardour for intellectual pursuits as ever did the obstructions of indigence.

Yet, where the love of knowledge has taken full possession of the heart, the rich man is much more favourably situated than the poor man for the prosecution of great enterprises in science or literature, demanding as they do both leisure and ease of mind—two good things, of the first of which generally but little, and of the second often not much, are his who has to provide for his daily bread by his daily labour. Hence some of the greatest names, in all departments of philosophy and learning, are those of persons who, unembarrassed by the toils and cares of obtaining a subsistence, have been free to lead a life of contemplation, having purchased to themselves that inestimable privilege by a relinquishment of the other pleasures or objects of ambition ordinarily pursued by those in their situation, and seeking no other advantage from their riches or their competence, than that of being at liberty to devote their time and their powers of mind to labours of their own choosing. From the list of the illustrious of ancient times, we need mention no others, and we can mention no greater, than Plato and Archimedes—both of whom were of distinguished birth (the former being a descendant of the family of Solon, the other a near relation of King Hiero), and, there is every reason to suppose, opulent. But we pass from times so remote, that, even when the circumstances of the case are well ascertained, the changes that have taken place in everything detract from the

value of an example or illustration, in order to notice two or three of the more remarkable instances which belong to a state of society more nearly resembling our own.

The first name we shall mention is that of JOHN NAPIER—commonly called Lord Napier. He was not, however, a nobleman, but only what would in England be called a lord of a manor. Such persons in Scotland were formerly designated *barones minores*, or *lesser barons*; and to this class the Baron of Bradwardine belonged as well as Napier, who in like manner was Baron of Marchistown, or Merchiston,* an old seat of the family in the neighbourhood of Edinburgh. Here, or, according to other authorities, at Gartness in Stirlingshire (an estate which also belonged to the family), Napier was born, in the year 1550, at which time his father, who lived for fifty-eight years after this, could not have been older than sixteen. In 1562 he entered St. Salvator's College, St. Andrews, as appears by the books of the University.† At this time, of course, he was only twelve years old; but this was not an unusually early age in those days for going to College in Scotland. Many entered even younger; and, in the University of Glasgow, it was found necessary to make a law that no student should be admitted to the degree of bachelor of arts before the age of fifteen, unless upon good reason appearing to dispense with a year in any particular case. Napier's own language, therefore, is not inappropriate, when, in his treatise on the Apocalypse, published in 1593, he tells us that it is "no few years" since he began to "precogitate the same," being then, as he adds, in his "tender years and barneage (childhood) at St. Androes, at the schools."

On leaving College, Napier is understood to have set out on his travels, in the course of which he visited France, Italy, and Germany. It is not known when he returned home; but he was probably a considerable time abroad; since we hear little more of him till he was above forty years of age. On arriving again in his own country, although he had already acquired considerable reputation for abilities and learning, and might probably have entered upon a political career with many advantages, he declined engaging in public affairs, and retired to Merchiston, with the intention of devoting himself exclusively to study. A room in which he used to seclude himself for this purpose, at the top of the old tower of Merchiston, is still shown; and he is also said to have resided occasionally at Gartness, where he was looked upon by the

* Thus, on the title-page of his "*Mirifici Logarithmorum Canonis Descriptio*" (Edin. 1614), he calls himself "*Baro Merchistonii*." He was not, on this account, however, either "the Lord Marchiston," as he is described by Lilly, the astrologer, or "the Lord Napier," as he has been called by others. He was merely *laird* of Merchiston; a title which, although, of course, etymologically identical

with the English *lord*, is applied in Scotland to any landed proprietor.

† Lord Buchan, in his "*Life of Napier*" (Edin. 1788), conjectures that he did not go to College till 1566; and observes that the records of the University do not ascend higher than the beginning of the seventeenth century. They reach, in fact, to the year 1413, when the University was opened.

common people, we are told, as a wizard—a common fate of learned and studious men, down even to an age so recent as this, although Napier's is probably one of the latest names that acquired this species of celebrity. As an evidence that his renown for more than mortal knowledge was not confined to the simple peasantry of Stirlingshire, we may mention that there is preserved in the British Museum a small tract, printed in London, of which the following is the title: "A Bloody Almanack, foretelling many certaine predictions which shall come to pass this present yeare 1647; with a calculation concerning the time of the day of judgment, drawne out and published by that famous astrologer, the Lord Napier of Merchiston."

But the fact is, that, although Napier did not himself profess to be either necromancer or astrologer, he cannot be altogether acquitted of pretending to this very insight into futurity which is here attributed to him. The first publication which he gave to the world was an exposition of the Revelations, which appeared at Edinburgh in 1593, prefaced by a dedication to James VI., which is characterized by singular plainness of speech. "Verily and in truth," says the writer, "such is the injury of this our present time, against both the church of God and your majesty's true lieges, that religion is despised and justice utterly neglected; for, what by atheists, papists, and cold professors, the religion of God is mocked in all estates; again, for partiality, prolixity, dearth, and deceitfulness of laws, the poor perish, the proud triumph, and justice is nowhere to be found." He then beseeches his majesty to attend himself to these enormities, assuring him that, if he act justly to his subjects, "God will ministrare justice to him against all his enemies; and contrarily, if otherwise." In redressing the evils denounced, he goes on to exhort him to "begin at his own house, family, and court;" a step, the necessity of which he endeavours to impress upon him at considerable length, and with extraordinary intrepidity. There is not a word of flattery in the whole epistle. As for the work itself, it is of a similar character to many others that have been written upon the same mysterious subjects. The most important proposition which it professes to demonstrate is, that the end of the world is to take place some time between the years 1688 and 1700. It is a large and elaborate treatise, and is garnished occasionally with effusions in rhyme, sometimes original, and sometimes translated. Among other aids, the author presses the famous Sibylline Oracles into his service, ornamenting them with a metrical version and a commentary. This work appears to have attracted a great deal of attention on its first appearance, and to have retained its popularity for a considerable time. It did not, perhaps, cease to be generally remembered till the termination of the seventeenth century effectually refuted its conclusions. A fifth edition of it, we observe, appeared at Edinburgh in 1645, which was, perhaps, not the

last. It was translated into the French language, and published at Rochelle in 1602.*

Napier's mathematical studies, after all, however, probably did more to procure for him the reputation of being a magician than even these theological lucubrations. It was believed, it seems, that he was attended by a familiar spirit in the shape of a black cock. A curious anecdote, for the truth of which undoubted evidence exists, would even lead us to suppose that he was not himself averse to being thought in possession of certain powers or arts not shared by ordinary men. A document is still preserved, containing a contract which he entered into in July, 1594, with a brother baron, Logan of Restalrig, to the effect that, "forasmuch as there were old reports and appearances that a sum of money was hid within Logan's house of Fastcastle, John Napier should do his utmost diligence to search and seek out, and by all craft and ingine to find out the same, and by the grace of God shall either find out the same, or make it sure that no such thing has been there. For his reward he was to have the exact third of all that was found, and to be safely guarded by Logan back to Edinburgh with the same; and in case he should find nothing, after all trial and diligence taken, he refers the satisfaction of his travel and pains to the discretion of Logan."† This, it will be observed, is very cautiously expressed, and so as not distinctly to advance on Napier's part any claim to supernatural skill; but a person engaging in such negotiations could hardly be very much surprised, in that age, if he was held to be acquainted with more of the sciences than he chose to admit. The whole affair places before us a very curious picture of the times.

We do not know exactly when it was that Napier deserted theology for mathematics—having in this respect taken the opposite course to that followed long afterwards by the celebrated Count Swedenborg, who, having been all his previous life a mere man of science, began, when between fifty and sixty years of age, to see visions of the spiritual world, and to converse with angels. But the work upon the Apocalypse was, at any rate, the last of his theological publications. He is understood to have devoted his attention in subsequent years chiefly to astronomy, a science which, recently regenerated by Copernicus and Tycho Brahé, was then every day receiving new illustrations from the discoveries of Kepler and Galileo. The demonstrations, problems, and calculations of this science most commonly involve some one or more of the cases of trigonometry,

* Napier's book probably occasioned some controversy. There is a MS. in the British Museum, entitled "Porta Lucis, or the way to decipher the name, number, and mark of the Beast, by a method more rational, free, and unstrained than ever any hitherto; occasioned by the peremptore determination of the Lord Napier of Merchistoun, upon the

name *Λατρευος*." The only part of the promised treatise, however, which the MS. contains, is the Preface, in twelve and a half closely-written folio pages.

† "Douglas's Peerage," by Wood, ii. 291. This is the same Logan of Restalrig who figures in the famous Gowrie Conspiracy.

or that branch of the mathematics which, from certain parts, whether sides or angles, of a triangle being given, teaches how to find the others which are unknown. On this account trigonometry, both plane and spherical, engaged much of Napier's thoughts; and he spent a great deal of his time in endeavouring to contrive some method by which the operations in both might be facilitated. These operations, the reader who may be ignorant of mathematics will observe, always proceed by ratios, or proportions. Thus, if certain lines be described in or about a triangle, one of these lines will bear the same proportion to another as a certain side of the triangle does to a certain other side. That is to say, there are two ratios, each consisting of two terms. Now, of the four particulars three may be known, and then the fourth will be found by multiplying together the known term of the second ratio with one of the two terms of the first, and dividing the product by the other. This rule is derived from the very nature of proportion, but it is not necessary that we should stop to demonstrate it. It will be perceived, however, that it must give occasion, in solving the problems of trigonometry, to a great deal of multiplying and dividing—operations which, as everybody knows, become very tedious whenever the numbers concerned are large; and they are generally so in astronomical calculations. Hence such calculations used to exact immense time and labour, and it became most important to discover, if possible, a way of shortening them. Napier, as we have said, applied himself assiduously to this object; and he was, probably, not the only person of that age whose attention it occupied. He was, however, undoubtedly, the first who succeeded in it—which he did most completely by the admirable contrivance which we are now about to explain.

When we state that 2 bears a certain relation to 6, we may mean either that 2 is the third part of 6, or that 2 is less than 6 by 4. If the former be what we mean, we may say that the relation in question is the same as that of 3 to 9, or of 4 to 12; if the latter, we may say that it is the same as that of 3 to 7, or of 4 to 8. The former kind of relation is often called *geometrical*, the latter, *arithmetical*, proportion; the former being that which regards the number of times, or parts of times, the one quantity is contained in the other; the latter regarding only the difference between the two quantities. It is better, however, to confine our use of the word proportion, as we have done in the last paragraph, to geometrical, which is the only true proportion. Now, while, as we have stated, it is the property of four numbers, the first and second of which have the same *geometrical* relation as the third and fourth, that the *product* of the second and third, divided by the first, gives the fourth, where the relation is *arithmetical* the *sum* of the second and third, diminished by the *subtraction* of the first, gives the fourth. Thus in the series 2, 4, 3, 6, in which the identity of the relations between

the 2 and the 4 and between the 3 and the 6 is geometrical (the one quantity being the double of the other), if 4 be multiplied by 3 it gives 12, which, divided by 2, gives 6; but in the series 2, 4, 3, 5, where the identity of the relations between the 2 and the 4 and between the 3 and the 5 is arithmetical (consisting in a difference of the same quantity 2), 4 and 3 being added together make 7, from which if 2 be subtracted there remains the fourth term 5. It is plain, therefore, that, especially where large numbers are concerned, operations in what has been called arithmetical, must be much more easily performed than operations in true or geometrical proportion; for in the one case you have only to add and subtract, while in the other you have to go through the greatly more laborious processes of multiplication and division.

Now it occurred to Napier, reflecting upon this important distinction, that a method of abbreviating the calculation of a *geometrical* proportion might perhaps be found, by substituting, upon certain fixed principles, for its known terms, others arithmetically (or differentially) related, and then finding, in the quantity which should result from the addition and subtraction of these last, an indication of that which would have resulted from the multiplication and division of the original figures. It had been remarked before this, by more than one writer,* that if the series of numbers, 1, 2, 4, 8, &c., that proceed in geometrical progression, that is, by a continuation of geometrical ratios, were placed under, or alongside of, the series, 0, 1, 2, 3, &c., which are in arithmetical progression, the addition of any two terms of the latter series would give a sum, which would stand opposite to a number in the former series indicating the product of the two terms in that series which corresponded in place to the two in the arithmetical series first taken. Thus, in the two lines,

1,	2,	4,	8,	16,	32,	64,	128,	256,
0,	1,	2,	3,	4,	5,	6,	7,	8,

the first of which consists of numbers in geometrical, and the second of numbers in arithmetical progression, if any two terms, such as 2 and 4, be taken from the latter, their sum 6, in the same line, will stand opposite to 64 in the other, which is the product of 4 multiplied by 16, the two terms of the geometrical series which stand opposite to the 2 and 4 of the arithmetical. It is also true, and follows directly from this, that if any three terms, as, for instance, 2, 4, 6, be taken in the arithmetical series, the sum of the second and third, diminished by the subtraction of the first, which makes 8, will stand opposite to a number

* Namely, by H. Grammateus, in his "Commercial Arithmetic," published in German, at Vienna, in 1518; and more clearly by Michael Stifel, in his "Arithmetica In-

tegra," printed at Nuremberg, in 1544. See Montucla, "Histoire des Mathématiques," ii. 19. Even Archimedes was acquainted with these relations.

(256) in the geometrical series which is equal to the product of 16 and 64 (the opposites of 4 and 6), divided by 4 (the opposite of 2).

Here, then, is, to a certain extent, exactly such an arrangement, or table, as Napier wanted. Having any geometrical proportion to calculate, the known terms of which were to be found in the first line or its continuation, he could substitute for them at once, by reference to such a table, the terms of an arithmetical series which, wrought in the usual simple manner, would give him a result that would point out or indicate the unknown term of the geometrical series. But, unfortunately, there were many numbers which did not occur in the upper line at all, as it here appears. Thus, there were not to be found in it either 3, or 5, or 6, or 7, or 9, or 10, or any other numbers, indeed, except the few that happen to result from the multiplication of any of its terms by 2. Between 128 and 256, for example, there were 127 numbers wanting, and between 256 and the next term (512) there would be 255 not to found.

We cannot here attempt to explain the methods by which Napier's ingenuity succeeded in filling up these chasms, but must refer the reader, for full information upon this subject, to the professedly scientific works which treat of the history and construction of logarithms.* Suffice it to say, that he devised a mode by which he could calculate the proper number to be placed in the table over against any number whatever, whether integral or fractional. The new numerical expressions thus found, he called *Logarithms*, a term of Greek etymology, which signifies the ratios of numbers. The table, however, which he published, in the first instance, in his "*Mirifici Logarithmorum Canonis Descriptio*," which appeared in Edinburgh in 1614, contained only the logarithms of the sines of angles for every degree and minute in the quadrant, which shows that he chiefly contemplated, by his invention, facilitating the calculations of trigonometry. These logarithms differed also from those that are now in use, in consequence of Napier having chosen originally, a different geometrical series from that which has since been adopted. He afterwards fixed upon the progression, 1, 10, 100, 1000, &c., or that which results from continued multiplication by 10, and which is the same according to which the present tables are constructed. This improvement, which possesses many advantages, had suggested itself about the same time to the learned Henry Briggs, then Professor of Geometry in Gresham College—one of the persons who had the merit of first appreciating the value of Napier's invention, and who certainly did more than any other to spread the knowledge of it, and also

* See especially Montucla, "*Histoire des Mathématiques*," ii. 16, &c.; Delambre, "*Histoire de l'Astronomie Moderne*," i. 491, &c.; and the Preface to Hutton's "*Mathematical*

Tables," London, 1785, which is reprinted in the first volume of Baron Maseres's "*Scriptores Logarithmici*."

to contribute to its perfection. Lilly, the astrologer, gives us, in his *Memoirs*, a curious account of the intercourse between Briggs and Napier, to which the publication of the logarithmic calculus led. "I will acquaint you," he writes, "with one memorable story related unto me by John Marr, an excellent mathematician and geometrician, whom I conceive you remember. He was servant to King James and Charles the First. At first, when the Lord Napier, or Marchiston, made public his logarithms, Mr. Briggs, then reader of the Astronomy Lectures at Gresham College, in London, was so surprised with admiration of them, that he could have no quietness in himself until he had seen that noble person, the Lord Marchiston, whose only invention they were; he acquaints John Marr herewith, who went into Scotland before Mr. Briggs, purposely to be there when these two so learned persons should meet. Mr. Briggs appoints a certain day when to meet at Edinburgh; but failing thereof, the Lord Napier was doubtful he would not come. It happened one day, as John Marr and the Lord Napier were speaking of Mr. Briggs; 'Ah, John,' said Marchiston, 'Mr. Briggs will not now come.' At the very instant one knocks at the gate; John Marr hastened down, and it proved Mr. Briggs, to his great contentment. He brings Mr. Briggs up into my lord's chamber, where almost one quarter of an hour was spent, each beholding other, almost with admiration, before one word was spoke. At last Mr. Briggs began: 'My lord, I have undertaken this long journey purposely to see your person, and to know by what engine of wit or ingenuity you came first to think of this most excellent help into astronomy, viz., the logarithms; but, my lord, being by you found out, I wonder nobody else found it out before, when now known it is so easy.' He was nobly entertained by the Lord Napier; and every summer after that, during the lord being alive, this venerable man, Mr. Briggs, went purposely into Scotland to visit him."

Napier's discovery was very soon known over Europe, and was everywhere hailed with admiration by men of science. The great Kepler, in particular, honoured the author with the highest commendation, and dedicated to him his *Ephemerides* for 1617. This illustrious astronomer, also, some years afterwards, rendered a most important service to the new calculus, by first demonstrating its principle on purely geometrical considerations. Napier's own demonstration, it is to be observed, though exceedingly ingenious, had failed to satisfy many of the mathematicians of that age, in consequence of its proceeding upon the supposition of the movement of a point along a line—a view analogous, as has been remarked, to that which Newton afterwards adopted in the exposition of his doctrine of fluxions, but one of which no trace is to be found in the method of the ancient geometers.

Napier did not expound the process by which he constructed his logarithms in his first publication. This appeared only in a second

work, published at Edinburgh in 1619, after the death of the author, by his third son, Robert. In this work also the logarithmic tables appeared in the improved form, in which, however, they had previously been published at London, by Mr. Briggs, in 1617. They have since then been printed in numberless editions, in every country of Europe. Nay, in the year 1721, a magnificent edition of them, in their most complete form, issued from the imperial press of Pekin, in China, in three volumes folio, in the Chinese language and character. As for the invention itself, its usefulness and value have grown with the progress of science; and, in addition to serving still as the grand instrument for the abridgment of calculation in almost every department in which figures are employed, it is now found to be applicable to several important cases which could not be managed at all without its assistance. Some of the greatest names in the history of science, we may also remark, since Napier's time, have occupied themselves with the subject of the theory and construction of logarithms; and the labours of Newton, James Gregory, Halley, and Euler, have especially contributed to simplify and improve the methods for their investigation.

Napier, however, did not live long to enjoy the reputation of his discovery, having died at Merchiston on the 3rd of April, 1617, in the sixty-eighth year of his age. That same year he had published at Edinburgh a small treatise in Latin, of about one hundred and fifty pages, which he entitled "*Rabdologiae, seu Numerationis per Virgulas, Libri Duo.*" It contained an account of a method of performing the operations of multiplication and division by means of a number of small rods, having the digits inscribed upon them according to such an arrangement as that, when placed alongside of each other in the manner directed, in order, for instance, to multiply any two lines of figures, the several lines of the product presented themselves, and had only to be transcribed and added up to give the proper result. This was not, however, nearly so convenient a contrivance as that of logarithms, even for multiplication, and it was still less useful in division; on which account it has been supposed that, although given to the world so late, it was probably an expedient which had suggested itself to Napier for the abridgment of calculation before his great invention. It has been thought, too, of so little practical utility as, in all likelihood, never to have been actually employed for the purposes of calculation (Montucla, "*Histoire des Mathématiques,*" ii. 26). A little tract, nevertheless, it may be remarked, appeared at London so late as the year 1684, entitled "*Enneades Arithmeticae,*" containing, among other things, an account of "*the Numbering Rods of the Right Honourable John, Lord Nepeer, enlarged;*" and this work bears to be "*printed for Joseph Moxon, at the sign of the Atlas in Ludgate-street, where also these numbering rods (commonly called Napier's bones) are made and sold.*" These rods, or bones, we may add,

are what Butler alludes to in his "Hudibras," where, in the account of the "rummaging of Sidrophel," he speaks of

"A moon-dial, with Napier's bones,
And several constellation stones,*
Engraved in planetary hour,
That over mortals had strange power." †

It was principally, as we have seen, with a view to the simplification of operations in trigonometry that Napier proposed the logarithmic calculus. This was not the only improvement which he contributed to that branch of science. Among others, it owes to him a formula of great elegance and convenience, by which the solution of all the cases of spherical trigonometry is comprehended under a single rule. This, with several other new views in the same department of mathematics, appeared for the first time in his second work on logarithms, published at Edinburgh, as we have already mentioned, in 1619.

But his ingenious and contriving mind did not confine itself merely to speculative science, if we may believe the very curious statements which he makes with regard to some of his other inventions, in a paper with his signature, which is preserved among the manuscript collections of Anthony Bacon (the brother of the Lord Chancellor Bacon) in the archiepiscopal library at Lambeth. This paper, which has of late years been several times printed,‡ is entitled "Secret Inventions, profitable and necessary in these days for the defence of this island, and withstanding of strangers, enemies to God's truth and religion." Of these, the first is stated to be "a burning mirror for burning ships by the sun's beams," of which the author professes himself able to give to the world the "invention, proof, and perfect demonstration, geometrical and algebraical, with an evident demonstration of their error who affirm this to be made a parabolic section." The second is a mirror for producing the same effect by the beams of a material fire. The third is a piece of artillery contrived so as to send forth its shot, not in a single straight line, but in all directions, in such a manner as to destroy everything in its neighbourhood. Of this the writer asserts that he can give "the invention and visible demonstration." The fourth and last of these formidable machines is described to be "a round chariot in metal," constructed so as both to secure the complete safety of those within it, and,

* A correspondent informs us that he has seen at Gartness globular stones with the circles of the sphere and constellations engraved on them, and concave stones with engravings of a like character, said to have been made by Napier. They were certainly not of modern date, and one is built into the wall of a mill, where it is still to be seen.

† Part ii. canto 3, v. 1095. See also canto 2, v. 409. It was perhaps these notices in "Hudibras" that led Sir Walter Scott to make Davie Ramsay in the "Fortunes of Nigel"

swear "by the bones of the immortal Napier." The late Professor Napier, of Edinburgh, was in possession of the set of bones said to have been used by the inventor of logarithms, from whom he claimed to be descended.

‡ In Dr. Anderson's "Bee," vol. iii. p. 133,—in Lord Buchan's "Life of Napier,"—in Tilloch's "Philosophical Magazine," vol. xviii. pp. 53, &c., and elsewhere. There is also a copy of it in the British Museum among the MS. collections of Dr. Birch.

moving about in all directions, to break the enemy's array "by continual charges and shot of the arquebuse through small holes." "These inventions," the paper concludes, "besides devices of sailing under the water, and divers other devices and stratagems for harassing of the enemies, by the grace of God and work of expert craftsmen, I hope to perform. John Napier, of Merchiston, anno dom. 1596, June 2."

From this date it would appear that Napier's head had been occupied with the contrivances here spoken of, long before he made himself known by those scientific labours for which he is now chiefly remembered; and, indeed, we might perhaps have inferred, even from the general nature of the inventions, and the object which the author avows he had in view by them, that they were the product of that part of his life in which his apprehension of the encroachments of popery contributed to animate his studies. Some of the announcements are certainly very extraordinary, and would almost lead us to suppose that the writer in this paper rather intended to state what he conceived to be possible, than what he had himself actually performed. Yet several of his expressions will not bear this interpretation; and there are not wanting other attestations which go to confirm what he asserts as to his having really constructed some of the machines he speaks of. There is a passage in a strange work, entitled "The Jewel," written by Sir Thomas Urquhart, and first published in 1652, which seems manifestly to allude to the third invention here enumerated. Sir Thomas, although certainly not the most veracious of authorities, would scarcely, one would think, have ventured to publish what we are now going to quote, only five-and-thirty years after Napier's death, if there had not been some foundation for his statement. His description may be sufficiently overcharged (for he writes, it will be observed, in an extravagantly bombastic and hyperbolic strain) without being altogether a fiction. After eulogizing Napier's mathematical learning in very high-sounding terms, Sir Thomas proceeds to remark, that he deems him especially entitled to remembrance on account of "an almost incomprehensible device, which, being in the mouths of the most of Scotland, and yet unknown to any that ever was in the world but himself, deserveth very well to be taken notice of in this place;"—"and," he adds, "it is this; he had the skill (as is commonly reported) to frame an engine (for invention not much unlike that of Archytas' dove), which, by virtue of some secret springs, inward resorts, with other implements and materials fit for the purpose, enclosed within the bowels thereof, had the power, if proportionable in bulk to the action required of it (for he could have made it of all sizes), to clear a field of four miles circumference of all the living creatures exceeding a foot of height that should be found thereon, how near soever they might be to one another; by which

means he made it appear that he was able, with the help of this machine alone, to kill 30,000 Turks, without the aid of one Christian. Of this it is said that (upon a wager) he gave proof upon a large plain in Scotland, to the destruction of a great many heads of cattle and flocks of sheep, whereof some were distant from other half a mile on all sides, and some a whole mile.*

It were to have been desired, certainly, that our author had been a little more particular in his description of the scene of this devastating exploit among the cattle—"a large plain in Scotland," being rather an unsatisfactory form of expression, even in reference to a country where there are not a great many large plains; but this indefinite mode of writing is only Sir Thomas's usual style. We are not inclined, indeed, to put much faith in the rumour here recorded that Napier actually put the power of his machine to the proof in the manner described; but the whole statement, taken in conjunction with what we have found the alleged inventor asserting under his own hand, seems to put it beyond doubt that he had at least imagined some such contrivance as that alluded to in the above passage, and even that his having done so was matter of general notoriety in his own day, and for some time after. Sir Thomas Urquhart was born in 1613, some years before Napier's death, and his "Jewel" was first published in 1652. Napier, he informs us, when requested on his deathbed to reveal the secret of this engine of such extraordinary potency in the destruction of cattle, sheep, and Turks, refused to do so, on the score of there being too many instruments of mischief in the world already for it to be the business of any good man to add to their number.† This may remind the reader of the story told respecting a machine of somewhat similar pretensions constructed at a later period by the celebrated James Gregory, of which Sir Isaac Newton, when it was shown to him, is said to have expressed his disapprobation on the same ground which Napier is here made to take. But the truth is, as has been often remarked, that the introduction of machines capable of producing the tremendous effects ascribed to those in question would, in all probability, very soon put an end to war—which has not become more destructive, but the reverse, since the invention of a more formidable artillery than that anciently in use; and which, waged with such contrivances as those of Napier and Gregory, would certainly never be resorted to by nations as a mode of settling their differences, until they had become literally insane. Another consideration, however, which might suggest itself to a man of very scrupulous feelings on such a matter, is, that it would be unfair for him to put even

* "The Discovery of a most rare Jewel," &c.; second edit. Edin., 1774, pp. 57, 58.

† There is a common belief, it seems, amongst the people at Gartness, that this

machine is buried in the ground, near the site of the old castle said to have been occupied by Napier.

his native country in possession of an instrument which would, in fact, give her an advantage in her disputes with the rest of the world against which there would be no possibility of contending. If it put an end to war, which is one great evil, it would do so by the still greater evil of enabling a single nation to triumph over the prostration of all the rest.

There appeared, a good many years ago, in one of our periodical works,* a very able and learned commentary on Napier's "Secret Inventions," the writer of which has collected, with great industry, whatever notices the annals of science afford of achievements similar to those which the Scottish mathematician is asserted to have performed. In regard to the mirror for setting objects on fire at a great distance by the reflected rays of the sun, he adduces the well-known story of the destruction of the fleet of Marcellus, at Syracuse, by the burning-glasses of Archimedes, and the other (not so often noticed) which the historian Zonaras records, of Proclus having consumed by a similar apparatus the ships of the Scythian leader Vitalian, when he besieged Constantinople in the beginning of the sixth century.† The possibility of such feats as these was long disbelieved; but may be considered as having been fully demonstrated by the experiments of modern times. Buffon, in particular, in the year 1747, by means of four hundred plane mirrors, actually melted lead and tin at a distance of fifty yards, and set fire to wood at a still greater. This too was in the months of March and April. With summer heat it was calculated that the same effects might have been produced at four hundred yards distance—or more than ten times that to which, in all probability, Archimedes had to send his reflected rays. It may be concluded, therefore, that there is nothing absolutely incredible in the account Napier gives of his first invention. His second announcement, however, is a good deal more startling; inasmuch as he here professes to have succeeded in an attempt in which nobody else is recorded to have made any approach to success. Gunpowder has been lighted by heat from charcoal, collected by one concave mirror and reflected from another; but no such effect has ever been produced by a single reflection of artificial heat. It is not very easy to comprehend the nature of the chariot mentioned by Napier as his fourth invention; but it seems to bear some resemblance, this writer remarks, to one of the famous Marquis of Worcester's contrivances. As for the device for sailing under water, noticed in the last paragraph of the paper, that exploit was performed in Napier's own day by the Dutch chemist Cornelius Drebell, who is reported to have con-

* Tilloch's "Philosophical Magazine," vol. xviii. pp. 53—65 (published Feb. 1804). See also pp. 245, &c.

† Malala, another old chronicler, however, says that Proclus operated on this occasion

not by burning-glasses, but by burning sulphur showered upon the ships from machines. Vide Montucla, "Histoire des Mathématiques," l. 334

structed a vessel for King James I., which he rowed under the water on the Thames. It carried twelve rowers, besides several passengers, the air breathed by whom, it is said, was made again respirable, by means of a certain liquor, the composition of which Boyle asserts in one of his publications that he knew, having been informed of it by the only person to whom it had been communicated by Drebell. Bishop Wilkins, also, who lived very near the time at which it was performed, expressly mentions Drebell's experiment in his "Mathematical Magic." Various successful essays in subaqueous navigation have also been made in more recent times.

It is to be lamented that the only one of Napier's inventions, the secret of which was solicited from him by his friends when he was leaving the world, should have been that which his conscience would not allow him to reveal, for the reason that has been stated. Had they asked him to explain to them his method of sailing under the water, for example, or even the construction of his burning mirrors, he probably would have had no excuse for withholding the information. But they seem to have been so anxious to get possession of the machine for destroying the thirty thousand Turks, that they had not a thought to spare for any of the other contrivances. The circumstance, however, of some of these inventions not having been re-discovered by any one else since Napier's time, ought not of itself to be taken as conclusive evidence that his pretensions to a knowledge of them were mere dreams. Extraordinary as is the progress that Science has made within the last two centuries, during which period the conquests she has effected have been more numerous and wonderful than had been witnessed by all the previous centuries that had elapsed from the beginning of the world, there can be no doubt that some of her apparently new inventions have been only the forgotten discoveries of a preceding age revived, and also that there were some things known in former times which modern ingenuity has not yet recovered from oblivion. Such machines as those which Napier professes to have constructed are exactly of the description least likely, for very obvious reasons, to occur to a modern speculator.*

In that curious record, "Birrell's Diary," which was printed at Edinburgh about the beginning of the present century, we find, under date of the 23rd October, 1598, the following notice: "Ane proclamation of the Laird of Merkistoun, that he tuik upon hand to make the land mair profitable nor it wes before, be the sawing of salt upon it." There can be little doubt, we think, that this was another scheme of the inventor

* For a great deal of curious information on the lost and revived inventions of antiquity, the reader may consult G. Pasch's learned work, entitled "De Novis Inventis quorum accuratiori cultui facem prætulit antiquitas," of which a second edition appeared at Leipsic in 1700; or Dutens's

"Recherches sur l'origine des découvertes attribuées aux modernes," first published in 1766, and, for the fourth time, in 1812. Of this last work there is an English translation. See also Theod. Almelooven's "Inventa Nov-Antiqua."

of logarithms; although the patent for the new mode of manuring appears to have been taken out in the name of his eldest son, Archibald, who had been infeft in the fee of the barony by his father about a year before.* The patent, or gift of office, as it is called, was granted upon condition that the patentee should publish an account of his method in print, which he did accordingly shortly afterwards, under the title of "The new order of gooding and manuring all sorts of field land with common salt." The facts that have been mentioned are interesting as establishing Napier's claim to an agricultural improvement which has been revived in our own day and considered of great value. The profits of the invention were probably given up to his son, who was at this time a young man of only twenty-five years of age, from the same disinterested feeling which had led his father previously to enfeoff him in his estate. Devoted to his books, Napier may have been somewhat indifferent about money; and one of his contemporaries, Thomas Dempster, a man of eminent learning and ability, but by no means to be always depended upon in what he states upon his own authority, even goes so far as to assert, that he dissipated his fortune by his experiments. Of this, however, there is no evidence; indeed, it appears that, occupied as much of his time was about other matters, he had taken good care of his property, which at his death was of large amount, both in land and in money, goods, and chattels. And, if he suggested this method of manuring with salt, he must be allowed to have directed his speculations occasionally to the improvement of the arts of common life, as well as to that of the abstract sciences.

Napier was twice married, and had twelve children, of whom Archibald, the eldest, mentioned above, was raised to the peerage, by the title of Lord Napier, in 1627. A small volume of *Memoirs* of this person, written by himself, was published in 1793. There are said to be still in the possession of the family some productions of their distinguished ancestor on scientific subjects, which have not been printed—especially a treatise, in English, on Arithmetic and Algebra; and another, on Algebra, in Latin.

The life which we have thus sketched may be considered as affording us an eminent example of the manner in which the many advantages enjoyed by the wealthy, may be turned to account in the pursuit of learning and philosophy. A good education, access to all the best means of improvement, uninterrupted leisure, comparative freedom from the ordinary anxieties of life, the means of engaging in inquiries and experiments the expense of which cannot be afforded by the generality of students—the possession of all these things, to the mind that knows how to profit by them, is indeed invaluable. We have seen what they

* See Records of Privy Council for 22nd June, 1598, quoted in "Douglas's Peerage," by Wood, ii. 292.

produced in Napier's case. In dedicating his time and his fortune to pursuits so much nobler than those that have usually occupied persons of his station, this illustrious individual had his ample reward. We can scarcely doubt that he led a happier life in his studious retirement, in the midst of his books and his experiments, than if he had given himself either to the ordinary pleasures of the world, or to the hazards and vexations of political ambition. The more useful and more honourable path he certainly chose. By his great and fortunate discovery he made the science of all succeeding times his debtor, and constituted himself the benefactor of every generation of posterity. And then for fame, which our very nature has made dear to us, that, too, this philosopher found in abundance in his closet of meditation. Even in his own day his renown was spread abroad over Europe, and he was greeted with the publicly expressed admiration of some of the most distinguished of his contemporaries; and the time that has since elapsed has only served to throw an increasing light around his name, which is now sure to retain its distinction so long as the sciences which he loved shall continue to be cultivated among men.

CHAPTER XXVII.

INTELLECTUAL PURSUITS BY MEN OF WEALTH AND STATION CONTINUED:—DRUMMOND OF HAWTHORNDEN; TYCHO BRAHÉ; TSCHIRNHAUSEN; BOYLE; THE AIR-PUMP; CAVENDISH; OTHER PERSONS OF RANK DISTINGUISHED IN LITERATURE AND SCIENCE.

It would be easy to add to that of Napier a long list of other names of men of wealth and rank, who, in like manner, have devoted themselves to science and literature, in preference to all other pursuits. But we can afford to mention only a very few. One, which Napier's naturally suggests to us, is that of his contemporary and countryman, WILLIAM DRUMMOND, of Hawthornden, one of the most elegant poetical writers of the early part of the seventeenth century. Drummond and Napier were neighbours, but probably no record has been preserved of any intercourse between the mathematician and the poet. As the former, however, was resorted to every year by his scientific English friend, Mr. Briggs, so the latter, also, had his visitor from the south, who came to pay his respects to him, from admiration of his kindred genius. In the year 1619, the famous Ben Jonson walked all the way from London to Hawthornden, to see his brother poet, and remained for some time as his guest. Of this visit a curious account is preserved, written by

Drummond himself, which has been often printed.* Drummond, who was distinguished for his learning as well as his poetry, died in 1649, in his sixty-fourth year, having lived through a very agitated period without mixing in its political convulsions, satisfied with philosophy and the Muses. Another contemporary of Napier, whose labours and speculations were more similar to his own, was the celebrated Danish astronomer TYCHO BRAHÉ. Brahé's family was both wealthy and noble; but when he first manifested his attachment to the science by his contributions to which he afterwards acquired so much reputation, being then only a boy at school, his friends did everything they could to check an inclination which they deemed quite unsuited to his birth and prospects; and the young astronomer was obliged to conceal from his tutor the mathematical books he had purchased with his pocket-money, and to read them, as well as to make his observations on the stars, in hours stolen from the time allowed him for sleep. For, even before he was sixteen, he had begun to measure the distances of the heavenly bodies from one another, although he had no better instrument than a common pair of compasses, the hinge of which he used to put to his eye, while he opened the legs until they pointed to the two stars whose relative position he wished to ascertain. A collection of celestial observations made by him at this early period is still preserved at Copenhagen. When he became of age, however, and was his own master, his fortune enabled him to choose his own pursuits; and, having first spent some years in travelling through Germany and Switzerland, and visiting the various observatories in those countries, he then returned home, took up his residence on his estate, and dedicated himself almost entirely to his favourite science. Some of the results of his studies which he published, soon drew to them the attention of the learned among his countrymen; and, at the desire of the king, he at last left his retreat to teach astronomy in the capital. But the constant interruptions to which he was here exposed disgusted him with a town life; and he sighed to get once more back to his country retirement. All his wishes in this respect were at length gratified by an act of extraordinary munificence on the part of his royal master, who bestowed on him the island of Huen, in the Sound, together with a pension of five hundred crowns, a lordship in Norway, and an ecclesiastical benefice, which brought him two thousand crowns more, in order that with these revenues, added to those of his original estates, he might be enabled to prosecute his celestial observations on the grandest scale. In this island, accordingly, Brahé now took up his abode, and soon erected on it a splendid observatory, provided with all the best instruments known in that age. He spent, he says, a hundred thousand crowns of his own

* But for the first time correctly and in full under the editorship of David Laing, Esq., for the Shakespeare Society, Lond. 1842.

money upon its completion, in addition to the produce of his grants from the king. Here he resided for seventeen years, during the whole of which time he continued to devote himself, with unabated zeal, to his scientific pursuits. But such was now his fame, that, even in this retirement, besides being surrounded, as before, by pupils who crowded to profit by his instructions, he was sought out by many visitors, both from his own and foreign countries. Among other persons of distinction who came to see him was our James I., then king of Scotland, who passed a week with him in the year 1590; but, if the story that is told be true, this visit was anything rather than a fortunate incident for Brahé. Some years afterwards, it is said, his protector, Frederick II., being dead, he was visited one day by the young king Christian IV., accompanied by his chief minister, Walckendorf; and it so happened that this latter personage, who was very sensitive and choleric, was barked at, as he approached the house, by two dogs belonging to the astronomer, at which he chose to be so much offended, that he went up to the animals and beat them severely. The dogs had been presented to Brahé by the Scottish monarch; and, irritated at seeing them ill-treated, he interfered to prevent the enraged senator from continuing his chastisement. This gave rise to some high words between the two, and the result was a quarrel, which Walckendorf, at least, never forgot. From that day, Brahé's ruin was resolved upon by his powerful enemy. A commission was soon after appointed to report upon the public utility of his establishment; and, upon this compliant body declaring that they saw nothing in his splendid observatory but a source of useless expense to the State, a decree was passed recalling all the grants he had received from the former king, and dispossessing him of his island. On this, Brahe determined to bid adieu for ever to his ungrateful country; and, taking with him all his instruments, he retired to Germany. About two years afterwards, however, he was invited to take up his residence at Prague by the Emperor Rodolph II.; and by this prince, who was warmly attached to science, he was provided with a second asylum, almost as splendid as that which he had enjoyed in his native country. But he lived only a very short time after this, having died in 1601, in the fifty-fifth year of his age. Tycho Brahé was the inventor or reviver of a peculiar scheme of the universe, according to which the earth is conceived to be immoveable in the centre of the system, the sun to revolve round it, and the other planets round the sun. It is unnecessary to say that this hypothesis has been long exploded. Indeed, although supported by its author with much ingenuity, it has been generally held to have been a most unphilosophical retrogression from the true system previously established by Copernicus.*

* But see a valuable article on TYCHO BRAHÉ, in the "Penny Cyclopædia" (vol. v. pp. 323—327), the writer of which declares it to be his opinion, "that the system of

Tycho Brahe was the only one of that day not open to serious physical objections, taking as a basis the notions of mechanics [then] admitted by all parties."

But, although Brahé may thus appear to have no very high claims upon our admiration as a theorist, he undoubtedly did much in another way to promote the improvement of astronomy. His extraordinary devotion to the science, of itself, operated as an inspiration upon many of the other ardent minds of the time. But it was by the great number and comparative exactness of his observations, far surpassing anything that had been attained by his predecessors, that he chiefly contributed to the progress of astronomy. No other but one in his circumstances could have commanded either the leisure or the pecuniary means necessary for the making of those observations, which, besides having occupied many years, owed much of their superior accuracy to the excellence and consequent costliness of the instruments which Brahé employed. Here, therefore, was a case in which science was indebted to the wealth of one of its cultivators for services which no zeal or talents could have otherwise enabled him to render.

Another man of fortune, to whom both science and the arts are under considerable obligations, is the German mathematician, TSCHIRNHAUSEN, celebrated for the discovery of the peculiar curve called, after him, Tschirnhausen's Caustics. He was born in 1651, at the seat of his ancestors, in Upper Lusatia; and although, after receiving an excellent education, he entered the army at an early age, he very soon quitted the profession of a soldier, and set out on his travels through England, Italy, and France. He spent several years in traversing these countries, embracing every opportunity of obtaining a knowledge of their arts, manufactures, and productions, and seeking the acquaintance of the learned men of the time, wherever he went. On returning home, he took up his residence on his estate, the revenues of which were ample; and the remainder of his life was given to scientific speculations and experiments. The science of optics was that to which he was chiefly attached; and it was while making some experiments with reflecting mirrors, that he discovered his Caustics, which are curves formed by light reflected in certain circumstances, and are so called from the Greek word for a burning-glass. They possess some remarkable geometrical properties.* When Tschirnhausen announced this discovery to the French Academy of Sciences, he was only in his thirty-first year; but he was immediately admitted a member of the Academy by order of the King, Louis XIV. In order to have the aid of proper instruments in the prosecution of his researches, he afterwards established three glasshouses in his native district; at which he employed all the resources of his ingenuity, in endeavouring to fabricate burning-glasses of greater size and power than any which had ever been elsewhere pro-

* In an article of some length upon Tschirnhausen, in the "Biographie Universelle" (xlvii 3), the writer, M. Gley, by a strange blunder, mistakes these curves for

actual burning-glasses: and describes, with great minuteness, their wonderful powers in kindling and consuming, or melting, wood, iron, tiles, slates and earthenware!

duced. In 1687 he had made a concave reflecting mirror of copper, of the diameter of four feet and a half, which consumed wood and fused metals at twelve feet distance, in a few seconds; but, although these effects greatly surpassed anything of the same kind that had been accomplished in modern times, he found the inconvenience of operating by reflection so great, that he determined to persevere in his attempts to obtain, if possible, a lens of equal magnitude. He did not exactly attain this object; for the largest lens he succeeded in producing had only a diameter of three feet. But when it is added that nobody but himself had ever before made one of more than four or five inches diameter, his success will probably be deemed sufficiently extraordinary. The method he employed in fabricating this immense glass is not known. It was convex on both sides, and weighed a hundred and sixty pounds. Although somewhat less in size, its effects greatly exceeded those of the reflector he had formerly used. This lens was purchased from Tschirnhausen by the Duke of Orleans, who afterwards made a present of it to the Academy of Sciences. Tschirnhausen deserves, also, to be remembered as the founder of the celebrated porcelain manufactory of Dresden. Before this time it was supposed that the Chinese employed for their porcelain a peculiar earth, only found in their own country: but he discovered that the same species of ware could be manufactured from a compound of different sorts of earth, which might be obtained in Europe as well as in China. This eminent benefactor to the arts, who, besides his contributions to the "Transactions of the French Academy," was also the author of two separate works—the first, entitled "The Medicine of the Body," the latter, "The Medicine of the Mind," being in fact, a system of the art of reasoning—died in 1708.

But perhaps the best example we can adduce of the manner in which wealth may be made subservient by its possessor, not only to the acquisition of knowledge, but also to its diffusion and improvement, is that of our celebrated countryman, the Honourable ROBERT BOYLE. Boyle was born at Lismore, in Ireland, in 1627, and was the seventh and youngest son of Richard, the first Earl of Cork, commonly called the Great Earl. The first advantage which he derived from the wealth and station of his father was an excellent education. After having enjoyed the instructions of a domestic tutor, he was sent at an early age to Eton. But his inclination, from the first, seems to have led him to the study of things, rather than of words. He remained at Eton only four years, "in the last of which," according to his own statement, in an account which he has given us of his early life, "he forgot much of that Latin he had got, for he was so addicted to more solid parts of knowledge, that he hated the study of bare words naturally, as something that relished too much of pedantry, to consort with his disposition and designs." In reference to what is here insinuated, in disparagement of

the study of languages merely as such, we may just remark that the observation is, perhaps, not quite so profound as it is plausible. So long as one mind differs from another, there will always be much difference of sentiment as to the comparative claims upon our regard of that, on the one hand, which addresses itself principally to the taste or the imagination, and that, on the other, which makes its appeal to the understanding only. But we are not to suppose that, because the epithet useful is commonly confined to the latter, the former is to be deemed useless. We call that, by way of distinction, useful which is *merely* useful. The agreeable or the graceful is plainly also useful. It is useful and something more. The study of language and style cannot with any propriety be denounced as a mere waste of time; but, on the contrary, is well fitted to become to the mind a source both of enjoyment and of power. So great, indeed, is the influence of diction upon the common feelings of mankind, that no literary work, it may be safely asserted, has ever acquired a permanent reputation or popularity, or, in other words, produced any wide and enduring effect, which was not distinguished by the graces of its style. Their deficiency, in this respect, has been at least one of the causes of the comparative oblivion into which Mr. Boyle's own writings have fallen, and doubtless weakened the efficacy of such of them as aimed at anything beyond a bare statement of facts, even in his own day. It was this especially which exposed some of his moral lucubrations to Swift's annihilating ridicule.

On being brought home from Eton, Boyle, who was his father's favourite son, was placed under the care of a neighbouring clergyman, who, instructing him, he says, "both with care and civility, soon brought him to renew his first acquaintance with the Roman tongue, and to improve it so far that in that language he could readily enough express himself in prose, and began to be no dull proficient in the poetic strain. Although, however," he adds, "naturally addicted to poetry, he forbore, in after-life, to cultivate his talent for that species of composition, because, in his travels, having by discontinuance forgot much of the Latin tongue, he afterwards never could find time to redeem his losses by a serious study of the ancient poets." From all this it is evident that the natural bent of his mind did not incline him very strongly to classical studies; and as, for the most obviously wise purposes, there has been established among men a diversity of intellectual endowments and tendencies, and every mind is most efficient when it is employed in accordance with its natural dispositions and predilections, it was just as well that the course of his education was now changed. In his eleventh year he and one of his brothers were put under the charge of a Mr. Marcombes, a French gentleman, and sent to travel on the Continent. In the narrative of his early life, in which he designates himself by the name of Philoretus, Mr. Boyle has left us an account of his travelling

tutor. "He was a man," he says, "whose gait, his mien, and outside, had very much of his nation, having been divers years a traveller and a soldier; he was well fashioned, and very well knew what belonged to a gentleman. His natural were much better than his acquired parts, though divers of the latter he possessed, though not in an eminent, yet in a competent degree. Scholarship he wanted not, having in his greener years been a professed student in divinity; but he was much less read in books than men, and hated pedantry as much as any of the seven deadly sins. . . . Before company he was always very civil to his pupils, apt to eclipse their failings and set off their good qualities to the best advantage. But in his private conversation he was cynically disposed, and a very nice critic both of words and men; which humour he used to exercise so freely with Philoretus, that at last he forced him to a very cautious and considerate way of expressing himself, which after turned to his no small advantage. The worst quality he had was his choler, to excesses of which he was excessively prone; and, that being the only passion to which Philoretus was much observed to be inclined, his desire to shun clashing with his governor, and his accustomedness to bear the sudden sallies of his impetuous humour, taught our youth so to subdue that passion in himself, that he was soon able to govern it habitually and with ease."

Under the guidance of this gentleman, who, although not much fitted, apparently, to make his pupils profound scholars, or even to imbue them with a taste for elegant literature, was, probably, very well qualified both to direct their powers of observation and to superintend and assist the general growth of their minds at this early age, the two brothers passed through France to Geneva, where they continued for some time studying rhetoric, logic, mathematics, and political geography, to which were added the accomplishments of fencing and dancing. "His recreations during his stay at Geneva," says Mr. Boyle of himself, "were sometimes mall, tennis (a sport he ever passionately loved), and, above all, the reading of romances, whose perusal did not only extremely divert him, but (assisted by a total discontinuance of the English tongue) in a short time taught him a skill in French somewhat unusual to strangers." The party afterwards set off for Italy; and, after visiting Venice and other places, proceeded to Florence, where they spent the winter.

While residing here, Mr. Boyle made himself master of the Italian language. But another acquisition for which he was indebted to his visit to Florence probably influenced to a greater extent the future course of his pursuits; we mean the knowledge he obtained of the then recent astronomical discoveries of Galileo. This great philosopher died in the neighbourhood of Florence in the beginning of the year 1642, while Boyle and his brother were pursuing their studies in that city. The

young Irishman, who was himself destined to acquire so high a reputation by his experiments in various departments of physical science, some of them the same which Galileo had cultivated, probably never even beheld his illustrious precursor; but we cannot tell how much of Boyle's love of experimental inquiry, and his ambition to distinguish himself in that field, may have been caught from this his accidental residence in early life in a place where the renown of Galileo and his discoveries must have been on the lips of all.

Boyle returned to England in 1644. Although he was yet only in his eighteenth year, he seems to have thought that his education had been long enough under the direction of others, and he resolved for the future to be his own instructor. Accordingly, his father being dead, he retired to an estate which had been left him in Dorsetshire, and gave himself up, we are told, for five years, to the study principally of natural philosophy and chemistry. His literary and moral studies, however, it would appear, were not altogether suspended during this time. In a letter written by him from his retirement to his old tutor, Mr. Marcombes, we find him mentioning, as also among his occupations, the composing of essays in prose and verse, and the study of ethics, "wherein," he says, "of late I have been very conversant, and desirous to call them from the brain down into the breast, and from the school to the house."

These details do not, like many of those we have given in former parts of our work, exhibit to us the ardent lover of knowledge beset with impediments at every step in his pursuit of the object on which he has placed his affections, and having little or nothing to sustain him under the struggle except the unconquerable strength of the passion with which his heart is filled. On the contrary, we have here a young man who has enjoyed from his birth upwards every facility for the improvement of his mind, and is now surrounded with all the conveniences he could desire for a life of the most various and excursive study.* A happy and enviable lot! Yet by how few of those to whom it has been granted, as well as to him of whom we are now speaking, have its advantages been used as they were by him! The truth is, that if the mind be not in love with knowledge, no mere outward advantages will enable any one to make much progress in the pursuit of it; while, with this love for it, there are no difficulties which the unkindness of fortune can throw in the way of its acquisition that may not be overcome. Sometimes difficulties will even operate as incentives, and the greatest of all difficulties has been when there were none.

In the same letter to Mr. Marcombes which we have just quoted we find Boyle making mention, for the first time, of what he calls "our new Philosophical or Invisible College," some of the leading members of which, he informs his correspondent, occasionally honoured him with

their company at his house. This *Invisible College* was the association of learned individuals who began about this period to assemble together in London for the purpose of scientific discussion, and whose meetings formed the germ of the Royal Society. According to the account given in a letter written many years after by Dr. Wallis, another member of the club, to his friend Dr. Thomas Smith, it appears that these meetings first began to be held in London, on a certain day in every week, about the year 1645. Mr. Boyle's name does not occur in the list of original members given by Dr. Wallis; but he professes to mention only several of the number. There can be no doubt that Boyle joined them soon after the formation of the association. According to Dr. Wallis, the meetings were first suggested by a Mr. Theodore Haak, whom he describes as a German of the Palatinate, then resident in London. They used to be held sometimes in Wood Street, at the house of Dr. Goddard, the eminent physician, who kept an operator for grinding glasses for telescopes and microscopes; sometimes at another house in Cheapside; and sometimes in Gresham College, to which several of the members were attached. The subjects of inquiry and discussion are stated to have embraced everything relating to "physic, anatomy, geometry, astronomy, navigation, magnetics, chemics, mechanics, and natural experiments," whatever, in short, belonged to what was then called "the new or experimental philosophy." In course of time, several of the members of the association were removed to Oxford; and they began at last to meet by themselves in that city, while the others continued their meetings in London. The Oxford meetings began to be regularly held about the year 1649. In 1654 Mr. Boyle took up his residence at Oxford, probably induced, in great part, by the circumstance of so many of his philosophical friends being now there, and engaged together in the same inquiries with himself. The Oxford associates, according to Dr. Wallis, met first in the apartments of Dr. Petty (afterwards the celebrated Sir William Petty, the ancestor of the Marquis of Lansdowne), who lodged, it seems, in the house of an apothecary, whose store of drugs was found convenient for their experiments. On Dr. Petty going to Ireland, they next met, the narrative proceeds, "(though not so constantly) at the lodgings of Dr. Wilkins, then warden of Wadham College; and, after his removal to Trinity College in Cambridge, at the lodgings of the honourable Mr. Robert Boyle, then resident for divers years in Oxford." Boyle, indeed, continued to reside in this city till the year 1668. Meanwhile, in 1663, three years after the Restoration, the members of the London club were incorporated under the title of the Royal Society.

It was during his residence at Oxford that Boyle made some of the principal discoveries with which his name is connected. In particular, it was here that he prosecuted those experiments upon the mechanical

properties of the air, by which he first made himself generally known to the public, and the results of which rank among the most important of his contributions to natural science. The first account which he published of these experiments appeared at Oxford in 1660, under the title of "New Experiments Physico-Mechanical, touching the spring of the air and its effects." The work is in the form of letters to his nephew, Viscount Dungarvon, the son of the Earl of Cork, which are dated in December, 1659. It may be not unnaturally supposed that Boyle's attention was first directed to the subject of Pneumatics when he was engaged at Florence in making himself acquainted with the discoveries of Galileo, whose experiments first introduced anything like science into that department of inquiry. He states, himself, in his first letter to his nephew, that he had some years before heard of a book, by the Jesuit Schottus, giving an account of a contrivance, by which Otto Guericke, Consul of Magdeburg, had succeeded in emptying glass vessels of their contained air, by sucking it out at the mouth of the vessel, plunged under water. He alludes here to Guericke's famous invention of the instrument now commonly called the Air-pump. This ingenious and ardent cultivator of science, who was born at Magdeburg, in Saxony, in the beginning of the seventeenth century, in his original attempts to produce a vacuum, used first to fill his vessel with water, which he then sucked out by a common pump, taking care, of course, that no air entered to replace the liquid. This method was probably suggested to Guericke by Torricelli's beautiful experiment, mentioned in a former chapter, with the barometrical tube, the vacuum produced in the upper part of which, by the descent of the mercury, has been called from him the Torricellian vacuum. It was by first filling it with water that Guericke expelled the air from the copper globe, the two closely fitting hemispheres comprising which, six horses were then unable to pull assunder, although held together by nothing more than the pressure of the external atmosphere. This curious proof of the force, or weight, of the air, which was exhibited before the Emperor Ferdinand III., in 1654, is commonly referred to by the name of the experiment of the Magdeburg hemispheres. Guericke, however, afterwards adopted another method of exhausting a vessel of its contained air, which could be applied more generally than the one he had first employed. This consisted in at once pumping out the air itself. If we suppose a barrel of perfectly equal bore throughout, and having in it a closely-fitting plug or piston, to have been inserted in the mouth of the vessel, it is evident that, when this piston was drawn up from the bottom to the top of the barrel, it would carry along with it all the air that had previously filled the space through which it had passed. Now were air, like water, possessed of little or no expansive force, this space, after being thus deprived of its contents, would have remained empty, and there would

have been an end of the experiment. But, in consequence of the extraordinary elasticity of the element in question, no sooner would its original air be lifted by the piston out of the barrel, than a portion of that in the vessel, beyond the piston, would flow out to occupy its place. The vessel and the barrel together would now, therefore, be filled by the same quantity of air which had originally been contained in the first alone, and which would consequently be diminished in density just in proportion to the enlargement of the space which it occupied. Although, however, so much of the air to be extracted had thus got again into the barrel, there would still at this point have been an end of the experiment, if no way could have been found of pushing back the piston for another draught, without forcing also the air beyond it into the vessel again, and thus merely restoring matters to the state in which they were at the commencement of the operation. But here Guericke was provided with an ingenious contrivance—that of the valve; the idea of applying which he borrowed, no doubt, from the common water-pump, in which it had been long used. A valve, which, simple as it is, is one of the most useful and indeed indispensable of mechanical contrivances, is, as most persons know, merely a flap or lid, moving on a hinge, which, covering an orifice, closes it, of course, against whatever attempts to pass through from behind itself (a force bearing upon it from thence evidently only shutting it closer), while it gives way to and permits the passage of whatever comes in the opposite direction. Now Guericke, in his machine, had two of these valves, one covering a hole in the piston, another covering the mouth of the vessel where the barrel was inserted; and both opening outwards. In consequence of this arrangement, when the piston, after having been drawn out, as we have already described, was again pushed back, the air in the barrel was prevented from getting back into the vessel by the further valve, now shut against it, while it was at the same time provided with an easy means of escape by the other, through which, accordingly, it passed away. Here then was one barrellful of the air in the vessel dislodged; and the same process had only to be repeated a sufficient number of times, in order to extract as much more as was desired; the quantity, however, that was removed becoming, of course, less every time, inasmuch as, although it filled the same space, it was more attenuated.

The principle, therefore, upon which the first air-pump was constructed was the expansibility of the air, which the inventor was enabled to take advantage of through means of the valve. These two things, in fact, constitute the air-pump; and whatever improvements have been since introduced in the construction of the machine have gone only to make the working of it more convenient and effective. In this latter respect the defects of Guericke's apparatus, as might be expected, were considerable. Among others with which it was chargeable,

it required the continual labour of two men for several hours at the pump to exhaust the air from a vessel of only moderate size; the precautions which Guericke used to prevent the intrusion of air from without, between the piston and the sides of the barrel, during the working of the machine, were both imperfect for that purpose, and greatly added to the difficulties and incommodiousness of the operation; and, above all, from the vessel employed being a round globe, without any other mouth or opening than the narrow one in which the pump was inserted, things could not be conveyed into it, nor, consequently, any experiments made in that vacuum which had been obtained. Boyle, who says that he had himself thought of something like an air-pump before he heard of Guericke's invention, applied himself, in the first place, to the remedying these defects in the original instrument, and succeeded in rendering it considerably more convenient and useful. At the time when he began to give his attention to this subject, he had Robert Hooke, who afterwards attained a distinguished name in science, residing with him as an assistant in his experiments; and it was Hooke, he says, who suggested to him the first improvements in Guericke's machine. These, which could not easily be made intelligible by any mere description, and which, besides, have long since given way to still more commodious modifications of the apparatus, so that they possess now but little interest, enabled Boyle and his friends to carry their experiments with the new instrument much further than had been done by the Consul of Magdeburg. But, indeed, Boyle himself did not long continue to use the air-pump which he describes in his first publication. In the second part of his *Physico-Mechanical Experiments* he describes one of a new construction; and, in the third part of the same work, one still farther improved. This last, which is supposed to have been also of Hooke's contrivance, had two barrels moved by the same pinion-wheel, which depressed the one while it elevated the other, and thus did twice as much work as before in the same time. The air-pump has been greatly improved since the time of Boyle by the Abbé Nollet, Gravesande, Smeaton, Prince, Cuthbertson, and others.

By his experiments with this machine Boyle made several important discoveries with regard to the air, the principal of which he details in the three successive parts of the work we have mentioned. Having given so commodious a form and position to the vessel out of which the air was to be extracted (which, after him, has been generally called the receiver, a name, he says, first bestowed upon it by the glassmen) that he could easily introduce into it anything which he wished to make the subject of an experiment, he found that neither flame would burn nor animals live in a vacuum, and hence he inferred the necessity of the presence of air both to combustion and animal life. Even a fish, immersed in water, he proved, would not live in an exhausted receiver.

Flame and animal life, he showed, were also both soon extinguished in any confined portion of air, however dense, although not so soon in a given bulk of dense as of rarefied air; nor was this, as had been supposed, owing to any exhalation of heat from the animal body or the flame, for the same thing took place when they were kept in the most intense cold, by being surrounded by a frigorific mixture. What he chiefly sought to demonstrate, however, by the air-pump was the extraordinary elasticity, or spring, as he called it, of the air. It is evident, from the account that has been given of the principle of this machine, that, if the pump be worked ever so long, it never can produce in the receiver a strictly perfect vacuum; for the air expelled from the barrel by the last descent of the piston must always be merely a portion of a certain quantity, the rest of which will be in the receiver. The receiver, in truth, after the last stroke of the piston, is as full of air as it was at first; only that by which it is now filled is so much rarefied and reduced in quantity, although it occupies the same space as before, that it may be considered as, for most practical purposes, annihilated. Still a certain quantity, as we have said, remains, be it ever so small; and this quantity continues, just as at first, to be diffused over the whole space within the receiver. From this circumstance Boyle deduced some striking evidences of what seems to be the almost indefinite expansibility of the air. He at last actually dilated a portion of air to such a degree that it filled, he calculated, 13,679 times its natural space, or that which it occupied as part of the common atmosphere. But the usual density of the atmosphere is very far from being the greatest to which the air may be raised. It is evident that, if the two valves of the air-pump we have already described be made to open inwards instead of outwards, the effect of every stroke of the piston will be not to extract air from the receiver, but to force an additional quantity into it. In that form, accordingly, the machine is called a forcing-pump, and is used for the purpose of condensing air, or compressing a quantity of it into the smallest possible space. Boyle succeeded, by this method, in forcing into his receiver forty times its natural quantity. But the condensation of the air has been carried much further since his time. Dr. Hales compressed into a certain space 1522 times the natural quantity, which in this state had nearly twice the density, or, in other words, was nearly twice as heavy as the same bulk of water. Of the air thus condensed by Dr. Hales, therefore, the same space actually contained above twenty millions of times the quantity which it would have done of that dilated to the highest degree by Mr. Boyle. How far do these experiments carry us beyond the knowledge of Aristotle, who held that the air, if rarefied so as to fill ten times its usual space, would become fire!

We have dwelt the longer upon these details, both as referring to

some of the most important contributions for which science is indebted to Mr. Boyle, and because they serve to continue the brief sketch of discoveries relating to the air which we have given in a previous chapter. On leaving Oxford, in 1668, Boyle came to London, and here he continued to reside during the remainder of his life. Up to this time his attendance at the meetings of the Royal Society had been only occasional, but he was now seldom absent. Science, indeed, was as much the occupation of his life as if it had been literally his business or profession. No temptations could seduce him away from his philosophical pursuits. Belonging, as he did, to one of the most powerful families in the kingdom—having no fewer than four brothers in the Irish peerage, and one of them also an English peer—the highest honours of the state were open to his ambition if he would have accepted of them. But so pure was his love of science and learning, and, with all his acquirements, so great his modesty, that he steadily declined even those worldly distinctions which might be said to lie strictly within the sphere of his pursuits. He was zealously attached to the cause of religion, in support of which he wrote and published several treatises; but he would not enter the church, although pressed to do so by the king, or even accept any office in the universities, under the conviction that he should more effectually serve the interests both of religion and learning, by avoiding everything which might give him the appearance of being their hired or interested advocate. He preferred other modes of showing his attachment, in which his wealth and station enabled him to do what was not in the power of others. He allowed himself to be placed at the head of associations for the prosecution of those objects which he had so much at heart; he contributed to them his time, his exertions, and his money; he printed, at his own expense, several editions of the Scriptures in foreign languages for gratuitous distribution; if learned men were in pecuniary difficulties his purse was open to their relief. And, as for his own labours, no pay could have made them more zealous or more incessant. From his boyhood till his death he may be said to have been almost constantly occupied in making philosophical experiments; collecting and ascertaining facts in natural science; inventing or improving instruments for the examination of nature; maintaining a regular correspondence with scientific men in all parts of Europe; receiving the daily visits of great numbers of the learned both of his own and other countries; perusing and studying not only all the new works that appeared in the large and rapidly widening department of natural history and mathematical and experimental physics, including medicine, anatomy, chemistry, geography, &c., but many others, relating especially to theology and oriental literature; and, lastly, writing so profusely upon all these subjects, that those of his works alone which have been preserved and collected, independently of many others that are

lost, fill in one edition, six large quarto volumes. So vast an amount of literary performance, from a man who was at the same time so much of a public character, and gave so considerable a portion of his time to the service of others, shows strikingly what may be done by industry, perseverance, and such a method of life as never suffers an hour of the day to run to waste.

In this last particular, indeed, the example of Mr. Boyle well deserves to be added to those of the other great men we have already mentioned. Of his time he was, from his earliest years, the most rigid economist; and he preserved that good habit to the last. Dr. Dent, in a letter to Dr. Wotton, tells us that "his brother, afterwards Lord Shannon (who accompanied him on his continental tour with Mr. Marcombes), used to say, that, even then, he would never lose any vacant time; for, if they were upon the road and walking down a hill, or in a rough way, he would read all the way; and, when they came, at night, to their inn, he would still be studying till supper, and frequently propose such difficulties as he met with in his reading to his governor." The following naïve statement, too, which we find in an unfinished essay on a theological subject, which he left behind him in manuscript, and of which Dr. Birch, the editor of his collected works, has printed a part, may serve to show the diligence with which he prosecuted his severer studies, even amidst all sorts of interruptions. "It is true," he writes, "that a solid knowledge of that mysterious language" [it is his acquisition of the Hebrew tongue to which he refers] "is somewhat difficult, but not so difficult but that so slow a proficient as I could, in less than a year, of which not the least part was usurped by frequent sicknesses and journeys, by furnaces, and by (which is none of the modestest thieves of time) the conversation of young ladies, make a not inconsiderable progress towards the understanding of both Testaments in both their originals." But the life of active and incessant occupation which he led, even in his declining years, is best depicted in another curious document which Dr. Birch has preserved. A few years before his death he was urged to accept the office of President of the Royal Society, of which he had so long been one of the most active and valuable members, and the Transactions of which he had enriched by many papers of great interest; but he declined the honour on the score of his growing infirmities. About this time he also published an advertisement, addressed to his friends and acquaintances, in which he begins by remarking "that he has, by some unlucky accidents, had many of his writings corroded here and there, or otherwise so maimed" (this is a specimen of the pedantic mode of expression of which Mr. Boyle was too fond), "that, without he himself fill up the *lacunæ* out of his memory or invention, they will not be intelligible." He then goes on to allege his age and his ill-health as reasons for immediately setting

about the arrangement of his papers, and to state that his physician and his best friends have "pressingly advised him against speaking daily with so many persons as are wont to visit him;" representing it as that which must "disable him for holding out long." He, therefore, intimates that he means in future to reserve two days of the week to himself, during which, "unless upon occasions very extraordinary," he must decline seeing either his friends or strangers, "that he may have some time both to recruit his spirits, to range his papers, and fill up the *lacunæ* of them, and to take some care of his affairs in Ireland, which are very much disordered, and have their face often changed by the public disorders there." He at the same time ordered a board to be placed over his door, giving notice when he did and when he did not receive visits.

Nothing can set in a stronger light than this the celebrity and public importance to which he had attained. His reputation, indeed, had spread over Europe; and he was the principal object of attraction to all scientific strangers who visited the English metropolis. Living, as it was his fortune to do, at what may be called only the dawn of modern science, Boyle perhaps made no discovery which the researches of succeeding investigators in the same department have not long ere now gone far beyond. But his experiments, and the immense number of facts which he collected and recorded, undoubtedly led the way to many of the most brilliant results by which, since his day, the study of nature has been crowned. Above all, he deserves to be regarded as one of the principal founders of our modern chemistry. That science, before his time, was little better than a collection of dogmas, addressing themselves rather to the implicit faith of men than either to their experience or their reason. These venerable articles of belief he showed the necessity of examining, in reference to their agreement with the ascertained facts of nature; and, by bringing them to this test, exposed the falsehood of many of them. His successors have only had to contribute each his share in building up the new system; he had also to overthrow the old one.

Mr. Boyle died, at the age of sixty-four, in 1691. The experimental science of modern times has never had a more devoted follower; and he claims to be recorded, as having not only afforded us an illustrious example of the ardent pursuit of philosophy in a man of rank, but as having dedicated to its promotion the whole advantages of which his station and fortune put him in possession, with a zealous liberality that has scarcely been surpassed or equalled. Other wealthy patrons of literature and science have satisfied themselves with giving merely their money, and the *éclat* of their favourable regard, to the cause which they professed to take under their protection; but he spent his life in the active service of philosophy, and was not more the encourager and supporter

of all good works done in that name than a fellow-labourer with those who performed them. For the long period during which he was, in this country, the chief patron of science, he was also and equally its chief cultivator and extender. He gave to it not only his name, his influence, and his fortune, but his whole time, faculties, and exertions.

There is another distinguished name connected with the more recent history of physical science in our own country, which ought not to be omitted under our present head;—we mean that of the late HENRY CAVENDISH. Mr. Cavendish was the son of Lord Charles Cavendish, brother of the third Duke of Devonshire, and was born in 1731. He was sent, when young, to a school, then of some celebrity, at Hackney, and he afterwards went to Cambridge; but it is believed that he derived his taste for science chiefly from his father, who was not only in the habit of amusing himself with philosophical experiments, but was a good mathematician, and is the author of some determinations with regard to the phenomena of the barometer, of considerable value and importance. Lord Charles Cavendish survived to the year 1783, when he had reached the age of eighty, and was the senior member of the Royal Society. His son had early shown an attachment to scientific pursuits, to which, indeed, he had resolved to dedicate his life, and to sacrifice every other object of ambition, at a time when he had but the prospect of a very moderate patrimony. It was only after he had passed his fortieth year that he came into the possession of his large fortune, which was unexpectedly left him by an uncle. He was admitted a Fellow of the Royal Society in 1760, and very soon began to distinguish himself as one of the most active members of that learned body. The papers with which he continued to enrich the Transactions extend over a period of nearly fifty years; and are marked throughout by an accuracy, elegance, and often an originality of investigation, which make them models of scientific research and reasoning. His contributions to pneumatic chemistry, in particular, the first portion of which was published in 1766, must be ranked among the most important that had yet been made to chemical science. And, if we may no longer assign to him the undisputed glory of the great discovery of the composition of water,—so long regarded by all as a perfectly simple element, if there was any such in nature, but now ascertained to be a compound of two airs, or gases, oxygen and hydrogen (or as it was formerly called inflammable air)—he will certainly for ever be remembered as the chief author of the experimental investigation which led to it. The manner, too, in which he proceeded in this inquiry affords us one of the most beautiful and instructive examples on record of the right method of examining nature,—of that cautious and scrutinizing observation by which alone truth is to be detected. Other chemists, Macquer, and afterwards Lavoisier in France, Scheele in Sweden, Volta

in Italy, as well as Priestley in England, had all previously performed experiments which, if they had only been conducted with the requisite care, could not have failed to lead to the same results which Cavendish obtained. His, which in the first instance were repetitions of some of Priestley's, were commenced in the early part of the year 1781, with an apparatus and with precautions especially adapted for ascertaining the precise weight of the two gases and of whatever their combination might produce. The result was, that, when they were set on fire by an electric spark in a close and perfectly dry vessel, a deposit was left on the sides of the vessel, which was found to be pure water, *and to be exactly equal in weight to the two gases*. The experiment was afterwards repeated by Lavoisier on a larger scale with the same result; and water, on the other hand, has since been decomposed into oxygen and hydrogen.*

* A keen controversy has been carried on of late years on the question of whether the great discovery of the composition of water really belongs to Cavendish or to his celebrated contemporary James Watt. The claim in favour of Watt was first publicly advanced by the late M. Arago, in an "Eloge" on Watt read by him before the French Academy of Sciences, 8th December, 1834, and afterwards published in the "Annuaire" of the Bureau of Longitude for 1839, with an Appendix by Lord Brougham, entitled "An Historical Account of the Discovery of the Composition of Water." There are two English translations of M. Arago's "Eloge;" the first published at Edinburgh in 1839, the other published at London the same year, with additional Notes and an Appendix, by James Patrick Muirhead, M.A., Oxford. These publications were followed on the same side by an account of Watt in the First Series of Lord Brougham's "Lives of Men of Science of the Time of George III.," 1845, and "The Correspondence of the late James Watt on his Discovery of the Composition of Water; with a Letter from his son: edited, with Introductory Remarks and an Appendix, by J. P. Muirhead," 1846. Meanwhile, Mr. Cavendish's claim had been elaborately and strenuously defended in an "Address to the Meeting of the British Association, held at Birmingham, 26th August, 1839," by the President, the Rev. William Vernon Harcourt; which was afterwards published in the 8th volume of the Reports of the Association, and also separately, with a Postscript, in the following year. The same view was taken by the Rev. Dr. Whewell, now Master of Trinity College, Cambridge, in the first volume of his "Philosophy of the Inductive Sciences," 1840, and in an article in the "Quarterly Review," No. 153, for December, 1845, understood to be by the Rev. Dr. Peacock, Dean of Ely. On the opposite side, again, or in assertion of Watt's claim, there appeared articles in the "Edinburgh Review," No. 142 (for January, 1842), No. 150 (for

January, 1844), and No. 153 (for December, 1845), the last by the late Lord Jeffrey; and also an article in the "North British Review," No. 11 (for November, 1846), understood to be by Sir David Brewster. But by far the most thorough and conclusive investigation that the question has received will be found in the "Life of Cavendish" drawn up by Dr. George Wilson of Edinburgh (Professor of Chemistry in the University), and printed for the Cavendish Society in 1851. Of this volume, extending to nearly 500 pages, more than half is occupied with a "Critical Inquiry into the Claims of all the alleged Discoverers of the Composition of Water."

It is to be observed that what is claimed for Watt is merely the merit of having been the first to perceive the full import of Cavendish's decisive experiment; and his statement to that effect, made in letters to Dr. Priestley, Dr. Black, and Mr. Hamilton of Glasgow, in April 1783, is certainly the earliest on record. It is further highly probable that he had for some considerable time before this, anticipated the possibility that water would be found to be resolvable into certain kinds of air. But it is not pretended that he either made or suggested any of the experiments by which the great truth was proved. These were all devised and performed by Cavendish. Such being the case, perhaps some difference of opinion may fairly be expected to prevail in regard to the real amount of Watt's share in the discovery, even if we disregard the objections that have been made to the absolute correctness of his theory or interpretation of Cavendish's experiments. But that Cavendish needed Watt's interpretation to enlighten him as to the meaning of his own experiments seems to be quite an unnecessary supposition. Cavendish's account of his experiments was read before the Royal Society on the 15th of January, 1784; and his paper and another by Watt were published together in the Transactions for that year.

The great caution with which Mr. Cavendish conducted his inquiries was one of the most distinguishing characteristics of his method of procedure. To whatever subject he gave his attention, he examined it thoroughly. What we have just stated is well calculated to show the value of such a habit in philosophy; for this great discovery, of itself enough to immortalize his name, would have eluded him, as it had done others, if he had not watched the experiment which revealed it more narrowly than they. But it was not in this case only that the result of his investigations richly rewarded the care and circumspection with which they had been prosecuted. The patience with which he used to review and weigh all the circumstances of the case to be resolved has given a perfection to whatever he has done, from which as much benefit has resulted to the interests of science as to his own fame; for, instead of merely vague and imperfect indications, or hypotheses consisting half of truth and half of error, he has in this way bequeathed to philosophy either completed discoveries or investigations in which, so far as they go at least, there is no fallacy. He never, it has been remarked, advanced anything in any of his papers which he had afterwards to retract.

Although experimental science was Mr. Cavendish's favourite pursuit, and that on his success in which his fame rests, his stores of information upon other subjects were known to his friends to be various and extensive. "He was," we are told by one of the writers in the controversy in regard to the great discovery so long popularly associated with his name, "familiar with nearly every branch of physical science; a great chemist, a great electrician, a magnetist, and a meteorologist: his views of geology . . . were greatly in advance of his age, and had led him to a very considerable knowledge of the true succession of the strata of Great Britain, founded chiefly upon a consideration of their mineral structure and character, at a period when this science, in other hands, was a prey to the most extravagant theories altogether independent of observation: his knowledge of mathematics was equal, if not superior, to that of any of his countrymen: he was equally learned and skilful as a practical and as a theoretical astronomer: if a comet or a planet, such as Uranus, was observed, it was Mr. Cavendish who calculated its elements: if a great astronomical phenomenon was expected, such as the transit of Venus over the disc of the sun in 1769, it was Mr. Cavendish who discussed the character of the observations to be made, and their results when obtained: his knowledge of the theory and use of astronomical and other instruments was superior to that of any other philosopher of his age, and he was singularly skilful and ingenious in the contrivance and construction of chemical and philosophical apparatus: to all these various accomplishments, he united the most cautious habits of reasoning, and never committed himself to a conclusion which

his experiments and observations did not appear fully to justify." (Quarterly Review, lxxvii. 114.)

Mr. Cavendish, indeed, spent his life, if any man ever did, in the pursuit of knowledge, making it his only amusement, as well as his only business. The simple and unexpensive habits of life which he had formed in his earlier years underwent no change on his coming into possession of his large fortune. He had accustomed himself from his youth to the utmost regularity in all his movements; and his practice in this respect, to his last days, nothing was ever suffered to derange. What might be called his public scene was the Royal Society, the meetings of which he attended punctually as long as his strength permitted. With this exception, he was but little seen abroad; and, perhaps, the seclusion in which he lived made his name less, popularly known in his own country than it would otherwise have been, notwithstanding his eminent merits. His fame, however, was more than British—it was European. On the Continent, where he was regarded without reference to his private habits and only as the author of many admirable scientific disquisitions and of some great discoveries, his name stood very high. The chief men of science in France gave the strongest proof of the estimation in which they held him, when, in 1803, they elected him one of the eight Foreign Associates of the Institute.

One valuable service which Mr. Cavendish's wealth enabled him to render to the students of science and literature of his time, was the establishment of an extensive library, which, with great liberality and public spirit, he threw open for the accommodation both of his friends and of all other persons engaged in intellectual pursuits who were properly recommended to him—allowing them not only to consult the books, but to carry them home. In the use of this privilege he made no distinction between himself and those whom he admitted to share it with him. When he wanted a book for his own perusal, the same application for it was made to the librarian, and the same receipt given for it, as if it had been borrowed by any other reader. Towards the close of his life, after the death of the person who had been accustomed to take charge of the collection, he even used to attend himself on a certain day of every week to give out the books to applicants.

This eminent person died in 1810, full of years and honours. Even in his last moments something of his love of watching and scrutinizing the phenomena of nature showed itself; he insisted upon being left to die alone, apparently that he might be able to observe the symptoms of approaching dissolution with the more undisturbed attention. Accordingly, when his servant, whom he had sent out of the room, returned sooner than he had desired, he immediately ordered him again to retire; and, when the man came back the second time, he found that his master had breathed his last. In his attachment to philosophy, Mr.

Cavendish was all his life so independent of other sources of pleasure, that his fortune, rather possessed than enjoyed, and not expended in the maintenance of any of the show and luxury in which a large revenue usually dissipates itself, had accumulated so greatly, that at the time of his death it is said to have amounted to twelve hundred thousand pounds. He may well be described, therefore, to have been, as a French writer ("Biographie Universelle," vii. 456) has quaintly expressed it, the richest of all the learned of his time, as well as probably the most learned of all the rich.

These histories are abundantly sufficient to prove both how frequently men of wealth and rank have resisted all other allurements in order to devote themselves to intellectual pursuits, and how many important contributions such persons have been enabled to make to literature, science, and the arts. Yet it would be easy to add many other examples from a very cursory survey of the annals of improvements and discoveries. Thus, to confine ourselves to the arts and sciences only, we might mention among our own countrymen the celebrated **MARQUIS OF WORCESTER**, author of the "Century of Inventions," among which we find the first suggestion of the steam-engine; his contemporary, **VISCOUNT BRONCKER**, the first President of the Royal Society, and noted as the perfecter of the theory of fractional arithmetic; the second **EARL OF MACCLESFIELD**, to whom we are chiefly indebted for the reformation of the calendar, and the introduction of the New Style into England; the third **EARL STANHOPE**, the inventor of the printing-press known by his name, as well as of many other ingenious and valuable contrivances;—and various others, all memorable either as inventors, or as the authors of some decided step in the progress of improvement. Among foreigners, too, there is **PRINCE RUPERT**, to whom, as already noticed, there has been attributed the discovery of the art of mezzotinto engraving. **BARON HERMELIN**, a nobleman of Sweden, who died in 1820, was the father of the modern and greatly improved system of working the mines of that country, which he expended many years of exertion and large sums of money in introducing and establishing. The modern art of fortification is the creation of the French **MARSHAL VAUBAN**, a man of rank and wealth, who, although he spent his life as a soldier, found leisure to write numerous works, which have been printed, as well as twelve large volumes in manuscript, which he left behind him, entitled "*Mes Oisivetés*" (*My Idle Hours*). The most elaborate and elegant work on Natural History that was ever written, and the one which, notwithstanding some serious defects and errors, has perhaps contributed more than any other to spread a taste for that science, was the production of another French nobleman, the celebrated **COUNT DE BUFFON**. A German nobleman, the **BARON VON CANSTEIN**, is noted for having discovered and practised at Halle, in the beginning of the last century, a new mode of printing,

which appears to have been the same with that now called stereotype. This invention is singular for its vicissitudes of notoriety and oblivion. The Chinese have had a long acquaintance with the art of printing from blocks or plates, instead of moveable types, and among them it is to this day the only method in use. It was probably also the first form which the art of printing assumed in Europe—was then forgotten for many years, till it was revived in the middle of the sixteenth century at Augsburg, where some of the plates that were used for the purpose are still preserved—was again introduced at Leyden about half a century later—was a few years after reinvented by Canstein—was practised at Edinburgh in 1744 by William Ged, who was quite ignorant of what had been done by his predecessors—and, lastly, after his attempts had ceased to be remembered, was taken up anew by the late ingenious Dr. Alexander Tilloch, and Fowlis, the Glasgow printer, who, however, did little more than merely take out a patent for what they deemed their discovery. These block or plate printers, however, did not all pursue the same method. Faust, for instance, on the invention of printing, employed merely wooden blocks, such as are used by the Chinese, on which the characters were cut out, as is done still in wood-engraving; the Augsburg printers appear to have set up their types in the usual manner, and then to have converted them into a solid plate by pouring melted metal upon the back of the congeries; and the present method, as is well known, is, after having set up the types, to take an impression from them in plaster of Paris, or some other composition, and to cast or found the plate in this as a mould. It does not very clearly appear what was the plan which Canstein followed; but it is known that he printed a great many volumes and sold them very cheap. A copy of the New Testament, for instance, he used to sell for fourpence; but, as he was very pious, it is not improbable that he distributed the Scriptures at less even than the cost price, which his fortune enabled him to do. It is said that it was while endeavouring to devise a cheap method of multiplying copies of the Bible for the use of the poor, that the notion of his invention suggested itself to him.

CHAPTER XXVIII.

SELF-EDUCATED CULTIVATORS OF SCIENCE:—PARKES; DAVY.

MOST of the individuals we have mentioned, who, born to rank and affluence, have devoted themselves to scientific pursuits, were enabled to accomplish what they did, in a great measure, from the peculiar advantages of their position, which afforded them both leisure for the

prosecution and maturing of their several schemes, and money to expend on the necessary apparatus and experiments. This proves to how much profit the rich man may turn his fortunate external circumstances, even in the pursuit of knowledge, if he can only rouse himself to enter with earnestness upon that enterprise. But still the ambition of aspiring minds, left to struggle unassisted by such external aids, has accomplished, after all, quite as great things as all the resources and immunities of what might be deemed the happiest worldly lot have ever given birth to. We now return to accompany for a while the onward steps of a few more of those courageous adventurers, who have begun and carried on the work of mental cultivation, without heeding any combination of worldly disadvantages against which they might have to contend. We shall begin with the cases of one or two individuals so situated, who have distinguished themselves in that same field of experimental science in which we have just seen what Boyle and Cavendish achieved in their very opposite circumstances.

The first name we shall mention is that of one who has no claim, we believe, to any important discovery in the department which he cultivated, but whose literary works, nevertheless, as well as his history, abundantly testify him to have been a most ingenious and meritorious man. We speak of the late MR. SAMUEL PARKES, the well-known author of the "Chemical Catechism." Mr. Parkes, as we learn from a communication with which we have been favoured by his surviving daughter, was born in 1761, at Stourbridge, in Worcestershire, where his father was a small grocer. At five years of age he was sent to a preparatory school in his native town; and it is remembered that, during the time of his attendance at this infant seminary, Mr. Kemble's company of itinerant players having visited Stourbridge and remained there for some months, that gentleman placed his daughter at the same school, the child who became afterwards the celebrated Mrs. Siddons. When ten years old, Parkes was sent to another school at Market Harborough; but, after remaining here only a very short time, he was taken away and apprenticed to a grocer at Ross, in Herefordshire. This person happened to be a man of some education, and to be possessed of a few books, which he very kindly lent to his apprentice; but, although he endeavoured to give him a taste for reading, he could not, it is said, gain much of his attention. It does not appear how long young Parkes continued in this situation; but at last his master failed, and he returned home to his father. We now hear no more of him till he had reached his thirty-second year, up to which time, it seems, he remained at home, assisting his father in the shop. It is probable, from the resources he afterwards displayed, that the foundation of many of his acquirements was laid during this interval. Perhaps he had also saved a little money; for he now went to Stoke-upon-Trent, began business on his own account

as a soap-boiler, and married. The new line upon which he entered shows that he had been already directing his attention to practical chemistry. But, after persevering for ten years in this business he met with so little success as to be obliged to give it up; and at the age of forty-two he came up to London with no property in the world, except ten pounds, which had been lent him by his father. It was hard enough to be obliged, as it were, to begin the world again at this time of life; but there was no help for it, and he set to work resolutely. Some friends whom he had made lent him a little assistance, and he began manufacturing muriatic acid for the use of dyers. It is very evident, that, although he had come to town without much money in his pocket, he had brought with him some useful knowledge—one fruit, at least, of the labours of his previous life, of which fortune had not been able to despoil him. This he now turned to excellent account. To his muriatic acid he soon added other chemical preparations, his skill in manufacturing which was not long in being generally appreciated, and eventually procured him a large trade and a high reputation.

Although Mr. Parkes had probably given considerable attention to some of the practical parts of chemistry before he came up to London, it was only after he had established himself in this last-mentioned line of business that he began to study the subject scientifically. At this time, as we have seen, he was above forty years of age—so that he may be quoted as another most encouraging example for those who have been prevented by any cause from commencing their studies till late in life. Notwithstanding the time he had lost, Mr. Parkes became eventually a most accomplished chemist, and gave to the world a succession of works relating to that science which long continued to hold the rank of textbooks of high authority. The earliest of these was his “Chemical Catechism,” which first appeared in 1805. It was translated, soon after its publication, into the German, French, Spanish and Russian languages. By this work alone, of which numerous large editions were printed, the author realized 5000*l*. The Catechism was followed by another work, “The Rudiments of Chemistry;” and that by the “Chemical Essays,” in five volumes. This last in particular, is an excellent performance, and strikingly shows the author’s extensive acquaintance with his subject. Like their precursor, these two works were also translated into the principal continental languages, and obtained great popularity abroad, as well as in this country. Among other gratifying testimonies which the author received of the sense entertained of his labours, was a splendid ring presented to him for his services to science by the Emperor Alexander I. of Russia.

One of the chief merits of the elementary works published by Mr. Parkes, and what must doubtless more than anything else have helped to make them popular, lies in this; that in all his explanations the

author begins at the beginning, and nowhere assumes any information necessary for understanding the subject, to exist in the mind of the reader beyond what he has himself communicated. It might seem, at first sight, as if this were a part of the art of teaching of no very difficult attainment. Yet the fact is, that it is a secret of which very few writers have made themselves masters. In general the person who resorts to a professedly elementary treatise, in order to study any branch of science of which he previously knows nothing, finds himself stopped before he has gone very far, by the author paying him the very inconvenient compliment of addressing him as if he were familiar with many things of which he is quite ignorant. Hence, more than on any other account, the uselessness, or at least the insufficiency, of the greater number of such works for the end which they are intended to serve. They almost always suppose the reader to know, before he opens them, no inconsiderable part of the very mystery which they profess to teach. It sometimes, no doubt, happens that the reader does accidentally possess this requisite preliminary information; and then (though no thanks to the author) he will make his way through the book without being inconvenienced by its deficiencies. In other cases he may have sufficient ingenuity to deduce from what is stated some conjecture more or less vague as to what is passed over, and in this way may be enabled to proceed in his perusal without finding himself absolutely in the dark. But his progress, so conducted, is not only slow, unsatisfactory, and painful, compared to what it might be, but is likely besides to leave him at last only half-informed or misinformed as to many things which he supposes himself to know. Perhaps the best way of employing books of the description to which we allude—when no better are to be had—is for the student to provide himself with two or more at the same time upon the subject of which he wishes to make himself master; so that, when he finds one deficient or unintelligible, he may have a chance of finding an interpreter in another. This is a method which has sometimes been successfully followed by persons who have been obliged to be their own instructors, after every attempt to understand the science, or other branch of education, which it was desired to learn by the assistance of a single author, had proved a failure; and we recommend it to others similarly situated. The probability is, that of two writers each of whom at times expresses himself obscurely, the one will not always or usually fall into that fault in regard to exactly the same matters as the other; and, therefore, though either alone might be an inadequate instructor, the two together may shed sufficient light on the subject. Besides, of two or more ways of presenting or illustrating the same truth, one mind is most readily reached by one, and another by another; so that, even when no absolute insufficiency can fairly be complained of in either treatise, the two are still better than one. The

force of this last consideration has induced some popular writers of elementary works to state the more difficult parts of their subject in a variety of ways, for the sake of more surely impressing them upon the various minds, or moods of mind, they may chance to address; and the practice, when followed judiciously, and so as not to overload the book with unnecessary repetitions, a course which only fatigues the reader and distracts his attention, is one which may be made greatly to contribute to the clear and effective exposition of the author's meaning.

It may seem strange that so many writers should have failed in the observance of a rule of elementary explanation apparently so simple and easy as that in question. What less difficult, it may be said, or even more natural, than, in expounding any subject to a mind which is supposed to be ignorant of its first principles, to state everything with a recollection of, and in accommodation to, that ignorance? It is only, in the first place, to deduce the introductory statements from sufficiently familiar instances, and then, in pursuing the line of inference or demonstration, to advance from one thing to another by sufficiently short steps. But even to do this requires no common degree of attention, patience, and skill. It is true that all science, even the highest and most recondite, is deducible from the facts or feelings of ordinary life; but it often happens that a proficient in a particular science has never viewed it in this connection. The manner in which he was himself taught it did not lead him to do so. He was probably carried through what were called its principles, by an exercise of his faith rather than of his reason; and left to gather a full understanding of them, not so much from what he knew of their foundations before, as from what he was to see of their application afterwards. He was like a man entering a half-darkened apartment, to whom everything is at first invisible, and who is indebted for the measure of discernment which at last enables him in some sort to distinguish objects, not to any additional light which is thrown upon them from without, but to the expansion of eye which the dimness itself occasions. It may happen that, in the progress of his studies, his partial acquaintance with one part of the subject has so much aided his partial acquaintance with another part, that he has at last attained to a tolerably clear notion of the whole. But still it remains in his head an insulated system of propositions, altogether withdrawn and separated from those truths of ordinary experience out of which, nevertheless, it has wholly sprung. When a person, therefore, who has acquired his knowledge in this manner sits down to write an elementary book, he will be very apt to overlook that connection between scientific and common truths to which his own attention has never been called. He will begin his treatise, not by reference to something which is understood by everybody, but by an announcement so far ahead of everything of this kind, that its meaning is likely to be

nearly imperceptible to all, except those who have already some acquaintance with the still more remote matters to which it is intended to lead. And his subsequent deductions will all be apt to be characterized by the same absence of the simple and the natural, proceeding as they do from a mind which did not acquire its own knowledge of the subject from contemplating it in its simplest and most natural aspect.

Now, a self-educated man, when he attempts to explain to others what he has himself learned, is much less likely to fall into this error of manner. His own earliest acquaintance with science was probably made by the aid of that unscientific knowledge which common observation teaches every man; and, having no master to supply the deficiencies of his books, he must have felt painfully the inconvenience of their omissions and obscurities. Hence in his own performances a method and style of address in all respects better suited to readers circumstanced as he himself was. He knows, from his own experience, what the difficulties of such readers are, and is therefore both the more solicitous and the better qualified to provide against them. In making his first approach to the science, he does it through the avenue of certain common and simple facts, calculated to carry with them the apprehension and assent of all; his references are frequent throughout the work to considerations of this class, which are always a valuable excitement and help to the mind; and his progress from one statement to another is marked by a happy skill in so selecting and arranging the intermediate points of notice, or, as we may express it, picking his steps, as to arrive at the ultimate object at once by the easiest and by the shortest road. For it is of importance to remark, that the secret of this art of perspicuous explanation does not lie so much in an exuberant minuteness of detail, which leaves no particular whatever unstated, as in bringing out from the group, and fixing the chief attention on, those comparatively few particulars which, being themselves apprehended, suggest and supply the rest. A prolix and indiscriminating enumeration of all the items of the case is rather adverse to a clear and effective exposition, tending as it does both to weary and confuse the mind. To make the description what it should be, nothing needful should be omitted, and there should also be nothing superfluous.

The elementary treatises of Mr. Parkes possess, as we have said, a good deal of this sort of merit, and owe to that circumstance much of their popularity and usefulness. Those of Ferguson, another self-educated individual, display the same excellence in a still greater degree, and have always, accordingly, been favourites of those students of science who, like the writer, have been their own instructors. We may here observe, however, that the advantages of the question and answer method pursued in the "Chemical Catechism" may reasonably be doubted. Where the composition assumes the form of a dialogue or

conversation, in which two or more speakers are made, as it were, to examine or discuss the subject, one proposing his doubts or difficulties, which another meets and solves by the proper reasons and explanations, as well exemplified, for instance, in some of Mrs. Marcet's treatises, the meaning and convenience of so breaking down the statements are sufficiently obvious. The attention of young readers especially is, perhaps, better kept alive by such an intermixture of the dramatic; and the artifice is also an ingenious one for enabling the author to notice and correct, in the most natural manner, the various misapprehensions into which the mind is apt to fall on first attempting to make acquaintance with a new subject. But neither of these purposes seems to be, in any degree, answered by merely introducing every sentence or short paragraph throughout the work with a formal interrogatory. Even in a mere school-book, the pupil's ingenuity is best exercised, and his understanding of what he reads most effectually insured, by the questions he should be able to answer being left to be put to him by his teacher, and the answers themselves to be given in his own words. The other plan would seem to be calculated only to assist the pupil in learning his task by rote.

Mr. Parke, in his latter and more prosperous days, used often to dwell with pleasure on his struggles in early life, and naturally felt proud of relating the hardships he had surmounted by his own industry. The success of the different works he published gave him, as might be supposed, the highest gratification. In addition to the literary performances which we have already mentioned, we ought to notice two pamphlets which he gave to the public in the years 1817 and 1819, in support of the attempt then making, and which was eventually successful, to obtain a repeal of the salt duties. He was one of the most active of the persons who stirred in this matter, anticipating, as it has been already noticed that the celebrated inventor of the logarithms appears to have done, great advantages to agriculture from the use of salt as a manure. Engaged, as he was, in the management of an extensive chemical manufactory, which required unremitting attention, his hours of literary labour were those which he stole from repose or from the time which most men give to relaxation and amusement. Yet, besides the different books which, in the course of a few years, he published in his own name, he contributed numerous papers to the different scientific periodical works of the day. As another evidence, too, of his punctuality and indefatigable industry, it may be mentioned that he had, from an early age, been in the habit of keeping a regular diary of every action of his life, and never retired to bed till he had committed to writing the events of the day. This, and all his other industrious habits, he kept up to the last; and, even up to within a few days of his death, although he had long been suffering under a painful disease, his attention to

business, and especially to his scientific pursuits, continued unrelaxed. He closed his valuable and active life on the 23rd of December, 1825, in the sixty-fifth year of his age.

Neither the acquisition of knowledge, nor that of wealth, then, need be despaired of even by those who have not succeeded in accumulating much of either after a large portion of life has been spent, provided they resolve to employ the requisite industry and perseverance during the remainder of it. These virtues seldom fail to obtain their natural recompense at last; although, in some cases, they may have to struggle for a long time with circumstances very unfavourable to success. A man is sometimes so unfortunately placed, so jammed in and hand-bound by the pressure of an unpropitious lot, that, with his best efforts, it is long before he can extricate himself and obtain even a fair opportunity of exerting what powers he may possess. This seems to have been the case with Parkes for the first forty years of his life. In the popular phrase, fortune was set against him; he either had no means of engaging in any likely line of well-doing, or whatever he attempted turned out unsuccessful. But, in such a shifting scene as this world is, it can rarely happen that a man shall, during the whole of his lifetime, have the blast against him. As the poet expresses it, "there is a *tide* in the affairs of men," an ebbing and flowing of the unstable element on which they are borne, and if this be only "taken at the flood," the "full sea" is gained on which "the voyage of their life" may be made with ease and the prospect of a happy issue. It is only those, however, who are constantly on the watch for it that will be prepared to seize the lucky moment when it comes; in other words, nothing but the cultivation and continued exercise of habits of industry and perseverance, even while they bring but small or no immediate return, will enable a man to benefit by the most favourable opportunities when they at last present themselves. To the habitually indolent and thoughtless it is the same as if the tide never were at flood at all—for they are sure to miss it when it is. Parkes spent nearly two-thirds of his life in contending with difficulties which baffled all his attempts to overcome them; and others may, sometimes, be for as long a period equally unfortunate. Let such be taught, by his history, that their sky may yet brighten; and, by his example, how to take advantage of it when it does. The space of life that remained to him after his more prosperous career began was comparatively short; but it was long enough to enable him, while he gave the most assiduous attention to business, not only to acquire much knowledge himself, but also to contribute largely to its diffusion in his own and other countries; and to secure, by his literary works, a highly respectable place among the scientific writers of the time.

But the annals of modern Chemistry supply us with a much more

splendid name among the self-taught cultivators of the science. The discoveries of all his predecessors have been, in later days, surpassed in brilliancy by those of SIR HUMPHRY DAVY. Davy was born in



SIR HUMPHRY DAVY.

1778, at Penzance, in Cornwall. His father followed the profession of a carver in wood in that town, where many of his performances are still to be seen in the houses of the inhabitants. Young Davy was taught the rudiments of classical learning at a school in Truro. He was then placed by his father with an apothecary and surgeon in his native place. But, instead of attending to his profession, he spent his time either in rambling about the country or in experimenting in his master's garret, sometimes to the no small danger of the whole establishment; and the doctor and he at last agreed to part. About his fifteenth year he was placed as pupil with another surgeon residing at Penzance; but it does not appear that his second master had much more success than his first in attempting to give him a liking for the medical profession. The future philosopher, however, had already begun to apply, of his own accord, to those sciences in which he afterwards so greatly distinguished himself; and, proceeding upon a plan of study which he had laid down for himself, he had, by the time he was eighteen, obtained a thorough knowledge of the rudiments of natural philosophy and chemistry, as well as made some proficiency in botany, anatomy, and geometry. The subject of metaphysics, it is stated, was also embraced in his reading at this period.

But chemistry was the science to which, of all others, he gave him-

self with the greatest ardour; and, even in this early stage of his researches, he seems to have looked forward to fame from his labours in this department. The writer of the memoir of Sir Humphry, to which we are indebted for these particulars, quotes an exclamation which broke from him one day in after-life, when contemplating, along with a friend, a picture of one of the mines of his native district, which shows what were the visions of his solitary rambles. "How often, when a boy," said he, "have I wandered about those rocks in search after new minerals, and, when tired, sat down upon those crags, and exercised my fancy in anticipations of future renown!" The peculiar features of this part of the country doubtless contributed not a little to give his genius the direction it took. The mineral riches concealed under the soil formed alone a world of curious investigation. The rocky coast presented a geological study of inexhaustible interest. Even the various productions cast ashore by the sea were continually affording new materials for examination to his inquisitive and reflecting mind. The first original experiment, it is related, in which he engaged, had for its object to ascertain the nature of the air contained in the bladders of sea-weed. At this time, he had no other laboratory than what he contrived to furnish for himself, by the assistance of his master's phials and gallipots, the pots and pans used in the kitchen, and such other utensils as accident threw in his way. These he converted, with great ingenuity, to his own purposes. On one occasion, however, he accounted himself particularly fortunate in a prize which he made. This was a case of surgical instruments with which he was presented by the surgeon of a French vessel that had been wrecked on the coast, to whom he had done some kind offices. Examining his treasure with eagerness, Davy soon perceived the valuable aid he might derive in his philosophical experiments from some of the articles; and one of the principal of them was, in no long time, converted into a tolerable air-pump. The proper use of the instruments was, of course, as little thought of by their new possessor as that of his master's gallipots was wont to be when he had got them up to his garret. Davy's subsequent success as an experimentalist, it is well remarked by the writer to whom we have referred above, was probably owing, in no small degree, to the necessity he was placed under in his earliest researches of exercising his skill and ingenuity in this fashion. "Had he," proceeds his biographer, "in the commencement of his career been furnished with all those appliances which he enjoyed at a later period, it is more than probable that he might never have acquired that wonderful tact of manipulation, that ability of suggesting expedients, and of contriving apparatus so as to meet and surmount the difficulties which must constantly arise during the progress of the philosopher through the unbeaten tracks and unexplored regions of science. In this art Davy certainly stands unrivalled; and, like his

prototype, Scheele, he was unquestionably indebted for his address to the circumstances which have been alluded to: there never, perhaps, was a more striking exemplification of the adage, that necessity is the parent of invention."

A curious catalogue might be made of the shifts to which ingenious students in different departments of art have resorted, when, like Davy, they have wanted the proper instruments for carrying on their inquiries or experiments. His is not the first case in which the stores of an apothecary's shop are recorded to have fed the enthusiasm and materially assisted the labours of the young cultivator of natural science. The German chemist, Scheele, who has just been mentioned, and whose name ranks in his own department with the greatest of his time, was, as well as Davy, apprenticed in early life to an apothecary. While living in his master's house he used secretly to prosecute the study of his favourite science by employing often half the night in reading the works that treated of it, or making experiments with instruments fabricated, as Davy's were, by himself, and out of equally simple materials. Like the young British philosopher, too, Scheele is recorded to have sometimes alarmed the whole household by his detonations;—an incident which always brought down upon him the severe anger of his master, and heavy menaces intended to deter him from ever again applying himself to such dangerous studies, which, however, he did not long regard. It was at an apothecary's house, as has been noticed in a preceding page, that Boyle and his Oxford friends first held their scientific meetings, induced, as we are expressly told, by the opportunity they would thus have of obtaining drugs wherewith to make their experiments. Newton lodged with an apothecary, while at school, in the town of Grantham; and as, even at that early age, he is known to have been ardently devoted to scientific contrivances and experiments, and to have been in the habit of converting all sorts of articles into auxiliaries in his favourite pursuits, it is not probable that the various strange preparations which filled the shelves and boxes of his landlord's shop would escape his curious examination. Although Newton's glory chiefly depends upon his discoveries in abstract and mechanical science, some of his speculations, and especially some of his writings on the subjects of light and colour, show that the internal constitution of matter and its chemical properties had also much occupied his thoughts. Thus, too, in other departments, genius has found its sufficient materials and instruments in the humblest and most common articles, and the simplest contrivances. Ferguson observed the places of the stars by means of a thread with a few beads strung on it, and Tycho Brahé did the same thing with a pair of compasses. The self-taught American philosopher, Rittenhouse, being, when a young man, employed as an agricultural labourer, used to draw geometrical diagrams on his plough, and study

them as he turned up the furrow. Pascal, when a mere boy, made himself master of many of the elementary propositions of geometry without the assistance of any master, by tracing the figures on the floor of his room with a bit of coal. This, or a stick burned at the end, has often been the young painter's first pencil, while the smoothest and whitest wall he could find supplied the place of a canvas. Such, for example, were the commencing essays of the early Tuscan artist, Andrea del Castagno, who employed his leisure in this way when he was a little boy tending cattle, till his performances at last attracted the notice of one of the Medici family, who placed him under a proper master. The famous Salvator Rosa first displayed his genius for design in the same manner. To these instances may be added that of the late English musical composer, Mr. John Davy, who is said, when only six years old, to have begun the study and practice of his art by imitating the chimes of a neighbouring church with eight horseshoes, which he suspended by strings from the ceiling of a room in such a manner as to form an octave.*

But to return to our young English chemical student. For a time Davy pursued his experimental investigations, without teacher or guide, in the manner that has been described, and aided only by the scantiest and rudest apparatus. When still a lad, however, he was fortunate in making the acquaintance of Mr. Gregory Watt, the son of the celebrated James Watt. This gentleman, having come to reside at Penzance for the recovery of his health, lodged with Mrs. Davy, and soon discovered the talent of her son. The scientific knowledge of Mr. Watt gave an accurate direction to the studies of the young chemist, and excited him to a systematic perseverance in his favourite pursuit. Chance attracted to him the notice of Mr. Davies Giddy (afterwards Mr. Gilbert, and President of the Royal Society), which the discovery of his merits soon improved into patronage and friendship. The boy, we are told, was leaning on the gate of his father's house when Mr. Gilbert passed, accompanied by some friends, one of whom remarked that there was young Davy, who was so much attached to chemistry. The mention of chemistry immediately fixed Mr. Gilbert's attention; he entered into conversation with the young man, and, speedily becoming convinced of his extraordinary talents and acquirements, offered him the use of his library, and whatever other assistance he might require for the pursuit of his studies. Mr. Gilbert and Mr. Watt soon after this introduced Davy to the celebrated Dr. Beddoes, who had just established at Bristol

* Many of our readers may probably be acquainted, either in the original or in the English translation, with the work of the German writer, Campe, entitled "The New Robinson," which, in an account of the various expedients supposed to be resorted to by a young seaman cast ashore on an uninhabited

island, and obliged to provide for himself sustenance and shelter by the aid merely of such implements as he could fashion by his own ingenuity, presents a very interesting picture of the manner in which many of the ordinary processes of mechanical art might be performed without the ordinary tools.

what he called his Pneumatic Institution, for investigating the medical properties of the different gases. Davy, who was now in his nineteenth year, had for some time been thinking of proceeding to Edinburgh, in order to pursue a regular course of medical education; but, Dr. Beddoes, who had been greatly struck by different proofs he had given of his talents, and especially by an essay in which he propounded an original theory of light and heat, having offered him the superintendence of his new institution, he at once closed with that proposal.

The young philosopher was now fairly entered on his proper path, and from this date we may consider him as having fairly escaped from the disadvantages of his early lot. But it was while yet poor and unknown that he had made those acquirements which both obtained for him the notice of his present patrons, and fitted him for the situation in which they placed him. His having attracted the attention of Mr. Gilbert, as he stood at his father's gate, may be called a fortunate incident; but it was one that never would have happened had it not been for the proficiency he had already made in science by his own endeavours. Chance may be said to have offered this opportunity of emerging from obscurity; but, had he not previously laboured in the cultivation of his mind as he had done, it would to him have been no opportunity at all.

The experiments conducted by Davy, and under his direction, at the Bristol Institution, were soon rewarded by important results; and of these, Davy, when he had just completed his twenty-first year, published an account, under the title of "Researches, Chemical and Philosophical, chiefly concerning Nitrous Oxide, and its Respiration." In this publication the singular intoxicating effects produced by the breathing of nitrous oxide were first announced; and it excited a considerable sensation in the scientific world, and at once made Davy generally known as a most ingenious and philosophic experimentalist. He was, in consequence, soon after its appearance, invited to fill the chemical chair of the Royal Institution, then newly established. When he commenced his lectures here, he was scarcely twenty-two years of age; but never was success in such an attempt more decided and brilliant. He soon saw his lecture-rooms crowded, day after day, by all that was most distinguished in the rank and intellect of the metropolis; and his striking and beautiful elucidations of every subject that came under his review riveted, often even to breathlessness, the attention of his splendid auditory. The year after his appointment to this situation he was elected also Professor of Chemistry to the Board of Agriculture; and he greatly distinguished himself by the lectures which, for ten successive sessions, he delivered in this character. They were published in 1813, at the request of the Board. In 1803, when only in his twenty-fifth year, Davy was elected a Fellow of the Royal Society, and his contribu-

tions to the "Transactions" from this time till his death, were frequent, and of the highest value. In 1806 he was chosen to deliver the Bakerian Lecture before the Society; and he performed the same task for several successive years. Many of his most brilliant discoveries were announced in these discourses. In 1812 he received the honour of knighthood from the Prince Regent, being the first person on whom his Royal Highness conferred that dignity: and two days after he married a lady who brought him a considerable fortune. Next year he was elected a corresponding member of the French Institute. He was created a baronet in 1818. In 1820 he was chosen a foreign associate of the Royal Academy of Sciences at Paris, on the death of the illustrious Watt. He had been for some time secretary to the Royal Society; and in 1820, on the death of Sir Joseph Banks, he was, by a unanimous vote, raised to the Presidency of that learned body—an office which he held till he was obliged to retire, from ill health, in 1827, when his friend and first patron, Mr. Gilbert, was chosen to succeed him. Little, we may suppose, did either of the two anticipate, when they first met, thirty years before, at the gate of Davy's father's house, that they would thus stand successively, and in this order, at the head of the most distinguished scientific association in England.

It is impossible for us in this place to attempt anything more than the most general sketch of Sir Humphry Davy's numerous and most important discoveries in chemical science. Even his earliest publication, the title of which we have already transcribed, was regarded as, for the first time, introducing light and order into an interesting department of the science—the theory of the various combinations of oxygen and nitrogen, the two gases which, mixed together in certain proportions, form our common atmospheric air, but in other proportions produce compounds of an altogether dissimilar character. The first memoir by Davy which was read before the Royal Society was presented by him in 1801, before he was a member. It announced a new theory, which is now generally received, of the galvanic influence, or the extraordinary effect produced by two metals in contact with each other, when applied to the muscle even of a dead animal, which the Italian professor, Galvani, had some years before accidentally discovered. It was supposed both by Galvani and his countryman Volta, who also distinguished himself in the investigation of this curious subject, that the effect in question was an electrical phenomenon—whence galvanism used to be called animal electricity; but Davy showed, by many ingenious experiments, that, in order to produce it, the metals in fact underwent certain chemical changes. Indeed, he proved that the effect followed when only one metal was employed, provided the requisite chemical change was by any means brought about on it, as, for example, by the interposition between two plates of it of a fluid calculated to act upon its surface

in a certain manner. In his Bakerian Lecture for 1806, he carried the examination of this subject to a much greater length, and astonished the scientific world by the announcement of a multitude of the most extraordinary results, from the application of the galvanic energy to the composition and decomposition of various chemical substances. From these experiments he arrived at the conclusion, that the power called chemical affinity was, in truth, identical with that of electricity. Hence the creation of a new science, now commonly known by the name of Electro-Chemistry, being that which regards what is held to be the action of electricity in the production of chemical changes. The discourse in which these discoveries were unfolded was crowned by the French Institute with their first prize, by a decision which reflects immortal honour upon that illustrious body; who thus forgot not only all feelings of national jealousy, but even the peculiar and extraordinary hostility produced by the war then raging between the two countries, in their admiration of genius and their zeal for the interests of philosophy.

But the results which this great chemist had already obtained only formed, in his hands, the source of new discoveries. In the interesting and extraordinary nature of its announcements, the Bakerian Lecture of 1807 was as splendid a production as that of the former year. There are certain substances, as the reader is aware, known in chemistry by the name of alkalies, of which potash and soda are the principal. These substances chemists had hitherto in vain exhausted their ingenuity, and the resources of their art, in endeavouring to decompose. The only substance possessing alkaline properties, the composition of which had been ascertained, was ammonia, which is a gas, and is therefore called *volatile* alkali; and, this having been found to be a compound of certain proportions of hydrogen and nitrogen, an opinion generally prevailed that hydrogen would be found to be also a chief ingredient of the *fixed* alkalies. Davy determined, if possible, to ascertain this point, and engaged in the investigation with great hopes of success, from the surpassing powers of decomposition which he had found to belong to his new agent, the galvanic influence. The manner in which he pursued this object is one of the most beautiful specimens of scientific investigation on record. One of the most important of the laws of galvanic decomposition, which he had previously discovered, was, that, when any substance was subjected to this species of action, its oxygen (an ingredient which nearly all substances contain) was developed at what is called the positive end or pole of the current of electricity, while, whenever any hydrogen or inflammable matter was present, it uniformly appeared at the opposite or negative pole. Proceeding upon this principle, therefore, Davy set to work with a fixed alkali; and at first submitted it dissolved in water to the galvanic action. The result, however, was, that the water alone was decomposed, nothing being disengaged by

the experiment but oxygen and hydrogen, the ingredients of that fluid, which passed off as usual, the former at the positive, the latter at the negative pole. In his subsequent experiments, therefore, Davy proceeded without water, employing potash in a state of fusion; and, having guarded the process from every other disturbing cause that presented itself, by a variety of ingenious arrangements, he had at last the satisfaction of seeing the oxygen gas developed, as before, at the positively electrified surface of the alkali, while at the same time, on the other side, small globules of matter were disengaged, having all the appearances of a metal. The long agitated question was now determined; the base of the fixed alkalies was clearly metallic. To ascertain the qualities of the metallic residue which he had thus obtained from the potash was Davy's next object. From its great attraction for oxygen, it almost immediately, when exposed to the atmosphere, became an alkali again, by uniting with that ingredient; and at first it seemed on this account hardly possible to obtain a sufficient quantity of it for examination. But at last Davy thought of pouring over it a thin coating of the mineral fluid called naphtha, which both preserved it from communication with the air, and, being transparent, allowed it to be examined.

We have thus rapidly sketched the course of these brilliant and successful experiments, because they form a most interesting and instructive exemplification of the manner in which knowledge is pursued, and the secrets of Nature extorted from her, by well-directed interrogation. The business of philosophic experiment, it may be well to observe, is not a mere random expenditure of tests and applications. The true disciple of the inductive philosophy, on the contrary, has always in his contemplation, while conducting his experiments, an idea or end which he aims at realising, and which, in fact, directs him to every experiment to which he resorts. Thus, in the present instance, the idea in Davy's mind was, that the alkali was compounded of two ingredients which had severally an attraction for the two opposite poles of the electric current. This idea he never lost sight of throughout the whole course of his experiments, though he repeatedly shifted his ground in regard to the contrivances by which he sought its proof and manifestation. To proceed in any other way would not be to philosophise, but merely, as it were, to dip the hand into the bag of chance in quest of a discovery, as men draw prizes at a lottery. It is true that, until the experiment has confirmed or refuted his expectations, this guiding idea upon which the experimenter proceeds must be regarded merely as a conjecture. But such a conjecture or hypothesis he must have in his mind, or he is in no condition to set about the inquisition of nature. What progress would the conductor of a trial in a court of justice be likely to make, in questioning a witness, without some previous notion of the truth which the evidence was likely to establish? He might waste the whole day

in putting questions and receiving answers, and at last have ascertained nothing. Just as unprofitably would the interrogator of nature spend his time, if he had no directing anticipation in every case, according to which to order his experiments. Accident might, it is possible, throw a discovery in his way; but his own occupation would be evidently as idle and as little that of a philosopher as the rattling of a dice-box. *Whenever, indeed, a discovery is made without being anticipated, we say that it has been made by chance.* On the other hand, the history of all discoveries that have been arrived at by what can with any propriety be called philosophical investigation and induction, attests that necessity which has been asserted of the experimenter proceeding in the institution and management of his experiments, upon a previous idea of the truth to be evolved. This previous idea is what is properly called an *hypothesis*, which means something *placed under* as a foundation or platform on which to institute and carry on the process of investigation. A *theory* is a completed view of an harmonious system of truths, evolved and proved by calculation or induction. As the latter is the necessary completion of every philosophical inquiry, so the former is its equally indispensable beginning. It is the aim in the mind of the philosopher, without which he cannot philosophise. It makes, in short, the main difference between the experiments of the philosopher in his laboratory, and those of the child among its playthings. Of course, however, every hypothesis must give way before an experiment, the result of which cannot be reconciled with it. Newton, in proceeding to investigate the system of the heavens, set out on the hypothesis that the same power of gravitation which made a stone fall to the ground, would be found to retain the moon and the planets in their orbits around the earth and the sun. The result of his first calculation was unfavourable to this supposition, and he at once abandoned it. We have here an example both of the use of an hypothesis, and of the proper limits of reliance on it. The grand discovery which eventually resulted from Newton's investigations affords us, again, an illustration of the manner in which an hypothesis serves to lead to, and originate a theory.*

The metal which Sir Humphry Davy obtained from potash he called *Potassium*; and from soda he also, by a similar process, obtained another which he called *Sodium*. Both these new metals he found to possess several curious properties, which, however, we cannot stop here to enumerate. He afterwards decomposed also the different earths, and showed them to be all, as well as the alkalis, compounds of oxygen with a metallic base. But these important discoveries, which may be said to have revolutionised the science of chemistry, were not the only results which he obtained from his galvanic and electrical experiments. The

* See this subject admirably treated in the Preliminary Discourse to the "Encyclopædia Metropolitana" (by Coleridge).

interesting subject of the connection between electricity and magnetism received considerable elucidation from his researches. For an account of his contributions to this branch of science, we must refer to the able memoir we have already mentioned, or to his papers on the magnetic phenomena produced by electricity, in the "Philosophical Transactions" for 1819.

Meanwhile his attention had been attracted to another subject of the greatest practical importance—the possibility of preventing the destructive explosions in coal mines occasioned by the fire-damp, or inflammable gas, which is found in many parts of them. By a series of experiments Davy found that this dangerous gas, which was known to be nothing more than the hydrogen of the chemists, had its explosive tendencies very much restrained by being mixed with a small quantity of carbonic acid and nitrogen (the ingredient which, along with oxygen, forms atmospheric air); and that, moreover, if it did explode when so mixed, the explosion would not pass through apertures less than one-seventh of an inch in diameter. Proceeding, therefore, upon these ascertained facts, he contrived his celebrated *Safety Lamp*. It consists of a small light, fixed in a cylindrical vessel, which is everywhere airtight, except in the bottom, which is formed of fine wire gauze; and in the upper part, where there is a chimney for carrying off the foul air. The air admitted through the gauze suffices to keep up the flame; which, in its combustion, produces enough of carbonic acid and nitrogen to prevent the fire-damp, when inflamed within the cylinder, from communicating the explosion to what is without. The heretofore destructive element, thus caught and detained, is therefore not only rendered harmless, but actually itself helps to furnish the miner with light, the whole of the interior of the cylinder being filled with a steady green flame, arising from the combustion of the hydrogen, which has been admitted to contact with the heat, but cannot carry back the inflammation it has received to the general volume without. Armed with this admirable protection, therefore, the miner advances without risk, and with sufficient light to enable him to work, into recesses which formerly he could not have dared to enter. The safety lamp has already been the means of saving many lives, and has enabled extensive mines, or portions of mines, to be wrought, which, but for its assistance, must have remained unproductive.* The coal owners of the northern districts invited Sir Humphry, in 1817, to a public dinner, and presented him with a service of plate of the value of 2000*l.*, in testimony of what they felt to be the merit of this invention.

We will mention only another of this eminent individual's ingenious practical applications of those scientific truths with which he enriched the philosophy of his age. About the year 1823, the attention of the

* See Report of Committee of the House of Commons on the Coal Trade (1829).

Commissioners of the Navy was so strongly excited to the fact of the rapid decay of the copper sheathings of ships, when exposed to the action of the salt water, that they applied to the Royal Society to take the subject into consideration, and endeavour to devise a remedy for the evil. On this occasion, Davy again had recourse to those principles of electro-chemistry, of which he had himself been the discoverer, and by the application of which he had already obtained so many brilliant results. One of the laws of electrical agency which he considered himself to have ascertained, was that two substances can only combine by what is called chemical affinity or attraction when they are in opposite electrical states—that is to say, when the one is positively, and the other negatively, electrified. The copper and the water, therefore, he concluded, were naturally in these circumstances; and all that would be required, consequently, to prevent the action of the one upon the other, would be to change the electrical condition of that one of them, namely the copper, which it was possible to submit to the necessary treatment. He thought of various ways of effecting this object; but, at last, he determined to try the effect of merely placing a quantity of zinc or iron in contact with the copper; the former metals being more positive than the latter, and therefore fitted by induction to repel a portion of its electricity, and so to render it negative like the water. The result surpassed his expectations. So powerfully did the one metal act in reversing the electrical state of the other, that a bit of zinc or iron no larger than a pea was found sufficient to protect from corrosion forty or fifty square inches of copper. Nothing, therefore, could be more perfect than the success of this contrivance for the particular purpose it was intended to serve. But, unfortunately, it has been found by experience, that, although Davy's method completely answers for preventing the wasting of the copper, the sea-weeds and marine insects accumulate in such quantities upon the bottoms of ships so protected, that they become, after a short time, scarcely navigable. For the present, therefore, the use of the zinc and iron is of necessity abandoned. It is by no means improbable, however, that some expedient may be contrived for counteracting this consequence of the application of Davy's invention—in which case it will be entitled to rank as one of the most valuable discoveries ever made.

We have thus, guided chiefly by the Memoir of which mention has been made above, pursued the principal triumphs of Sir Humphry's splendid career, and described what he achieved, although cursorily and briefly, in such a manner, we trust, as to put even the unscientific reader in possession of a tolerably just view of the great discoveries on which his fame rests. In 1827, as we have already mentioned, his health had so broken down that he found it necessary to resign the Presidency of the Royal Society. Immediately after this he proceeded to

the Continent. During his absence from England, he still continued to prosecute his chemical researches, the results of which he communicated in several papers to the Royal Society. He also, notwithstanding his increasing weakness and sufferings, employed his leisure in literary composition on other subjects, an evidence of which appeared in his "Salmonia," a treatise on fly-fishing, containing many accurate and striking descriptions of natural phenomena, and breathing throughout the most amiable and contented spirit, which he published in 1828. His active mind, indeed, continued, it would seem, to exert itself to the last almost with as unwearied ardour as ever. Beside the volume we have just mentioned, another work, entitled "The Last Days of a Philosopher," which he also wrote during this period, was given to the world after his death. He died at Geneva on the 28th of May, 1829. He had only arrived in that city the day before; and, having been attacked by apoplexy after he had gone to bed, expired at an early hour in the morning.

No better evidence can be desired than we have in the history of Davy, that a long life is not necessary to enable an individual to make extraordinary advances in any intellectual pursuit, to which he will devote himself with all his heart and strength. This eminent person was, indeed, early in the arena where he won his distinction; and the fact, as we have already remarked, is a proof how diligently he must have exercised his mental faculties during the few years that elapsed between his boyhood and his first appearance before the public, although, during this time, he had scarcely any one to guide his studies, or even to cheer him onward. Yet, notwithstanding that he had taken his place, as we have seen, among the known chemists of the age almost before he was twenty-one, the whole of his brilliant career in that character, embracing so many experiments, so many literary productions, and so many splendid and valuable discoveries, extended only over a space of not quite thirty years. He had not completed his fifty-first year when he died. Nor was Davy merely a man of science. His general acquirements were diversified and extensive. He was familiar with the principal continental languages, and wrote his own with an eloquence not usually found in scientific works. All his writings, indeed, show the scholar and the lover of elegant literature, as well as the ingenious and accomplished philosopher. It not unfrequently happens that able men who have been their own instructors, and have chosen for themselves some one field of exertion in which the world acknowledges, and they themselves feel, their eminence, both disregard and despise all other sorts of knowledge and acquirement. This is pedantry in its most vulgar and offensive form; for it is not merely ignorant, but intolerant. It speaks highly in favour of the right constitution and the native power of Davy's understanding, that, educated as he was, he

escaped every taint of this species of illiberality; and that, while, like almost all those who have greatly distinguished themselves in the world of intellect, he selected and persevered in his one favourite path, he nevertheless revered wisdom and genius in all their manifestations.*

CHAPTER XXIX.

MR. FARADAY ; M. LAURENT.

FOR his years Sir Humphry Davy might still have been among us,† an old man, but younger than several illustrious contemporaries—than Mr. Savage Landor, whose “prompt eloquence, . . . in prose or numerous verse,” still flows as readily as ever, both from lip and pen, at the age of eighty-two—than Ludwig Tieck, who survives at that of eighty-four, the venerable father of living poets, novelists, and æsthetic critics—than Lord Lyndhurst, who, at that of eighty-five, still keeps his place in the front rank of parliamentary debaters, with his wonderful clear-headedness and power of mental grasp unimpaired—than Alexander Von Humboldt, one of the remarkable products of the memorable year sixty-nine, which gave birth also to Napoleon and Wellington and Mehemet Ali and Castlereagh, still the master of his universal knowledge, and with head and heart both strong, at eighty-eight—than Rogers, who passed away only the other day at ninety-four, and continued to enjoy life almost to the last, having already surmounted his fortieth year at the date of the execution of Louis the Sixteenth, and perfectly remembering the death of Samuel Johnson, which took place when he was a young man of two and twenty, and having actually made his appearance in print in the same year, and probably some months earlier in the year, which witnessed the first publication of the poetry of Burns (who was his senior by only three years, having been born in the same year with the younger Pitt). If Davy had been alive now, he would have been some months younger than Lord Brougham, who still fills as large a space as any other living man in the public eye—enjoys, in fact, more than any other now remaining a European celebrity, and that both in politics and in letters—and whom we all hope to retain for yet many a day. It is only a few months since we had a new book from Davy’s younger brother, his able biographer and the editor of his collected works. But the living light of the great chemist’s genius may be said to be still with us in one who took from him his first inspiration, and whom a more advanced state of science,

* The “Life of Sir Humphry Davy” has been twice written in full detail; by Dr. J. A. Paris, in 2 vols. 8vo. 1830, and by his brother Dr. John Davy, whose narrative makes the

first volume of Sir Humphry’s collected works, 9 vols. 8vo. 1839–40.

† This was written in 1858.

and perhaps also a still higher originality and inventive power, and a finer and subtler intellect, have possibly carried to some more comprehensive philosophic views than Davy of himself would have reached. FARADAY has himself related how it was that he first became connected with his distinguished predecessor, in the following letter to the late Dr. Paris, which is given in that gentleman's "Life of Davy :"—" My dear Sir, you asked me to give you an account of my first introduction to Sir H. Davy, which I am very happy to do, as I think the circumstance will bear testimony to his goodness of heart. When I was a bookseller's apprentice, I was very fond of experiment, and very averse to trade. It happened that a gentleman, a member of the Royal Institution, took me to hear some of Sir H. Davy's last lectures in Albemarle Street. I took notes, and afterwards wrote them out more fairly in a quarto volume. My desire to escape from trade, which I thought vicious and selfish, and to enter into the service of science, which I imagined made its pursuers amiable and liberal, induced me at last to take the bold and simple step of writing to Sir H. Davy, expressing my wishes, and a hope, that, if an opportunity came in his way, he would favour my views ; at the same time I sent the notes I had taken at his lectures. The answer, which makes all the point of my communication, I send you in the original, requesting you to take great care of it, and to let me have it back, for you may imagine how much I value it. You will observe that this took place at the end of the year 1812, and early in 1813 he requested to see me, and told me of the situation of Assistant in the Laboratory of the Royal Institution, then just vacant. At the same time that he thus gratified my desires as to scientific employment, he still advised me not to give up the prospects I had before me, telling me that science was a harsh mistress ; and, in a pecuniary point of view, but poorly rewarding those who devoted themselves to her service. He smiled at my notion of the superior moral feeling of philosophic men, and said he would leave me to the experience of a few years to set me right on the matter. Finally, through his good efforts, I went to the Royal Institution, early in March 1813, as Assistant in the Laboratory ; and in October of the same year went with him abroad, as his assistant in experiments and in writing. I returned with him in April 1815, resumed my station in the Royal Institution, and have, as you know, ever since remained there." Sir Humphry's note was as follows :—" December 24, 1812. Sir, I am far from displeased with the proof you have given me of your confidence, and which displays great zeal, power of memory, and attention. I am obliged to go out of town, and shall not be settled in town till the end of January : I will then see you at any time you wish. It would gratify me to be of any service to you. I wish it may be in my power. I am, Sir, your obedient, humble servant, H. DAVY." All this is as illustrative of Davy as of Faraday, and equally

honourable to both. It links the history of the one to that of the other. Faraday is stated to have been born in 1794; he was therefore eighteen when he thus made acquaintance with Davy, and obtained through him his first appointment at the Royal Institution. His birthplace, we believe, was Kirkby Stephen, in Westmoreland; and, of humble parentage, he is understood to have had but little school education. But with such minds a little goes a long way; the seed, that might have fallen upon a rock, and withered away, because it lacked moisture, or among thorns that would have sprung up and choked it, falling on good ground bears fruit an hundredfold. Faraday's life, we may be sure, has been throughout one of self-education; he would neglect no opportunities of improvement, would be dead to no good influence he ever came in the way of. Even the binding of books was a connection with literature which would not go for nothing. Here, too, is a sort of *composition*, or putting together, although the term has not happened to be technically so applied, as it has been to the other mechanical operation of setting up the types. Decorative bookbinding almost rises to the character of a subordinate department of the artistic; a beautifully bound book is a delight to look at. They talk of *style* being the dress of thought; the true *dress* of thought is what is given it by the bookbinder. And his art, even when it is purely mechanical, is always ingenious; so much so that it has often been assiduously practised even as an amusement. While Faraday worked at it, we are told, his inventive talent had displayed itself in the construction of an electrical machine and other scientific contrivances; and it was the sight of these, to which his master, one Riebau, of Blandford Street, London, one day called the attention of a customer, Mr. Dance, of Manchester Street (such names ought to be remembered), that induced the latter, who was one of the old members of the Royal Institution, to take the boy with him to hear the last four lectures that Sir Humphry delivered as professor. Faraday's subsequent career, as all know, has been brilliant in the highest degree. He has, as he observes in his letter to Dr. Paris, been faithful, ever since it first opened its doors to him in 1813, to the Royal Institution, where he has since the retirement of Mr. Brande, in 1834, filled the chair of Davy, and where, by the extraordinary faculty of easy and luminous exposition with which he is gifted, and by the neatness and never-failing dexterity of his experimental manipulation, he has made the philosophy of matter, in many of its highest as well as of its simplest manifestations, interesting alike to all classes, to the learned and unlearned, to the old and young, to men and women. Meanwhile his splendid discoveries in electrical chemistry and the contiguous regions of physical science, and the singular combination, in all his views and speculations and methods of procedure, of the most patient vigilance in examination, and the most self-denying caution in forming his conclusions, with the

highest originality and boldness, have placed him by universal recognition in the first rank of the modern cultivators of physical science. But all this renown has changed nothing of the noble and beautiful nature of the man; it is impossible even for a stranger, seeing him only in public, not to be attracted and charmed by the unsophisticated simplicity and sunny brightness of his whole demeanour; and he is as much the object of affectionate regard with all who know him in private life, as he is the pride of his country and the admiration of the whole scientific world.

With his genius Faraday combines a remarkable share of practical talent; his practical talent may even be said to make part of his genius. To this he has no doubt been much indebted for his success in life. Not unfrequently, however, we have among the students of the severer sciences, as well as among the cultivators of poetry and the imaginative arts, genius of a very high order, and also the most disinterested devotion to their intellectual pursuit, and great skill in all the operations and methods of procedure it demands, accompanied with apparently so little of ordinary worldly ability, that we are apt to think one of the elements of their genius must be their deficiency in common sense. But this can hardly be ever the true view of the matter. It is not usually that the capacity for attaining what is called success in life is wanting in the man of genius, but rather that he has a much stronger desire for another kind of success. The most powerful and most harmoniously adjusted minds, it is true, with the same preference for the higher object, find no difficulty in giving the requisite attention also to the other. Nevertheless, even where the intellectual devotee fails in doing this, his appreciation of what is greatest and noblest, bringing inconvenience only upon himself, is a beautiful thing, and only commands our sympathy and admiration all the more for what it costs him. It is still, in its one-sidedness, as superior to the opposite more common one-sidedness, as superior not only in attractiveness but in true wisdom, as poetry is to prose.

A few years ago, one of the most remarkable among the cultivators of chemical science in France, ended a life of continual contest with circumstances by a premature death. As the propounder of what are known as the Nucleus Theory and the Theory of Substitution, AUGUSTE LAURENT ranks among the few discoverers to whom we owe the knowledge of certain new general principles of the constitution of the universe, or what may be called laws of nature. He was born in the department of the Haute Marne, in 1807; and, the son of a wine merchant, was originally intended to be brought up to his father's business. They could not get him, however, we are told, to learn book-keeping. He appears, in fact, to have had a decided preference for other occupations that afforded more scope and exercise for his ingenuity and inventive

genius than that respectable art. For some time his head was filled, as so many others, young and old, have been, with the dream of the perpetual motion. Then he took to constructing small mills, in some way of his own. At last, when he was nineteen, his father was prevailed upon to allow him to follow his inclination, and he was sent to Paris, and entered at the *Ecole des Mines*.

Here he remained till 1829, when he left the institution with the diploma of *Ingénieur des Mines*, and set out on a course of scientific exploration through Austria, Poland, Saxony, and the Rhine Provinces, making inspection everywhere both of mines and factories, and treasuring up what he observed in copious notes.

But the end was that he resolved to give himself up exclusively to chemistry, which had powerfully attracted him from his first acquaintance with it. By this determination he changed his profession, or his professional destination, again, but it was for the last time; he had now at length found his proper field, the science for which he was born and made.

Even thus, however, he had attained for himself no secure social position or resting-place; nor was that, apparently, what he much cared for. All that he wanted was simply so much of leisure as to enable him to carry on his chemical investigations. Give him that, with merely enough to keep him alive, and he was satisfied. No success in money-making, on the other hand, would have been to him other than a gilded bondage which did not leave him the independent command of the larger portion of his time. It is true that there was something of weakness and morbid feeling in this, and much miscalculation and mismanagement in his way of proceeding; with a little more prudence and self-control he might have been much more successful even in achieving the independence which was what he most cared and longed for; the only such independence possible in this world is what is based on the possession of money or other accumulated capital, and Laurent's shortest and most direct course to his desired haven of leisure, would have been through steady perseverance for a few years in the making and saving of money. The only hard work to which he could ever give himself for any length of time was such as had his whole heart. But, on the other hand, if he had no turn or talent for making money, he appears to have been as little given to the wasting of it; whatever he earned lasted him longer than it would have done most people.

The first appointment which he obtained was that of chemist at the celebrated porcelain manufactory of Sèvres. But in no long time he resigned it, and, betaking himself to a garret in Paris, there set up his own laboratory, proposing to make a livelihood by receiving pupils. And he had no difficulty in procuring as many as he wanted; the value

of his instructions was appreciated, and his enthusiasm also probably proved contagious. But as soon as he had in this way accumulated a little money, he dismissed his classes and shut himself up alone among his crucibles and alembics. Then, when his money was all spent, he again set to, to earn more in the same way; and, when he had done so, secluded himself as before. It was in the midst of all this, in November, 1837, that, to obtain from the University his degree of Doctor of Science (*Docteur des Sciences*), he presented his thesis on the Theory of Organic Combinations, in which he announced some of the most remarkable of his new views, and which he had to defend in a contest of two hours with Dumas and other professors.

We next find him employed for two years as superintendent of the chemical operations in the establishment of a Parisian perfumer. This he left to be chemist to a porcelain manufactory in Luxembourg. Here finding, on settling accounts with his employer after eighteen months, during which he had drawn no salary, except only a five franc piece now and then, that there was about 400*l.* sterling due to him, he thought himself rich enough to marry. And soon after he accepted a Professorship in the College of Bordeaux. But his late first experience of money-making, with the pressure of the new demands upon him in his altered condition, had now made him think that a larger income might be convenient; and he entered into partnership with another capitalist, no doubt much richer than himself, in a scheme for the manufacturing of sulphate of magnesia and sulphate of copper. It proved a failure, and, after a world of trouble, he was glad to get fairly disentangled from it at the cost of his ten thousand francs, all that he possessed in the world. "Take my all," he said, after they had wearied him out, "and let me off." He now, we are told, resolved to devote himself exclusively to the theoretical part of science, convinced that he had not a practical turn of mind.

The next thing we hear of him is his resignation of his professorship. No other reason is assigned for his taking this step, except that he found himself out of his element at Bordeaux, which he conceived to be essentially a literary town, and as such an uncongenial residence for a cultivator of the physical sciences. The true way of putting the case, perhaps, would rather be, that he felt his provincial life to be a sort of exile, or life underground, and yearned to get back to Paris, the centre of intelligence, as his proper home and working-place. Thither, accordingly, he repaired, in the beginning of 1846, with his wife and son, and a matter of 2,000 francs, being half his salary, with which they had paid him off, and established himself in a fourth floor of the Rue de l'Université, proposing to make an income by resuming his old plan of taking pupils. It was the same passion, though operating in an opposite direction with that which draws the wild man back to his woods, and

makes the heart of the Celtic mountaineer bound high when he feels his step once more upon the heather. There is some one kind of life that is alone truly life to each of us, in which alone we seem to ourselves to have the full light of day about us.

In an economical sense Laurent's transference of himself to Paris cannot be said to have turned out ill. He probably continued to make at least as good an income as he had had at Bordeaux; and he was certainly better placed for the prosecution of his peculiar studies and investigations, and also more in the way of public recognition and patronage. The laboratory of the *Ecole Normale*, we are told, was at once placed at his disposal by its director, M. Balard; and he was thus enabled to complete some important researches—although, it is intimated, in his modest and delicate feeling with regard to what was not his own, he confined himself to the use of such materials and apparatus as were least expensive.

Nor had he long to wait for a public appointment. In May, 1848, he was made Assayer to the Mint. He had thus again secured a fixed position. He now gave himself up entirely to the duties of his office and his chemical investigations, passing all his spare time at the *Hôtel de la Monnaie*, unfortunately in a room which is described as a kind of cellar, and both dark and damp. This soon began to tell upon his health.

We have collected the above facts from a somewhat more detailed account contained in the address of Colonel Philip Yorke, the President, delivered at the Anniversary Meeting of the Chemical Society of London, on the 30th of March, 1854, and published in the *Quarterly Journal of the Society* for July of the same year. Two years, Colonel Yorke states, passed in the circumstances that have been described. "Engaged," the memoir proceeds, "on nearly all subjects of organic chemistry, and in analyzing the most complicated mixtures, Laurent yet found the means of extending his hospitality to one or two chemists who had no laboratories, and furnishing them with the means of working. His laboratory was the rendezvous of a great number of scientific men; there was no lack of news there; and Laurent had every day some new result to announce, or some new idea to develop. Raw materials were also sent to him from all sides for examination. Among other matters of this kind, mention is made of a certain amorphous precipitate, which no one was able to recognise, prepared by a chemist who refused to state the means by which he had obtained it, and moreover shrank from the difficulty of obtaining anything definite from it. Laurent was totally ignorant of its origin, but that made little difference to him. He employed his usual re-agents, and in a few hours succeeded in extracting from it a beautiful yellow crystalline substance consisting of a nitro-compound of the phenyl series. The amorphous pre-

cipitate was a residue obtained by treating coal-tar naphtha with nitric acid.

“Laurent possessed a degree of analytical tact never before known: his researches on naphthalia, indigo, bitter almond oil, &c., remain as monuments of a genius for investigation which, unfortunately, will not soon be equalled. The immense number of new compounds which he discovered—for which, indeed, he was obliged to create a new nomenclature—were prepared with the aid of a small number of re-agents; and the merit of these researches is farther increased by the consideration that they were not merely the inspiration of an active mind, but were conceived under the influence of a fundamental idea, of which the Substitution Theory is one of the consequences. With chlorine, nitric acid, ammonia, sulphuric acid, and potash, Laurent produced his combinations and decompositions; water, alcohol, ether, and the goniometer, served him for the recognition and isolation of his products. He was the first to employ the goniometer as a re-agent, and no one knew better how to manage it. He had learned the use of it while pursuing his studies at the *Ecole des Mines*, and had early recognised its utility in purely chemical investigations. At an early period, also, he had laid down the fundamental proposition, that Form and Arrangement may be as important as composition—a proposition round which all his researches may be said to gravitate. The consequences which followed from it are well known: their names are, Theory of Nuclei, Theory of Substitution, Divisibility of Atoms, Paramorphism, Hemimorphism, Isotheromorphism, Multiple Equivalents, Law of Even Numbers, &c.

“In the midst of these brilliant discoveries, Laurent devoted himself to his work with daily increasing ardour, each laboratory session yielding its contingent of new results. As if aware of the premature end which awaited him, he used all his efforts to produce and to consolidate. Happily for science, but unfortunately for his family, this preoccupation of his mind bore sway over every other consideration, and made him totally negligent of the material side of life; as a pioneer of the future, he belonged especially to humanity, and devoted himself entirely to his mission as one who thoroughly appreciated it.”

At length, however, an affection of the chest, under which he had been for some time suffering, became so much worse that his physicians insisted upon his withdrawing himself from his laboratory. He reluctantly obeyed; he consented to forego the more exciting work of actual analysis and experiment; but work of some kind was almost a necessity for his ardent nature and busy brain. Balard, Biot, and other friends suggested that he should weave the vast number of new facts that he had registered, and the various original views which he had from time to time thrown out, **into** a systematic treatise. He eagerly

caught at the idea; and in a comparatively short time he produced what Colonel Yorke characterises as a colossal work. "This work," the narrative goes on, "supplied him with constant occupation; as long as he was able to hold a pen, he worked at it with a degree of vigour and activity which excited the admiration of those who were acquainted with his situation. Laurent, indeed, had never deceived himself about the fate which awaited him; it was not the mere prospect of death which alarmed him, but he was about to leave a wife and two children in a state of destitution; he had had no time to amass wealth, nor had he rendered a sufficient amount of administrative service to hope for a pension for his widow. These harassing thoughts were not of a nature to ameliorate his already hopeless state; and those who approached his bedside during his intervals of delirium could well appreciate the poignant grief which oppressed the dying man.

"His delirium, however, was only occasional, and he retained his reason to the last moment. At times, indeed, he entertained hopes of improvement, and then began to think of resuming some investigation, verifying some fact, or examining some opinion: then, as throughout his life, ideas flowed rapidly in his brain; but he breathed painfully, and could not speak without the greatest difficulty. It might then be observed that he endeavoured to include the greatest possible meaning in the fewest words; but his sufferings increased, his respiration became more and more laborious, and he was even denied the consolation of making known his dying thoughts."

It seems to have been towards the end of 1853 that the struggling light was quenched, and the martyr to science released. Of the disposition and moral nature of the man we are told that he was kind, obliging, indulgent in his judgments of others, steady in friendship, firm in his convictions, a hater of injustice, always ready to acknowledge an error, but very sensitive, so that he suffered much from being or apprehending himself to be misconstrued, and fancied he had more enemies than he really had. In a short life, he had yet done his work; and the torch had only burned the brighter for having wasted away so fast.

CHAPTER XXX.

DIVERSITIES OF INTELLECTUAL EXCELLENCE. PAINTERS:—BENJAMIN WEST.

THE ambition of intellectual excellence is the same passion, by whichever of the many roads that lie open to it it may choose to pursue its object. The thing that is interesting and valuable is the purity and

enduring strength of the passion. These are the qualities that make it both so inestimable in the possession and so instructive in the exhibition. The mere department of study in which it displays itself is of inferior importance; for, even if it should be contended that, of the various pursuits which equally demand the highest degree of intellectual application and devotion, one is yet better calculated than another to promote by its results the general improvement or happiness of mankind, it will scarcely be argued that even those of inferior value in this respect should not also have their followers. The arrangements of Providence, by forming men at first in different moulds, and placing them afterwards in different circumstances, regulate, doubtless with more wisdom and success than could be obtained by any artifice of human polity, the distribution of taste and talent and enterprise over the varied field of philosophy and art, no part of which is thus left altogether uncultivated. One man, from his original endowments, or his particular advantages of training or situation, is more fit for one line of exertion, another for another; and, although the pursuits to which they are in this manner severally attracted may not, in the largest view, be of equal importance, that is no reason why we should regret that there are labourers to engage in each. Indeed, the more truly enlightened any mind is, the less ready will it be to look with a feeling either of contempt or of slight respect upon any pursuit, which has had power to call forth in an eminent degree the resources of the human intellect. The ground is holy wherever genius has won its triumphs. The further the domain of science is explored, the more, in all probability, will it be found to be pervaded and connected, in all its parts, by a principle of order, consistency, and unity; and the more confirmations shall we discover of what are almost already universally admitted axioms of philosophy, that no truth is without its worth, and no sort of knowledge without some bearing upon every other.

We are now about to relate the history of some men of genius whose paths have been very different from those of the distinguished discoverers and inventors with whom we have last been engaged. But we shall find that, in every variety of intellectual enterprise, the same devotion and diligence have been exhibited by ardent and generous spirits; and that everywhere these qualities are the indispensable requisites for the attainment of excellence. By no class of students, perhaps, has a greater love of their chosen pursuit been displayed than by Painters. We have already had occasion, indeed, to mention many names from this department of biography, in illustration of the force with which a passion for knowledge has often contended against the most depressing discouragements, and eventually subdued everything that would have prevented its gratification. We have noticed the early difficulties and subsequent eminence of Salvator Rosa, Claude Lorraine, the Caravag-

gios, our own Opie, and many others. We will now proceed to sketch somewhat more in detail the unpromising circumstances of birth and original situation, through which some of the other most distinguished names in the recent history of English art have had to struggle into light.

The first individual we shall mention was not, indeed, strictly speaking, a native of this country, though he was born a subject of the British crown; but, as an artist, he belongs nevertheless to England. We speak of the late BENJAMIN WEST. He was born at Springfield,



BENJAMIN WEST.

near Philadelphia, in North America, in the year 1738. *His parents were Quakers, his father being of a good English family, and he was the youngest of ten children. It is related, that his mother brought him into the world immediately after being frightened almost into convulsions by a sermon, in which the preacher scarcely relieved the horrors of a description which he gave of the coming destruction of the world on this side of the Atlantic, by the assurance which he added of the happy destiny in reserve for America, where a new and better order of things was forthwith to arise and be perpetuated, after all vice and evil should have been swept from the earth by that visitation of vengeance. This incident, seemingly of little importance, afterwards exercised considerable influence on the boy's history. The preacher, flattered by what he probably deemed a proof of the power of his oratory, continued to regard the child with feelings both of pride and kindness; and took pains to persuade his father that, born in such extraordinary circumstances, he would undoubtedly turn out no common man. We shall find presently that these predictions were not thrown away either upon the father or the son.

Meanwhile, however, Benjamin, as might be supposed, grew up without anything marvellous appearing about him, till he had completed his sixth year. Soon after this, one of his sisters, who was married, came to pay a visit to her parents, and brought her child with her. One day, Benjamin's mother having taken her daughter out with her to the garden, they left the child asleep in its cradle, and he was appointed to watch it. As he sat looking at his little niece, she happened to smile in her sleep; and he was so struck with the beauty of the infant, that, there being some paper and pens on the table, and some red and black ink, he immediately attempted to make a drawing of her face. His effort, it would seem, was not altogether unsuccessful; for, when his mother and sister returned, the former exclaimed at once, on obtaining a sight of the paper, which he tried to conceal, "I declare he has made a likeness of little Sally!" Reassured by this, he was in an ecstasy of delight with his new-found art, and immediately offered to make drawings with his black and red ink of the flowers his sister had brought from the garden. So true and delicate a sensibility, thus early awakened, to the beauty of mere expression, showed the genius of the future painter even more than any skill in delineation he can well be supposed to have displayed in this first attempt. Perhaps the circumstance of the boy having been nurtured among the quiet and gentle affections of a Quaker family was not unfavourable to the growth of so much of the poetical feeling, at least, as he showed on this occasion.

When his father saw this drawing he began to ponder more deeply than ever on the prophecies of his friend the preacher, the fulfilment of which he, doubtless, thought was already begun. As for his son, he went on making ink sketches of birds and flowers, to his own great delight, and the admiration of the simple neighbours. For a year he had no other colour than ink, and only a pen for a pencil; nor, in all likelihood, was he aware that any better resources existed for the practice of his art: for so simple and primitive were the manners and domestic accommodations of the little Society of Friends in which he had been brought up, that it is averred he had never at this time seen either a painting or an engraving. At last a party of Indians came to visit Springfield, and were shown some of the boy's performances. They were not very unlike the delineations they themselves were in the habit of making; and these children of the woods were delighted with such evidences of a taste kindred to their own. But their greater experience had given them some advantages over the young prodigy. In particular, they were possessed of colours with which he had no acquaintance, being accustomed to use both a red and a yellow ochre. These, therefore, they taught him the method of preparing; and his mother, to complete his assortment of such new auxiliaries, presented him with a piece of indigo. Still he had no pencil; but, having been told by some

one that pencils were made in Europe of camel's hair, his ingenuity soon found out a tolerable substitute for this material. Seizing upon a black cat, which was kept in the house, he extracted the requisite quantity of hairs from her tail for his first brush, and afterwards pillaged her back for others.

About a year after this, a Mr. Pennington, a merchant of Philadelphia, chanced to pay old West a visit, and Benjamin's pictures were shown to him. Pennington knew a little more of such matters than the villagers of Springfield, and was so much struck with the merit of the boy's performances, that he promised to send him a box of paints as soon as he got back to the city. The box, accordingly, soon made its appearance, and was opened with eager expectation. To an assortment of colours, oils, and pencils, the care of the good merchant had added several pieces of canvas prepared for being painted upon, and half a dozen engravings. Benjamin was perfectly enraptured. The true nature of the prints he did not suspect at first, the existence of such an art as that of engraving never having entered his imagination. But, of course, he thought them the finest things he had ever seen in his life. During the remainder of the evening he scarcely lifted his eye from his box and its contents. Sometimes he almost doubted that he was actually master of so precious a treasure, and would take it in his hand merely to be assured that it was real. Even after going to sleep he awoke more than once during the night, and anxiously put out his hand to the box, which he had placed by his bedside, half afraid that he might find his riches only a dream. Next morning he rose at break of day, and, carrying his colours and canvas to the garret, proceeded to work. Everything else was now unheeded; even his attendance at school was given up. As soon as he got out of the sight of his father and mother he stole to his garret, and there passed the hours in a world of his own. At last, after he had been absent from school some days, the master called at his father's house to inquire what had become of him. This led to the discovery of his secret occupation. His mother, proceeding to the garret, found the truant; but so much was she astonished and delighted by the creation of his pencil which also met her view when she entered the apartment, that, instead of rebuking him, she could only take him in her arms, and kiss him with transports of affection. He had made a new composition of his own out of two of the engravings, which he had coloured from his own feeling of the proper tints; and so perfect did the performance already appear to his mother, that, although half the canvas yet remained uncovered, she would not suffer him to add another touch to what he had done. Mr. Galt, West's biographer, saw the picture in the state in which it had thus been left, sixty-seven years afterwards; and the artist himself used to acknowledge that in none of his subsequent efforts had he

been able to excel some of the touches of invention in this his first essay.

Some time after this, Pennington paid them a second visit at Springfield, and, pleased with the progress the young painter had made since he had provided him with the proper materials of his art, took him with him to Philadelphia. Here he met a brother artist, a Mr. Williams, whose pictures, the first he had seen except his own, moved him even to tears. Williams lent him also Fresnoy's Poem on Painting, and Richardson's Essay; and these works contributed not a little to feed his enthusiasm. He returned to Springfield more in love with painting than ever; and so contagious was his ardour, that even his school-fellows, with hardly an exception, began to follow his example, and no other amusement was minded but drawing on the walls with chalk and ochre. West used to assert that many of the performances of these juvenile amateurs were such as would have done no discredit to the students of an academy. But no one of them, it would seem, had the same deep-seated love of art as himself; for, when the pastime had lasted its season, it was forsaken and forgotten, he alone looking forward to his present pursuit as the occupation of his life, and being resolved to sacrifice everything else for its sake.

He had as yet, however, made no money by his art, not so much even as to enable him to purchase colours and canvas. But one of the neighbours, a cabinet-maker, having kindly given him some smoothed boards, on which he used to draw his sketches, with ink, chalk, and charcoal, a Mr. Wayne, another neighbour, calling one day at his father's, was shown these performances, and admired them so much that he took a few of them away with him to show to his family or his friends. Next day he returned, and, having resolved by this time to keep the pictures, gave the boy a dollar for each. About the same time a Dr. Jonathan Morris made him a present of a few dollars to buy paints with. These encouragements were invaluable to him at the time; and West never afterwards forgot his first patrons. It does not appear that his father, either at this or any other time, gave him any assistance to enable him to pursue his favourite art, although the family seem to have been in rather comfortable circumstances. If the old Quaker continued to look forward to his son becoming a great man, as the preacher had foretold he would, he seems to have trusted entirely to the efficacy of his reverend friend's prediction to bring about that result. Notwithstanding, however, the pleasure he could not but feel in the uncommon talent which the boy continued to evince by the productions of his pencil, he probably had considerable misgivings, arising from his peculiar religious opinions, as to the lawfulness of the art itself, and wished that the young prodigy would choose another road to the distinction destined for him. Not such were Benjamin's own notions. Ever since reading

Fresnoy and Richardson, the profession of a painter had seemed to him the most honourable that man could follow. He had also already got possessed by the prophecy that had been uttered in his favour; and was so persuaded of his future greatness that, finding himself upon one occasion mounted, for a holiday trip, on the same horse with a schoolfellow, who was imprudent enough to confess, in the course of their conversation, that his father intended to make him a tailor, a trade which, he added, he thought a very good one, West dismounted immediately, exclaiming that no one who meant to be a tailor should ride with him, who was to be a painter—the companion, as he expressed it, of kings and emperors. This conviction of his high destiny, although it was only in his boyhood that it occasioned such ebullitions as this, never forsook the artist; and, doubtless, contributed somewhat to carry him buoyantly forward through the strange circumstances of his commencing career.

The peculiarity of his situation, indeed, consisted chiefly in this—that, young as he was, he was left solely to the strength of his own enthusiasm, to prompt and sustain him in every effort he made to advance himself in the line he had resolved to pursue. He had no sufferings to endure from want of bread, or from extreme poverty in any of those shapes in which it has so often pressed to the earth the young aspirant after knowledge; but, on the other hand, he had no one to instruct him, or even to urge him to seek instruction. He had everything to do for himself and of himself. The other boys, we have seen, his companions, who also at one time took a fancy to painting, had none of them steadiness or perseverance to pursue the art beyond a few weeks or months. He had no greater external advantages than they had; yet he alone became a painter. He had that within himself which they wanted—that ardour and constancy in the prosecution of his object, which has sustained the exertions of all those whose names are to be reckoned with his, in the honourable catalogue of self-educated and self-raised men, and without which, indeed, there cannot be achieved anything great or anything worthy. West's history has been described as abounding in fortunate incidents—in the casual occurrence of circumstances favourable to the display and successful operation of his powers; and this is quite true. But, undoubtedly, the luck would have been of no use, but for the desert which was always ready to take advantage of it. This, indeed, is in many cases the true secret of what is called good fortune; it consists only in the being never unprepared to seize a favourable opportunity when it comes. West, as we shall see immediately, met with a succession of friends to encourage and assist him, as soon as his talents became known beyond his native village; but their aid would have been valueless, and, indeed, they never would have sought him out at all, if he had not cultivated those talents with the extraordinary zeal and industry which he did, when, in his father's house,

he neither had nor needed any one to prompt his application, and found difficulty enough even in procuring the necessary implements of his art. He had arrived at his fifteenth year when he attracted the notice of a Mr. Flower, a gentleman of cultivated taste, who resided near the town of Lancaster, at some distance from Springfield. Mr. Flower, having seen some of his productions, was delighted with the talent they displayed, and invited the young artist to spend a few weeks at his house. West derived much benefit from this visit. An English lady, of superior accomplishments, resided in the house as governess to Mr. Flower's children. To this lady Benjamin was indebted for his first knowledge of even the existence of the ancient Greeks and Romans, the lives and characters of whose great men she used to make the frequent themes of her conversation. During his residence here he also got acquainted with another intelligent person, a Mr. Ross, who lived in Lancaster. This gentleman's wife and daughters were remarkable for their good looks; and it was arranged that West should draw their pictures. He acquitted himself in this affair so much to the taste of the people of Lancaster, that numbers of other persons immediately presented themselves to sit to him, and, for some time, he had as much to do as he could manage.

Whether or not Mrs. Ross and her daughters were the first persons whose portraits he had ever taken, is not stated; but the following is expressly mentioned as the occasion of his first historic painting. One of his Lancaster acquaintances was an individual of the name of William Henry, who had made some money as a gunsmith, and was a man of considerable reading and reflection. Conversing one day with his friend, Henry remarked that he thought it a pity talents of so superior an order should be expended, merely in taking likenesses of people whom nobody but their own relations knew or cared about; and suggested how much nobler a use the painter might make of his pencil if he would take some one of the grand scenes of history, and endeavour to transfer it to canvas. He mentioned, as a good subject, the death of Socrates, the story of which he immediately read, probably from some translation of Plato. West liked this idea, and, forthwith proceeding to sketch the composition, in due time produced his first historical picture.

About this time, also, he fell into the hands of Dr. Smith, Provost of the College of Philadelphia, who undertook to put him in possession, by a summary process, of as much classical knowledge as it was thought a painter needed. Dr. Smith is said to have been himself a profound as well as an elegant scholar; but he preferred a very superficial mode of teaching in the case of his present pupil. In fact, the knowledge of Latin he communicated to West amounted scarcely to anything. Yet it is probable that he may have derived some advantage from the lessons of his instructor, in so far as regarded the enlargement of his acquaint-

ance with the facts of classical history and mythology. In the midst of these studies he fell sick, and was confined, for a considerable time, to his bed—a circumstance which led to his display of a new species of ingenuity. After he had got over the worst of his attack, he one day not a little alarmed both his physician and the other persons in attendance, by insisting that he distinctly saw a procession of phantoms crossing the ceiling of the room, the figures being some of them men, some women, pigs, fowls, &c. Nobody else could discern anything of the kind, and they doubted, notwithstanding the appearances of recovery, whether his brain was not a little affected. But the fact was, that, from having been so long shut up in the darkened apartment, his eyes had distended in accommodation to the diminished light, and had thus acquired a power of distinguishing what was invisible to others. The figures on the ceiling were merely the pictures of objects passing along the street, which were formed by the rays reflected from them, and transmitted through a round hole which happened to be in the window-shutter. This West soon found, when, upon being left alone, he rose from his bed and examined the room, in the determination of discovering the cause of the phenomenon. Having satisfied himself as to how the matter stood, he immediately bethought him that here was a principle of which a useful application might be made; and he soon constructed an apparatus, which, whenever the sun shone, procured him a picture of any object or portion of the landscape to which he chose to turn it. He had, in fact, invented the *Camera Obscura*. When he carried his box, however, to his friend Williams at Philadelphia, that gentleman showed him a much more perfect instrument of the same description, which he had just received from London; so that West found that his invention, though new to himself, would not be so to the world in general.

He now returned home to Springfield. Hitherto, whatever might have been his own views, his father had probably looked upon the boy's picture-making as merely an amusement for a few years of his youth, and had not dreamed of it becoming his profession for life. But, even if he had reconciled himself to such a destination for his son, there were the probable scruples of his brethren to be overcome. No Quaker had ever before turned artist. Yet, upon the matter being talked over in the family, it soon appeared that not only was the young man's own attachment to the career upon which he had already entered too strong to be shaken, but that his mother also had fixed her affection upon the profession of a painter for her son. In this emergency his father resolved to be guided by the decision of his brethren. The prophecy of the preacher was not yet forgotten, and he was as much persuaded as his wife that their son would yet become a great man, although he did not perhaps so clearly see how. Accordingly he called together the

members of the society, and stated the circumstances of the case. We must refer to the pages of Mr. Galt for a description of the consultation. Suffice it to say, that it terminated in a unanimous resolution to permit the young man to exercise the extraordinary talents with which God had endowed him in their proper occupation. Benjamin was forthwith called in, and set apart by something like a consecration to his chosen pursuit. This strange proceeding made an impression upon the mind of the painter, which remained through life, and helped, along with his faith in the announcements of future greatness with which he had been still more early familiar, to strengthen and sustain the enthusiasm with which he devoted himself to art as the one object of his life.

Not long after this he lost his mother, to whom he was much attached; and, when he had recovered from this severe blow, he left his father's house, and, proceeding to Philadelphia, set up there as a portrait painter. This was in the end of August, 1756. He took up his residence in the house of a Mr. Clarkson, his brother-in-law, and soon found sufficient employment. After painting all day, too, he used to spend his evenings with his old friend Dr. Smith, who continued his instructions to him on the beauties of the classics and other matters of taste. But he had long felt that his professional education would be very incomplete till he had had an opportunity of seeing works of art superior to any which America, at this time, contained. His cherished ambition, therefore, was to visit Rome; and every shilling he could spare was carefully put aside, to enable him to accomplish this object. His terms were two guineas for a head, and five guineas for a half-length. He was obliged to work hard to be able to save anything at these prices; but he had the advantage of gaining, at the same time, a command of hand, and facility of execution, which he could not have attained in the same degree with less laborious practice, and which he afterwards found of great service. He also employed what time he could spare in the study of the higher styles of art; and, among other performances, made a copy from a picture of great merit, which had fallen into Governor Hamilton's hands through the capture of a Spanish vessel, a St. Ignatius, after Murillo. Of the great superiority of this picture, however, to anything he had yet seen, he was not at this time aware; but Dr. Smith was so much struck by West's copy, that he insisted upon being drawn himself in the attitude of the Saint. While residing in this city, West also executed, for a Mr. Cox, a picture on the subject of the Trial of Susannah—his second historical painting—of which he used afterwards to speak in high terms. It comprehended forty figures, all of which were delineated from nature. From Philadelphia he proceeded to New York, having now a little money in his pocket. Here his reputation brought him many sitters, and, after some time, he raised the price of his half-length portraits to ten guineas. A Flemish picture, which he saw in

this city, of a hermit praying before a lamp, inspired him with the desire of painting, as a companion to it, a man reading by candle-light. He was much perplexed, at first, as to how he should proceed, in order to produce the effect of candle-light on a picture which was, of course, to be seen during the day; but at last he attained his object by making his landlord sit looking upon an open book before a candle, in a darkened closet, while he himself remained painting in the day-light in the adjoining room, from which he had a view of his model through a narrow passage.

When he had been in New York about eleven months, he heard that a vessel was about to sail from Philadelphia direct for Leghorn, with a cargo of wheat and flour, in consequence of the failure of the harvest in Italy. It immediately occurred to him that here was a favourable opportunity of accomplishing his long-projected visit to Rome. In the meantime the same thought had suggested itself to Dr. Smith; and he received a letter from that gentleman, inviting him to return to Philadelphia without delay. He was, at the moment, engaged in painting a picture of a Mr. Kelly, a merchant of New York, whose name deserves to be remembered for the considerate generosity with which he behaved on this occasion. West, having finished the portrait, communicated to him his intention of going to Italy; upon which Kelly, after paying him his ten guineas, said that he would give him a letter to his agents in Philadelphia, who might be serviceable in giving him directions about his outfit. On reaching Philadelphia, and presenting this letter, the painter was informed that it contained an order for the payment to him of fifty guineas. This was a most welcome addition to his scanty funds, and sent him on board with a light heart.

After touching at Gibraltar and several ports on the coast of Spain, West and his fellow-passengers reached Leghorn, from which the former lost no time in setting out for Rome, after receiving letters of introduction to several of the principal persons in that capital from Messrs. Jackson and Rutherford, the correspondents of his friend Mr. Allen of Philadelphia, to whom the vessel and its cargo belonged. He reached Rome on the 10th of July, 1760, in charge of a French courier, with whom he had been provided by his friends at Leghorn, being at this time quite ignorant of the language of the country, and indeed of every language but his own. When a report was spread that a young American had come to study the works of the great masters, the learned of Rome did not know very well what to think of it. The English diplomatist, Mr. Robinson (afterwards Lord Grantham), having sought him out, took him to an evening party, where most of the persons were to be assembled to whom he had letters of introduction; and, of course, as soon as he entered the room, most of the company perceived that the transatlantic stranger, in point of outward appearance at least,

did not differ materially from any one of themselves. But there happened to be present the celebrated virtuoso, Cardinal Albani, then an old man and quite blind. When West was presented by Mr. Robinson to this personage, as a young American who had come to Italy to study the fine arts, his Eminence, who had no notion that there were any other Americans except the native savages, asked whether he was black or white. Having been set right as to this matter, however, the Cardinal was led to form a very favourable opinion of his new acquaintance—especially after passing his hands over his head, which (being, it would seem, even in those days, a sort of craniologist) he remarked was very admirably formed. Next day West was taken to see some of the great works of art; and so curious were the fashionable world of Rome to observe the effect which these master-pieces would produce on the young Quaker, that he was accompanied by no fewer than thirty of the principal equipages in the city. The first expressions of his astonishment seemed to indicate rather a wild taste to these Italian connoisseurs. When he saw the Apollo he is reported to have exclaimed, "How like a young Mohawk!" All this notoriety made poor West's ordeal rather a severe one, for, with all his natural talent, he was necessarily deficient in many things which only cultivation can bestow; but, on the other hand, the notice he attracted was calculated to operate greatly in his favour, if he should succeed in satisfying the expectations which were formed of him.

Feeling the necessity, therefore, of doing something to prove himself more than a mere wonder, whose only claim to regard was that he happened to be the first of his countrymen, or of his sect, who had ever come to Rome to study the fine arts, he resolved to present to the Italians some evidence of what he actually could perform with his self-taught pencil. He accordingly asked Mr. Robinson to do him the favour of sitting to him for his portrait; and that gentleman kindly complied with his request. Mr. Robinson was at this time also sitting to the celebrated Mengs, then the most eminent artist resident in Rome; and the circumstance was generally known. When West's picture was finished, Mr. Robinson, concealing the name of the artist, sent it to the house of his friend Mr. Crespigné, where a party was to assemble in the evening. Here it excited great attention. It was generally regarded even by the artists present as the work of Mengs; although some remarked that its colouring was superior to that of most of his performances. But Mr. Dance, an Englishman, having examined it with a very scrutinising eye, pronounced that it was not by Mengs. The colouring, he said, surpassed what was to be found in the works of that artist; but the drawing did not equal his. Meanwhile, all these remarks were translated by Mr. Robinson to West, who sat apart on a sofa, all anxiety and agitation. At last it was announced by Mr. Crespigné that the picture was not painted

by Mengs—that it was the work of the young American. The surprise of the Italians was unbounded; but they congratulated the artist warmly. Mengs himself made his appearance soon after, and, having examined the picture, expressed himself, in regard to West's merits, in terms of the most frank and generous commendation. He proceeded to give him advice as to his future studies, telling him he had no need to come to Rome to learn to paint; but that, after examining everything in the city deserving of an artist's attention, he should go successively to Florence, Bologna, and Venice, and, having made himself familiar with the productions of the great masters preserved in these cities, should then return to Rome, paint an historical picture, exhibit it, and, from the opinion expressed of it, decide on the line of art he should follow.

By this time West had been little more than a month in Rome: but such was the excitement he had undergone, that, as happened to Salvator Rosa, he was taken alarmingly ill; on which his medical attendants insisted that he should go back to Leghorn. From Leghorn he some time after proceeded to Florence, in order to consult an eminent surgeon of that city. It was eleven months before he recovered from this attack. During the greater part of this time he remained in a state of extreme weakness and suffering. But even in that condition he did not neglect the study of his profession. He had a table constructed on which he would draw while he lay in bed; and whenever his strength permitted he had his brush in his hand.

Meanwhile, however, this long illness, during which he was probably subjected to some additional expenses, as well as prevented from making any money, was exhausting his scanty funds, and he had arrived at his last ten pounds before he was completely recovered. But at this crisis unexpected assistance arrived. One day, his old patrons in Philadelphia, Mr. Allen and Governor Hamilton, were dining together at the house of the former, when a letter arrived from Allen's Leghorn correspondent, in which, after the customary commercial advices, the writer added a short account of the reception of West's picture of Mr. Robinson at Rome. Delighted with this success of his countryman and protégé, Allen immediately declared that he regarded this youth as an honour to America, and that he was determined he should not want the means of proceeding with his studies. "I shall send him," said the generous merchant, "whatever money he may require." The governor joined warmly in the same sentiments, and insisted on sharing with Allen the honour of supplying the necessities of the young artist. The result of this conversation was, that, when West went to his Florence banker to draw his last few pounds, that person, unfolding a letter, informed him that he was instructed to give him unlimited credit.

From Florence, West proceeded to Bologna, and from thence to Venice, remaining some time at each city, in order to study the works of art which

it contained. He then returned to Rome; and, according to the counsel he had received from Mengs, painted two historical pictures, which he exhibited. They were received with great applause. Having now, as he conceived, accomplished every object for which he had been desirous of visiting Italy, he had no other thought than to return to America, when a letter arrived from his father, recommending to him, in the Philadelphian phraseology of that day, first to go for a short time *home*, meaning to England. Although his heart at this time seems to have been still in America, this proposal was not disagreeable to West, and he prepared immediately for his journey to the land of his fathers. Leaving Rome, he proceeded to Parma, where they elected him a member of the Academy, a similar honour having been previously bestowed upon him by the Academies of Florence and Bologna. He then passed through France, and arrived in London on the 20th of August, 1763. Here he unexpectedly found his old American friends, Allen, Hamilton, and Smith; and was, through their means, and some letters he had brought with him from Italy, speedily made known to Sir Joshua Reynolds and Wilson, the highest names in English art. He soon after, not so much by the advice of his friends as in a well-founded dependence upon his own talents, took apartments in Bedford Street, Covent Garden, and commenced the practice of his profession. His sagacity had by this time discovered that London afforded a somewhat more promising field for a painter than Philadelphia; and he thought no more of returning to America. One of the first things he did, in order to make himself generally known, was to paint a picture (on one of the same subjects which he had chosen at Rome), and to send it to the exhibition which then took place annually in Spring Gardens. It appeared here, accordingly, in 1764, and attracted considerable notice. He was some time after invited to dinner by Dr. Drummond, the Archbishop of York, who was so much pleased both with his conversation and the proofs of genius which he conceived his paintings to exhibit, that he contrived to have him introduced to George III. His Majesty's favour, which he immediately acquired, placed the artist's rising fortunes upon a sure foundation, and leaves us nothing more to relate of his struggles to escape from obscurity to distinction. The self-taught boy had now won his way to the highest professional employment, and was soon numbered among the best known painters of the age. It was not the patronage of royalty, however, to which he was really indebted for this elevation. That patronage his own merits chiefly had acquired for him; for all that the happy accidents by which he was assisted could have done for him would have been merely nothing, had not his real talents and acquirements enabled him to take advantage of the favours of fortune. But, with these merits, had he never been noticed at court, he would undoubtedly have found in time a still more munificent patron in the public. The chief benefit (if it was a benefit) which he derived from

the favour of the king was, that it secured to him at once, and from the first, that independence to which he probably would not otherwise have attained except through the exertions of years. On the other hand, had he been obliged to trust merely to the general appreciation of his merits, his success, if not quite so sudden, might have been more permanent; for he lived, as is well known, to find, that to rest his reliance, as he did, on the protection of a single individual, however exalted, was after all but to place himself at the mercy of the most common accidents. After having been chiefly employed for more than thirty years of his life in executing commissions for his majesty—during which time he completed the eight pictures illustrative of the reign of Edward III., in St. George's Hall, at Windsor, and the twenty-eight (out of thirty-six which were designed) on subjects from the Old and New Testaments, in the Royal Chapel—he suddenly received an intimation, on the king's illness, in 1809, that the works on which he had been engaged were ordered to be suspended; and he was never called upon to resume his pencil. It was immediately after this that he painted his celebrated picture of Christ healing the Sick, one of the noblest he ever produced, which he first exhibited to the public, and afterwards sold to the British Institution for three thousand guineas, a much larger sum than he had received for any of the pieces he had executed at the royal command. He afterwards painted many other pictures on similar subjects; continuing to study and work with unabated industry almost to the very close of his long life. He was always an early riser, and the way in which he spent his day was nearly uniform. The morning hours before breakfast, and generally all the evening after dinner, were given to the study of the subject he was preparing to paint; while, during the intermediate part of the day, namely, from ten till four, he was employed without intermission at his easel. All this labour and devotion to his art, besides the improved skill and excellence which practice gives, enabled West to produce an unusually great number of works. His pictures in oil amount to about four hundred—many of them of extraordinary size, and containing numerous figures. In 1791, on the death of Sir Joshua Reynolds, West was appointed President of the Royal Academy, which had been established in 1768. This honourable office (with the exception of one year) he held till his death, on the 11th of March, 1820, in the eighty-second year of his age.

One serious disadvantage, however, which West brought upon himself, by the almost exclusive attention he had given to painting from his earliest years, was, that he remained to the end of his life a somewhat illiterate man. It has been asserted, that to spell his words correctly, when he had anything to write, was a task of no little difficulty to the President of the Royal Academy. This neglect and ignorance of everything not immediately appertaining to the department of their own favourite study has been, perhaps, as frequently exemplified by painters

as by any other class of self-educated men. The celebrated Claude Lorraine could scarcely write his name. Our own Hogarth, although by the assistance of a friend he appeared on one occasion as an author, affected to despise literature, and, indeed, every species of mental cultivation, except the knowledge of the art of painting; nor did he much exaggerate when he professed to have himself little or no acquaintance with anything else. It would be easy to mention other instances of the same kind. They ought to serve as warnings to the individual who, with an ardent desire for knowledge, has no one to guide him in its acquisition, of a risk to which he is peculiarly exposed. Even the great artists we have named, with capacities that might have compassed any attainments in literature or philosophy, must be held, notwithstanding all they did, to have neglected a duty they owed to themselves, or, at least, to have followed a lamentably mistaken course, in disregarding that general cultivation, without which excellence in any department of art may almost be said to lose the character of a liberal accomplishment.

CHAPTER XXXI.

OTHER ENGLISH PAINTERS:—SPENCER; HIGHMORE; HANNAM; WRIGHT; GILPIN; GAINSBOROUGH; BARRY; LAWRENCE.

MANY others of our recent English painters have been almost as entirely their own instructors as West was. JARVIS SPENCER, who was celebrated as a miniature painter in the latter part of the last century, was originally a menial servant, and while in that condition used to amuse himself by attempting to draw, when no one suspected what he was about. At last, one of the family in whose service he lived having sat to an artist for a miniature, the performance, when it was finished, was seen by Spencer, who immediately remarked, very much to the surprise of everybody, that he thought he could make a copy of it. He was allowed to try his skill, and succeeded to admiration. His master, upon this discovery of his servant's genius, very generously exerted himself to place him in his proper sphere, and to make him generally known; and Spencer, as we have said, rose eventually to great eminence in the department which he cultivated. JOSEPH HIGHMORE, who painted, among other well-known works, the Hagar and Ishmael in the Foundling Hospital, and long enjoyed high reputation, both for his historical pictures and his portraits, taught himself the art which he afterwards practised with so much success, while he was serving his apprenticeship in a solicitor's office and was without any one to give him a lesson. Highmore died in 1780. Another painter of that day, of the name of HANNAM,

whose works, however, have not attracted much attention, was originally an apprentice to a cabinetmaker; and, having acquired some skill in painting by his own efforts, used to be allowed by his master to spend as much of his time as he chose in executing pictures for those who gave him commissions, on condition of his handing over the price to that person, who found that he made more in this way than he could have done by keeping Hannam to his regular work. RICHARD WRIGHT, who about the same period was much celebrated for his sea-pieces, rose from the condition of a house and ship painter, having taught himself to draw while he followed that trade in his native town of Liverpool. The late Royal Academician, SAWREY GILPIN, so celebrated especially for his faithful and spirited delineations of animals, was also originally apprenticed to a ship-painter. He lodged in Covent Garden, and there being a view of the market from the window of his apartment, Gilpin used to amuse himself in making sketches of the horses and carts, with their attendants, as they passed, or formed themselves into picturesque groups in the square. GAINSBOROUGH, the great landscape painter, again, led by his different genius, used, while yet a mere boy, to resort to the woods and pasture fields in the neighbourhood of his native town of Sudbury, and there to employ himself unweariedly, often from morning until night, in sketching with his untutored pencil the various objects that struck his fancy, from a flock of sheep, or the shepherd's hut, to the stump of an old tree. It was to these studies of his earliest years, undoubtedly, that Gainsborough was indebted both for that perfect truth and fidelity by which his works are distinguished, and for that deep feeling of the beautiful in nature which has thrown over them so great a charm. He learned also in this way a habit of diligent, minute, and accurate observation, which never left him; and it is both interesting and instructive to read the account which has been given of the unrelaxed zeal with which he continued to pursue the study of his art even to the last. "He was continually remarking," says Sir Joshua Reynolds, speaking of the habits of his more mature years, "to those who happened to be about him, whatever peculiarity of countenance, whatever accidental combination of figures, or happy effects of light and shadow, occurred in prospects, in the sky, in walking the streets, or in company. If in his walks he found a character that he liked, and whose attendance was to be obtained, he ordered him to his house; and from the fields he brought into his painting-room stumps of trees, weeds, and animals of various kinds; and designed them, not from memory, but immediately from the objects. He even framed a kind of model of landscapes on his table, composed of broken stones, dried herbs, and pieces of looking-glass, which he magnified and improved into rocks, trees, and water; all which exhibit the solicitude and extreme anxiety which he had about everything relative to his art; that he wished to have his objects embodied,

as it were, and distinctly before him, neglecting nothing that contributed to keep his faculties alive, and deriving hints from every sort of combination." It is not, indeed, generally, the highest genius which is least inclined to avail itself of such assistance in its labours as study and painstaking may procure.

Another of the most distinguished names in the list of British artists of the last century is that of JAMES BARRY. Barry was born at Cork in 1741. His father appears to have been a somewhat unsettled character, or at least to have shifted from one pursuit to another, probably without obtaining much success in any. It is commonly said that he was originally a mason; some authorities state that he had been also a victualler. At the time of Barry's birth he was the master of a small coasting vessel, in which he traded between England and Ireland.

Barry is understood to have received a good education in the ordinary branches of scholarship. At an early age, however, his father took him with him to sea, and made him do duty as a ship-boy. This occupation



JAMES BARRY.

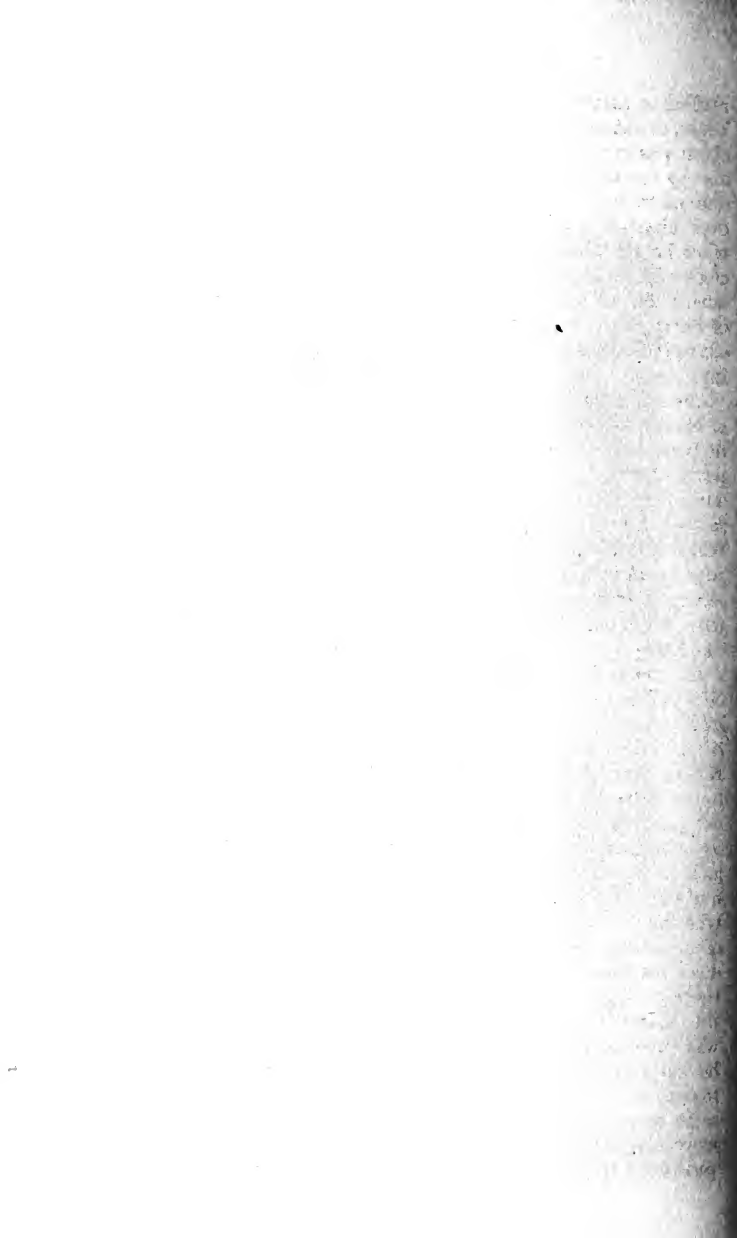
he detested. The love of painting had already taken possession of him, and his greatest pleasure was to cover the deck with sketches of objects made with chalk or ochre. His father, at last, finding all his efforts to make him a sailor of no avail, allowed him to remain at home, and to pursue his studies in literature and art. He now returned to school, and distinguished himself by an ardour and diligence which left all his class-fellows behind him. Even his play-hours were generally given to hard study. Instead of associating with the other boys in their amusements, his practice was to retire to his room, and there to employ himself in



Painted by Himself

Engraved by T. Wright

JAMES BARRY.



reading or painting. Whatever money he got, he spent in purchasing books, or candles to enable him to read during the night. His enthusiasm was at this time (and indeed throughout his life) partly sustained also by certain notions of the virtue of ascetic observances, which he had derived from his mother, who was a Catholic, and had great influence over him. In conformity with these opinions he was wont to sleep, when he did take rest, upon the hardest bed, and to wear the coarsest clothes he could procure. These theological prejudices were not calculated to have a salutary effect upon the growth of a character like that of Barry, whose morose and atrabilious temperament rather required an education calculated to bring the gentler affections of his nature more into play.

His ardour in study, however, both during this and every other part of his life was admirable. He had as yet but few books of his own, but he borrowed from all who had any to lend, and sometimes learned the passages which he liked by heart (a practice of which he soon found the advantage in the growing strength of his memory), and sometimes transcribed them. It is said, that transcripts of several entire volumes, which he had made at this period, were found after his death among his papers. Among the works which he especially delighted to study, it is recorded, were many on controversial divinity—unfortunately not the most wholesome sustenance for an intellectual and moral organization like his.

He was in his seventeenth year when he first attempted to paint in oil; and for some years he wrought with no one to encourage or to notice him. Among the first performances which he produced, were compositions on the escape of Æneas from Troy, the story of Susannah and the Elders, and that of Daniel in the Lion's Den. These pictures he hung up on the walls of his father's house, and there they remained long after the painter's fame had spread over Europe. At last, in his twentieth or twenty-first year, he produced a work which appeared to himself such as he might exhibit in a more public place. This was a picture on the fine subject of the baptism by St. Patrick of one of the kings of Cashel, who stands unmoved while the ceremony is performed, amidst a circle of wondering and horror-struck spectators, although the saint, in setting down his crozier, has, without perceiving it, stuck its iron point through the royal foot. With this work he set out for Dublin, and placed it in the exhibition room of the Society for the Encouragement of Arts. It was universally admired. But no one knew the artist, or was aware that he was a native of the country; and when Barry, who used frequently to come to the room to observe the impression it made, dressed in the same coarse attire which he wore in the country one day, overcome by emotions which he could no longer conceal, announced himself the painter of the picture, his avowal was received with an incredulous

laugh. He burst into tears and left the room. The patriotic enthusiasm of his countrymen, however, amply recompensed him for this when they found that he, an Irishman, was really the person who had produced this admired performance. The young ascetic soon found himself the favourite of the gayest society of his native metropolis. But perceiving that this new course of life interrupted his studies, and seduced him occasionally into worse follies, he became alarmed, and determined to withdraw himself from it before it should have become a habit. These feelings came over him with so much force one night when he was returning from a tavern, where he had spent the evening with a bacchanalian party, that he actually threw what money he had in his pocket into the river, cursing it as having betrayed him into the excesses of which he had been guilty, and from that day returned to his books and his easel.

Meantime, however, he had also acquired some worthier friends; and, among others, had been introduced to the illustrious Edmund Burke, then commencing his splendid political career as assistant to the secretary of the Lord Lieutenant. A story has been told respecting Barry's first interview with Burke, which would be interesting if it could



EDMUND BURKE.

be received as true. Having got into an argument with each other, Barry is said to have quoted a passage from the "Essay on the Sublime

and Beautiful" in support of his opinion; on which Burke expressed himself slightly of that anonymous performance. This insensibility to the merits of a work which was one of his especial favourites, fired Barry, and, after vehemently eulogizing the book, he concluded by declaring, that not having been able to purchase it when it first came into his hands, he had actually transcribed the whole of it. His surprise and delight were extreme, when, in reply to this appeal, the other told him that he was himself the author of the work. "And here," exclaimed Barry, taking a bundle of papers from his pocket, "is the very copy I made of it with my own hand." All the truth that there probably is in this story is merely that Barry quoted Burke's own essay in reply to some of that gentleman's arguments. He could hardly have been ignorant that Burke was the author of the work, which had been published so far back as 1757, at least five or six years before the interview in question is stated to have occurred.

But Burke did not satisfy himself with merely bestowing upon his young countryman the patronage of his favourable regard. Although, at this time, his income was a very limited one, he most generously undertook to provide the means of sending Barry to Italy, and supporting him there while he nourished and matured his genius by the study of the works of the great masters. Accordingly, after he had been seven or eight months in Dublin, the young artist proceeded, at Burke's invitation, to London, where the latter now resided. For a short time he was occupied in making copies of some paintings in oil for James Stuart, the author of the "Antiquities of Athens;" an employment which Burke procured for him, and which was well calculated to improve him in his art. In the end of the year 1765 he left London for the Continent, and, passing through France, proceeded to Rome. He remained absent from England about six years in all, during the whole of which time Burke, assisted by his two brothers, supplied the funds necessary for his support. During his residence at Rome, Barry was not idle—that, with all his faults, he never was at any time of his life—but his studies were not always directed so wisely as they might have been to the object which he ought to have had principally in view; and his unfortunate temper involved him in continual quarrels with his brother students. He received from Burke the best advice, administered in the kindest manner: but all failed to have much effect.

He made his re-appearance in London in the beginning of the year 1771, and immediately proceeded to give proofs of his improved powers, by painting some pictures, which he exhibited. But it was not his fortune to meet with much applause. All his performances were characterized by certain obvious defects of execution, which struck everybody, while their merits were frequently not of a kind to be appreciated by the multitude. Among other pictures he painted one, in 1776, on the

death of Wolfe, in which, as had been usual in such pieces, the combatants were represented naked, it being in those days held impossible to preserve any heroic effect where modern costume was introduced. But just at this time West produced his noble picture on the same subject, in which all the figures were painted dressed as they had actually been; and the force of nature and truth carried it over the scruples of criticism. Barry's performance was found quite unequal to sustain any competition, in point of attraction, with its rival. This and many other disappointments he had to bear: nor were those the least of his vexations which he brought upon himself by his own absurd and ungovernable temper. He had been before this time chosen an Associate of the Royal Academy, but he had already quarrelled with the council. His wayward and ungrateful conduct at length well-nigh tired out even the friendship of Burke. To add to all this, his pencil, his only resource, brought him but the scantiest returns; and his days were darkened by the miseries of severe poverty.

Yet all did not crush his spirit. While struggling with these complicated distresses, he continued to worship his art with as warm an enthusiasm as ever. In a letter, written when he was in Italy, to his friend, Dr. Hugh, he had said, "My hopes are grounded in a most unwearied, intense application; I every day centre more and more in my art; I give myself totally to it; and, except honour and conscience, am determined to renounce everything else." In addressing himself, about the same time, to another friend, he exclaims, in touching anticipation of the fate that awaited him, "Oh, I could be happy, on my going home, to find some corner where I could sit down in the middle of my studies, books, and casts after the antique, to paint this work and others, where I might have models of nature when necessary, bread and soup, and a coat to cover me!" He had now hardly the prospect of securing even these humble accommodations, when he nevertheless determined, for the honour of historic painting, to devote himself to the accomplishment of a great work, requiring much time and labour, and holding out to him at the best only a scanty, distant, and precarious remuneration. He proposed to the Society for the Encouragement of Arts, Manufactures, and Commerce, to adorn their great room in the Adelphi with a series of compositions on some appropriate subject by his own hand, on condition only of being allowed to choose his subject, and of being provided with the necessary canvas, paints, and models. This was in the year 1777. He had just before published an elaborate work in refutation of the theories of some continental critics, who had maintained the impossibility of the higher styles of art ever flourishing in England, on account of the climate being too northerly and cold; and he now thought himself bound, he informs us, to follow up his argumentative vindication of the national genius by a proof of what it could produce,

“in duty,” says he, “to the country, to the art, and to my own character.” He calculated that this work would cost him the constant labour of two years, and he knew that he must, during all that time, procure himself the means of existence by additional toil in hours stolen from sleep. But the prospect of these things had no power to deter him. With only sixteen shillings in his pocket he entered upon his undertaking, determined, if only life should be granted him, to accomplish it upon the terms he had proposed.

And he would probably have been able to keep to the letter of his engagement, if the work had cost him no longer time than he originally contemplated. But, although he laboured diligently and unceasingly, he found it impossible to finish it in less than six years, instead of the two which he had thought would be sufficient. The subject which he chose was the Progress of Human Improvement, which he has represented in a series of six pictures. Of these he intended the first to be emblematical of the savage state, or rather of the earliest dawn of civilization, when the chase was the only employment of men, and their rude natures were just beginning to be attempered to the influences of religion, law, and music; the second, of the age of agriculture; the third, of the establishment of civil polity, and the reign of literature, science, and the arts; the fourth, of the modern triumphs of navigation; the fifth, of the age of manufactures and commerce; and the last, of Elysium, or the immortal happiness of the great and good in a future state of existence. The conception of these different compositions displays considerable learning and ingenuity; but the subject attempted to be illustrated scarcely lies, perhaps, within the legitimate province of painting. At any rate, it has been generally felt that Barry's allusive groups and figures often shadow forth but very dimly and imperfectly what he means them to represent; and, indeed, that without his own printed explanations they would be sometimes nearly unintelligible. If, however, he overrated his own powers, or those of his art, in undertaking this task, the manner in which he prosecuted and accomplished it (in so far as he found its accomplishment possible) must be allowed to form as fine a display of zeal, disinterestedness, self-denial, and heroic perseverance, as is anywhere to be found on record. During the six years which were devoted to the execution of these pictures, the enthusiastic artist led, voluntarily and contentedly, a life of incessant toil and privation. Wearing, as usual, the coarsest clothes, and living upon the humblest fare, his limited personal expenses still compelled him, not unfrequently, after working ten hours at the Adelphi, to sit up half the night painting or engraving something for the booksellers, with the price of which he might purchase bread for the following day. At last, however, he was obliged to make an application to the Society of Arts for some assistance to enable him to continue his labours, and, after some

delay, they voted him a hundred guineas. They also presented him with two hundred guineas more on the conclusion of his undertaking, and permitted him to exhibit the pictures to the public, by which he realized about five hundred pounds. These sums, together with about two hundred and fifty pounds more, which he derived from the admiration of a few affluent individuals, formed all the remuneration he received for his six years' labours. But, inadequate as it was, it was more than he had counted upon. It deserves to be mentioned to the credit of Barry's prudence, that, as soon as he obtained this money, he placed it in the funds, not having, it would appear, even during the long period he had existed almost without any income at all, incurred any debts which it was now necessary for him to discharge. He thus secured an income for the rest of his life, which, although small, was an independence to a person of his economical habits; and, indeed, added to the fruits of his daily industry, it enabled him afterwards to save money.

Barry lived for many years after the completion of these paintings at the Adelphi, during which he continued his studies and his professional labours as assiduously as ever, and although not much encouraged by popular favour, produced numerous works of various degrees of merit. While yet engaged with his great undertaking which has just been described, he was elected Professor of Painting to the Royal Academy; and, as soon as he had finished the pictures, he commenced his lectures. He also, in the course of his life, published various literary works, which, together with his Lectures and Correspondence, have been collected since his death, and form two volumes quarto. He died in February, 1806, having been suddenly attacked by a pleuritic fever, which carried him off in a few days, in the sixty-fifth year of his age.

The biographies of many men are as instructive from the details which they present of the unhappy consequences that have flowed from errors of conduct or constitutional failings, as those of others are from their pictures of success won by merit. To the young and inexperienced, lessons of warning are as necessary as lessons of encouragement. It often happens that great excellences are combined in the same individual with great defects; and it is exceedingly requisite that, while he is taught and made to feel what may be accomplished by a due application of the one, it should also be deeply impressed upon him that the other, if indulged or allowed to remain uncorrected, may render the best abilities, and even the most arduous exertions, useless. The utter insufficiency of mere talent, indeed, to attain either independence or honourable distinction, when unaccompanied by habits of industry and perseverance, has been too often exemplified, to make it necessary that we should cite any instances in proof of it. Even the highest powers unemployed must remain unproductive. But the history of Barry illustrates another case

which also sometimes occurs—that of a person who, uniting great capacity and unwearied application, still fails in obtaining the success he might have expected, from the want of other qualities. The deficiencies and mistakes of this able man were chiefly such as are peculiarly apt to mark the temper and conduct of persons who, in early life, have been entirely or principally their own instructors. Such persons, before entering the real world, in which they must mix with their fellow-men, have commonly created, as it were, around themselves a world of their own, to which all their notions and habits are accommodated, having been there, in fact, formed and learned. Their associates in ordinary life have not hitherto acquired any of their respect, by having guided or assisted, or even participated with them in those studies which they have pursued with so much ardour. They have here had to do everything for themselves, and have found themselves sufficient for everything. From all this naturally springs some weakness, as well as much strength: on the one hand, an independence and self-reliance, both moral and intellectual, begetting generally a manner of thinking unusually manly and unprejudiced, and sometimes considerable originality of view; but, on the other, an ignorance of the actual world and of mankind, an undue impatience of, and contempt for, the ordinary conventional forms and arrangements of society (which are all founded upon the principle of mutual concession among many variously feeling minds), a bigotry in favour of certain peculiar notions which will brook neither contradiction nor advice; in one word, such an excess of the spirit of confidence and aversion to control as amounts sometimes to positive perversity and wilfulness. The character of Barry exhibited, in strong relief, both the good and the bad qualities we have mentioned. The love of his art was with him a passion. He pursued, throughout his life, the study and the practice of it with a zeal and a laborious application which no difficulties and no discouragements could abate. He possessed in sufficient measure that trust in his own powers, without which nothing great can be either achieved or attempted. And he both thought and wrote with a force and decision which showed a mind unenervated by the habit of taking its opinions from others, and capable of stamping its own impress upon whatever subject it investigated. But this masculine energy and hardihood of nature, from having been allowed to grow up undisciplined, very early degenerated into a species of recklessness and ferocity, which proved the blight of his genius and the curse of his existence. His arrogance and infirmity of temper, as well as his imprudence and his extraordinary ignorance of the world, showed themselves almost in the very commencement of his career. Scarcely had he set his foot in Rome, when he discovered (to his own satisfaction) that all the principles and maxims there recognised with regard to the art he came to study were stupidly wrong, and he forthwith not only denounced them as such, but quarrelled

with everybody who chose to stand up in their defence. It is possible that he may have been right in his judgment; but somewhat more of forbearance in the expression of it, and of toleration for the opposite opinion, would have savoured both of charity and of wisdom. From something of the same spirit of opposition and contumacy, he would not, while here, pursue the same method of study as his brother artists; but, instead of employing himself in making drawings of the works of the great masters with his hand, he satisfied himself with taking fac-similes of them by an instrument. He even spent much of his time, as we have already mentioned, in the investigation of subjects hardly connected at all with his proper occupation. All this while he had in his friend Burke an invaluable monitor, whose counsels continued to be tendered to the last with a frankness, and, at the same time, a delicacy in the manner, only equalled by the admirable wisdom of the matter. But, although he felt the kindness, and, at times, even the unanswerable good sense of the advice he received, it certainly produced no effect upon his conduct. On his return to England, as we have seen, he acted in the same manner as he had done at Rome—attacking and quarrelling with everybody, insisting upon having his own way in everything, too often apparently out of a spirit of selfishness, or the mere love of dispute and opposition, and, in short, in his whole conduct regarding nothing save his own humours and impetuous impulses. To deport himself after this fashion, he seems to have thought was a privilege he possessed as a man of genius—a weak mistake, which, if his genius had been of the highest kind, he never would have fallen into. How much truer a wisdom than that which his own ill-regulated temper and childish notions of dignity suggested to him, might he have found in a few sentences of one of the letters addressed to him by Burke, a short time before he returned from Italy: “Believe me, my dear Barry,” writes this considerate friend, “that the arms with which the ill dispositions of the world are to be combated, and the qualities by which it is to be reconciled to us, and we reconciled to it, are moderation, gentleness, a little indulgence to others, and a great deal of distrust of ourselves; which are not qualities of a mean spirit, as some may possibly think them, but virtues of a great and noble kind, and such as dignify our nature as much as they contribute to our repose and fortune; for nothing can be so unworthy of a well composed soul as to pass away life in bickerings and litigations, in snarling and scuffling with every one about us. Again and again, my dear Barry, we must be at peace with our species, if not for their sakes, yet very much for our own.”

We may add a sketch of the career of another English painter, of great distinction in one branch of the art, who also was mainly self-taught, the late SIR THOMAS LAWRENCE. The boyhood of this great artist exhibited almost as remarkable an instance of the precocious development

of talent as any on record. He was born in 1769, being the youngest of a family of sixteen children. His father had been bred an attorney, but had afterwards become an Excise officer, and when his son Thomas was born, was an innkeeper at Bristol; which city, however, being unsuccessful in his business, he left a few years subsequent to this event, and established himself in the same capacity at Devizes. He appears to have been a strange character, as indeed this outline of his history would itself lead us to suppose. His ruling passion, it seems, was a love of poetry; and this he carried so far as not only to spend much of his own time in writing verses, but often to insist that his guests also should postpone all other affairs to listen to his effusions. How he found this sort of treatment to answer in attracting or attaching customers to his house, may be easily conceived. All who did not prefer such intellectual banquets to more substantial fare, gradually deserted the rhyming innkeeper, by whom, of course, many matters of considerable, though merely terrestrial, importance were apt to be neglected, while he was employed in the service of the Muses. The consequence was, that in six or seven years his Devizes speculation also failed, and old Lawrence was once more ready for a change of residence, if not of profession.

Long before this, however, his son Thomas had become famous in the neighbourhood as a little prodigy. He was a very beautiful boy, and had



SIR THOMAS LAWRENCE.

been remarkable from infancy for his sprightly and winning manners. His father, whose favourite he was, had early taught him to recite poetry; and when the child was only four or five years old, it was common for him to be presented by his partial parent to all strangers who visited the

house, to exhibit to them his proficiency in this accomplishment. But, even at this very early age, he had acquired considerable mastery in a species of performance much more difficult than that of spouting verses. He was able already to use his pencil, and to take likenesses. This art he had acquired entirely of himself—if we should not rather say that, appearing as it did with the very commencing development of his intellectual powers, it was more a faculty born with him than an art which he had to learn. It was several years after he began to draw before he had an opportunity of seeing a good painting. He had not only, therefore, to form himself merely by copying nature, but to invent the mechanical processes of his art by his own ingenuity, without either a master or a model. Yet the portraits which he sketched, even so early as his fifth year, are affirmed to have been generally happy likenesses; and one of Lady Kenyon, which he executed at this period, is particularly recorded as having been at once recognised when shown to a friend of her ladyship twenty-five years after.

At the age of six he was sent to school, but he was only allowed to remain two years; and this, with the exception of a few lessons in Latin and French some time afterwards, was all the education he ever received. The uncommon talents he had displayed had now made him generally known; and one gentleman generously offered to defray the expense of maintaining him for some years in Italy, that such extraordinary natural powers might not be deprived of the advantages of the best possible cultivation. But his father had very absurdly taken it into his head, that instruction would only cramp and weaken his son's genius; or, at least, he chose to say that such was his opinion; and upon this pretext he not only refused to permit him to go to Rome, but would not even hear of his taking lessons from a master in his own country. He allowed him, however, to visit the houses of some of the neighbouring gentry, where he saw some good pictures; and these first gave him an idea of historical painting. He copied various pieces of this class, and at last produced several original compositions of his own.

His father had probably, for some time before leaving Devizes, resolved to make an attempt to turn his son's singular talents to some account; and it may have been partly with this view that he declined allowing any lessons to be given to the boy. He considered, of course, that he would attract more wonder by being presented to the public as an entirely self-taught genius, than if it should have to be acknowledged that he had derived any part of his skill from the instructions of others. When Mr. Lawrence gave up his inn at Devizes, Thomas was about ten years of age. The whole family immediately proceeded to Oxford. As soon as they arrived in this city, the boy's qualifications were announced; and numbers soon thronged to him to have their likenesses taken. The commencement of the speculation was thus sufficiently successful. From

Oxford they removed to Salisbury, and thence to Weymouth; and at both places the talents of the young artist reaped a considerable harvest. At last, in 1782, Mr. Lawrence proceeded with his son, and the rest of his family, to Bath, where he proposed to fix his future residence. Thomas was at this time in his thirteenth year.

On his arrival in Bath, he found the persons of distinction assembled in that fashionable place of resort familiar with his name and his extraordinary abilities; and sitters soon came to him in such numbers, that he raised the price of his crayon portraits from a guinea to a guinea and a half. Some of the persons by whom he was noticed, also possessed valuable collections of pictures,—and these he used to employ much of his time in studying and copying. Among other copies which he made was one of the Transfiguration by Raphael. This he sent to the Society of Arts; and although, in consequence of an informality, it was found not to be admissible as a competitor for any of the regular prizes, the Society were so much struck by its merits, that they bestowed upon the young artist their large silver palette, gilt, and five guineas in money.

He remained at Bath about six years; and during the whole of this time, young as he was, he was the sole support of his father and the rest of the family. He is said to have worked regularly at painting portraits at least four hours every day, besides which, he spent much time in studies and voluntary exercises connected with his art. At last his father, to whom he had so long brought a considerable income, either thinking that his labours might be made still more profitable in a larger field, or perhaps prevailed upon by the remonstrances of the young man himself, determined to remove his establishment to London. The family arrived here in 1787, when Thomas was in his eighteenth year. His coming to London at this time was, undoubtedly, a fortunate event in every way for the artist. The folly, or more interested views of his father, had hitherto withheld from him all the ordinary means of improvement in his profession; but he himself, it is understood, with more good sense, felt anxiously desirous to be able to avail himself of better opportunities of study than he could enjoy in the country. When he found himself in London, accordingly, he hastened to procure admission as a student at the Royal Academy. He also got himself introduced to Sir Joshua Reynolds, to whom, then in the height of his fame, his father would seem to have intended that he should at once set up as a rival,—having, in the first instance, established him in an expensive suite of apartments in Leicester Square, in the immediate neighbourhood of the rooms of the great painter. In this matter, also, however, his son acted more modestly, and more wisely. He sought access to Sir Joshua's study with one of his performances in his hand, submitted the picture to his inspection, and listened to his remarks with the attention and deference

of one who both knew their value and how to profit by them. He also very soon removed from Leicester Square to less splendid lodgings in Tavistock Street, Covent Garden.

Such was the early history of Sir Thomas Lawrence. His subsequent career, as all know, was one of great brilliancy. He was elected a Royal Associate in 1791. On the death of Sir Joshua Reynolds, the following year, he was appointed his successor in the offices of painter to his Majesty and to the Dilettanti Society. From this time his reputation grew steadily, till he came to be generally acknowledged the first portrait painter of the age. In 1815 the honour of knighthood was bestowed upon him by the Prince Regent. The preceding year, on the visit of the foreign sovereigns to this country, he had received his Royal Highness's commands to take the likenesses of those personages, and some of the more distinguished individuals in their suite; and during their stay he finished the portraits of the King of Prussia, Field-marshal Blucher, and the Hetman Platoff. Four years afterwards, on occasion of the Congress at Aix-la-Chapelle, he repaired to that city, where he painted the Emperor Alexander; and, proceeding from thence to Vienna, he there completed portraits of the Emperor of Austria, the Archdukes, Prince Metternich, and other distinguished persons belonging to that court. From Vienna he went to Rome, where he arrived in May, 1819. Here he painted the Pope Pius VII., and Cardinal Gonsalvi. He



SIR JOSHUA REYNOLDS.

remained in Rome for several months, during which he received the most gratifying testimonies of respect and admiration from his brother

artists there, and it was not till the month of April, 1820, that he returned to England. The day before he arrived in town he had been unanimously elected to the Presidency of the Royal Academy, as successor to Mr. West. This distinguished office he continued to hold till his sudden and lamented death, on the 7th of January, 1830. Only the day before this event happened, he had worked for some time in his study as usual, and even a few minutes before he expired, he had been conversing cheerfully with some friends who had spent the evening with him, on the art which he loved, and which it was then little thought by any of them he would so soon cease to adorn.

Gifted as he was with such an extraordinary natural capacity for his art, as to have been in reality a miracle of precocity, Sir Thomas Lawrence does not furnish us with an example so valuable as many others we have quoted, with reference to the peculiar object of the present work. His first acquisitions in the line in which he afterwards so greatly distinguished himself, were not made either through laborious application or in the face of any uncommon difficulties; but rather by a happy innate skill and facility, which enabled him to paint and draw likenesses almost as soon as his hand could hold a pencil, and with something approaching to the same unconsciousness and absence of effort with which in other men the limbs obey the impulse of volition in their most ordinary movements. But still his history is not altogether uninteresting, even as a lesson on the subject of the pursuit of knowledge. Although in his earliest efforts he met with no opposition, but, on the contrary, with abundance of encouragement and applause, from his father, we have seen the resistance which that person afterwards offered to every plan which was proposed for his son's improvement; and it is to be taken, therefore, as an evidence both of great good sense and no ordinary firmness on the part of the son, that, not intoxicated either by the flatteries which had been lavished upon him, or by the decided success which had crowned even his yet imperfect performances, he felt, what his father did not, how useful study and instruction might be to him, and, as soon as it was in his power, took measures of his own accord to secure both. Had this eminent artist, indeed, not possessed many superior qualities beside his talent as a painter, the education which he received in his boyhood, suited as it was to force out his genius into brilliant but premature display, would, in other respects, have been productive of very unfortunate effects on both his professional and his general character. He must have been very active in availing himself of such opportunities as his after life presented for repairing the injuries of his early training. He is one of a very few of our great English painters (Gainsborough was another) who have attained to eminence in their art, without having enjoyed the advantage of an early residence in the country which contains the principal works of the great masters.

Sir Thomas Lawrence never visited Italy till he went there, as we have mentioned, on his return from Vienna, in 1819, when he was fifty years of age. This was one misfortune which he owed entirely to the obstinacy of his father. Considering the very scanty education, too, which he received in the ordinary branches of learning, the respectable measure of literary information of which he afterwards made himself master deserves to be mentioned to his credit. Although not what is commonly called a scholar, he was well acquainted, we are told, with the best English authors; and had taken great pains to obtain a knowledge of classical and foreign works, in so far as they were accessible to him through translations. Finally, the sober and rational equability of temper and conduct, so opposite both to the low excesses of Morland and the morbid cynicism of Barry, which this eminent artist preserved throughout his life, notwithstanding his early exposure to so many influences well calculated to corrupt both his understanding and his heart, forms another ground on account of which his example is exceedingly worthy of being held up to the imitation of all, and especially of such as may have to tread a path so perilous as his, in the commencement of life.

CHAPTER XXXII.

FOREIGN PAINTERS:—GIOTTO; BATONI; GREUZE; EHRET; SOLARIO.—
OTHER CULTIVATORS OF THE FINE ARTS:—CANOVA; BEWICK.

IF we were to go over the long catalogue of foreign painters, we should find many names to add to those we have already enumerated of individuals who have attained the highest distinction after acquiring their art originally without a teacher, or practising it for a considerable time in unnoticed obscurity. GIOTTO, for instance, one of the great revivers of the art in the beginning of the fourteenth century, was the son of a peasant in the village of Vespignano, near Florence, and was employed, when a boy, in tending sheep. While in this condition, he was one day found by Cimabue drawing the figure of one of his flock on a large stone which lay on the ground; and that master (the first who practised anything deserving to be called painting in modern Europe) was so much pleased with this attempt, that he took the boy with him to Florence, and carefully instructed him in his art, in as far as he knew it himself. Giotto afterwards greatly surpassed his master, and, indeed, had no equal in his own age, either as a painter or a sculptor. To descend to much later times, BATONI, the principal artist whom Italy produced in the last century, taught himself painting while working with his father

as a goldsmith; and, although he afterwards went to study at Rome (being sent there by some admirers of his genius, who subscribed to defray the expense of his residence), he merely availed himself of that opportunity to copy some of the works of the great masters, and to pursue the acquisition of his art under the direction of his own taste and judgment. His contemporary, GREUZE, whom the French reckon their most eminent portrait-painter of that day, and who acquired besides great fame by his compositions from humble life, was likewise a self-taught artist. Having begun at a very early age, we are told, to cover the walls and furniture of the house with his sketches, he was strictly forbidden by his father to continue that amusement; but the bias of his genius was too strong for the paternal interdiction, and he was again and again found with his chalk or charcoal in his hand, and busy at his old employment. At last, one day, when his father had been scolding him on this account, a painter of the name of Grandon, from Lyons, happened to pay them a visit (they lived in the town of Tournus in Burgundy, at no great distance from that city); and it was agreed by all parties that young Greuze should be taken home by him to Lyons, and regularly instructed in the art to which he had shown so strong an attachment. It is affirmed, however, that he was already nearly as good a painter as the master to whom he was thus consigned, and that in his subsequent progress also he was chiefly his own instructor. Another artist of the same period, distinguished in a different line, GEORGE DIONYSIUS EHRET, whose admirable drawings of botanical objects are well known from the engravings in the *Hortus Cliffortianus* and other splendid works, was the son of a working gardener, employed in the gardens of one of the German princes, and, when a boy, acquired his skill in delineating flowers so entirely by his own efforts, and, it may be even added, with so little consciousness of the progress he was making, that he had formed a valuable collection of the productions of his pencil before he was aware that his labours were worth anything. Dr. Trew, a physician of Nuremberg, having accidentally heard of him, desired to see his drawings, and found that he had already executed representations of about five hundred plants in a style of extraordinary excellence. These paintings had been merely the amusement of the young and self-taught artist; and his surprise may be conceived when Dr. Trew offered to purchase them from him for four thousand florins, or above two hundred and fifty pounds sterling. Even the money was not so welcome as the assurance thus given him of the value of a talent which he had hitherto rated so lightly. Ehret, who from this moment, determined upon making botanical drawing his profession, eventually, as we have said, earned the highest distinction in this line of art—especially after the intimate acquaintance he formed with the celebrated Linnæus, who directed his attention to the importance of minute fidelity

in delineating some of the details of vegetable nature, which he had been accustomed too much to overlook. After having resided in different parts of the Continent, he came to England in 1740, when he was about thirty years of age, and remained in this country till his death in 1770. He had educated himself diligently in other branches of literature and science, as well as in those immediately connected with his profession, and had been a Fellow of the Royal Society many years before his death.

To these instances we may add the strange and romantic story of the Italian painter, ANTONIO DE SOLARIO, commonly called *Il Zingaro*, or *The Gipsy*, to which, after it had been long almost forgotten, attention was recalled some years ago, in consequence of the discovery of one of the artist's paintings at Venice. On this painting, which was purchased from a dealer by the Abbate Louis Celotti of that city, Solario designates himself a Venetian; and the circumstance appears to have been received as a matter of no small gratification and triumph, by those who now consider themselves as hence entitled to claim him as their countryman. A Signor Moschini has published a small pamphlet (*"Memorie della Vita di Antonio de Solario, detto il Zingaro Pittore Veneziano. Venezia, 1828"*) upon the subject, which he dedicates to the Abbate Celotti, and in which he details the particulars of Solario's history, as they are given in Bernardo Dominici's *"Lives of the Neapolitan Painters,"* one of the few writers by whom even his name had heretofore been noticed. Dominici, however, represents him as having been a native of the province of Abruzzo, in Naples; and Moschini therefore addresses himself, in the first place, to refute this error, as he conceives it to be, and to maintain the claim of Venice to the honour of having been the Gipsy's birth-place. His argument upon this point, though rather long, issues, after all, merely in a reference to the inscription upon the Abbate Celotti's picture, which, in the absence of all other direct evidence, he contends ought to settle the question. But, wherever he may have been born, it is agreed on all hands, that Solario was originally a Gipsy, or wandering tinker, and that it was in this character he first made his appearance at Naples in the beginning of the fifteenth century. He was, at this time, in the twenty-seventh year of his age, having been born, it is said, although about this date there is some doubt, in the year 1382. While here, he chanced to be employed to do some work in the way of his craft by a painter of the name of Colantonio del Fiore. This painter had a very beautiful daughter; the young lady was seen by Solario; and the tinker at once fell deeply in love with her. It was taking a bold step, certainly, and one not very likely to be successful; but, impelled by his passion, the enamoured Solario determined to ask the lady from her father in marriage. His application was treated with ridicule by Colantonio; who, by way of

effectually extinguishing the poor Gipsy's hopes, told him that he meant to bestow his daughter only upon some one who was as good a painter as himself. "Then will you accept of me," said Solario, "for your son-in-law, if after a certain time I shall present myself to you with that qualification? Will you give me ten years to learn to paint, and so to entitle myself to the hand of your daughter?" Colantonio thought that he would not hazard much by assenting to this proposal, by which he would at least rid himself for the present, and for a considerable time to come, of his importunate suitor, whose pertinacity and earnestness began somewhat to alarm him; and so, not greatly apprehending that he should ever hear more of him, he assured the tinker, that, if he came back within the period in question transformed into a painter, the young lady should be his. Before this, the story relates, Solario had, by some means or other, obtained the attention and favour of the King's sister; and he now insisted that Colantonio should go with him to that princess, and, in her presence, renew his covenant. Somewhat more favourably impressed towards his proposed son-in-law, probably, by being made aware of the interest he had at court, the painter agreed to this also; and the princess accordingly became the witness of the solemn ratification of his engagement. Having settled the matter thus far, Solario immediately left Naples, for Colantonio had stipulated that he should remove to a distance while acquiring his new accomplishment; and in the first instance he proceeded directly to Rome. Here, however, he could not find an instructor to his mind; but he heard much talk of Lippo Dalmasi, who resided at Bologna, and thither therefore he determined to betake himself. On finding Lippo, and telling him his object, he received at first from that person only an urgent exhortation to think no more of so wild a plan, and to trust to the efficacy of time and absence to cure his passion; but Solario continued to press his application so perseveringly, employing even tears to aid his entreaties, that the reluctant painter was at last prevailed upon to admit him as his pupil. To the ardent Solario it now seemed as if all his difficulties were over. From the moment in which he began to receive Lippo's instructions his application was unceasing. Awkward as he was at first, he soon became the admiration and envy of his fellow-students; and even his master himself now advised him to persevere in his new career, as earnestly as he had formerly endeavoured to dissuade him from entering upon it. He remained six or seven years with Lippo, and then left Bologna to visit the other principal towns of Italy, with the view of improving himself in his art by studying the various styles of other painters. In this peregrination he spent nearly three years, during which he visited, among other places, Florence, Ferrara, and Venice; and then, returning once more to Naples, after an absence of nine years and some months, he first presented himself to one of the

gentlemen attached to the court, whose picture he drew, and by his means was introduced to the presence of his old friend, the princess, who had by this time ascended the throne.* Changed as he was in outward appearance, as in everything else, he was not recognised by his former patroness; but a Madonna and Child, of his own drawing, which he offered to her, was graciously accepted. When her majesty had expressed her approbation of this picture, the painter threw himself at her feet, and ventured to ask her if she did not recollect the wandering Gipsy, who ten years before had had the honour of being admitted to her presence, and in whose fortune she had then been pleased to take an interest? After recognising him, the queen, at first, would scarcely believe that he had really painted the picture he had given her; but, on his executing in her presence a portrait of herself, she no longer doubted his pretensions. She then sent for Colantonio, and, having submitted the pictures to his inspection, desired him to tell her what he thought of them. Colantonio extolled them both to the skies. On this her majesty asked him whether he would not rather give his daughter to the artist whose productions were now before him, than wait any longer for the return of the Gipsy, of whom he had heard nothing for so many years? Too glad of such an opportunity of escaping from his engagement, the Neapolitan painter eagerly expressed his assent to this proposal; when her majesty, calling to Solario to step forward from his place of concealment behind a curtain, where he had heard all that passed, at once solved the mystery. We need scarcely add the conclusion of the story. Solario received his well-earned bride; the father, as he put her hand in his, remarking that, if not his ancestry, at least his art deserved her. Solario was soon after this appointed painter to the Neapolitan Court. During the remainder of his life he executed many works, which placed him in the very first rank of the painters of that age. In particular his series of pictures in *fresco*, illustrative of the life of St. Benedict, in the church of the convent of St. Severinus, at Naples, long excited universal admiration; and, even in the half-defaced state in which they at present exist, testify the extraordinary powers of the artist. These frescos, however, he left unfinished at his death, in 1455. The picture by Solario, which the Abbate Celotti has lately recovered, and of which an engraving is given in Signor Moschini's pamphlet, is considered as fully sustaining the artist's traditionary fame. As for the history which we have just detailed, it is not improbably indebted to the popular love of the marvellous for some portion of the shape in which it has come down to us; but there can be little doubt that it is, in the main, founded upon fact. The reader will remark its similarity to that of Matsys, the Flemish painter (p. 39); and, if both relations be true, seldom, certainly, has love had to boast of

* This must have been Joan II., who reigned at Naples from 1414 to 1435.

a greater or worthier triumph than those it achieved in the cases of the Italian tinker and the blacksmith of Antwerp.

But we should never come to an end if we were to seek to notice all the histories of the subjugation of outward circumstances, by the enthusiasm and strong determination of genius, which the biography of painters would supply. We will add one name from a kindred department of art—that of the great sculptor CANOVA. He was also, in great part, a self-taught artist. Canova was born in 1757, at a small village situated in the Venetian territory. His father was a stone-cutter, and died when Antonio, who was his only child, was in his third year. His mother in a few months married again, and removing to another village, left the child, who was of a very delicate frame of body, with his paternal grandfather and grandmother. This turned out by no means the most unfortunate thing that could have happened to Antonio; for his grandfather, whose name was Pasino, although only a stone-cutter too, was a man of remarkable intelligence and ingenuity, and, by all accounts, much better qualified at least to kindle to its first love of art the genius of the future sculptor than his own father, had he lived, would probably have been. Pasino's wife, Catherina, too, took the most tender care of her little grandson. He was, indeed, the delight of the good old people; and, while he was yet almost a child, Pasino, who as we have just said, was accomplished much beyond the generality of his class, had taught him the elements of drawing, and had even set him to model in clay, and to shape little fragments of marble into the figures of the more simple and easy inanimate objects. The young artist, on his part, had no delight anywhere but in his grandfather's workshop, unless it was, after the hours of labour, to listen to the tales and ballads recited to him by his grandmother. So early as his ninth year, indeed, Pasino employed him as a regular workman, and he continued to work as such till he was twelve. During these three years he had been wont occasionally to accompany his grandfather to execute repairs at the houses of the neighbouring proprietors, several of whom were Venetian noblemen, who had their country residences in this district. Among them was the Signor Giovanni Falieri, a gentleman of cultivated taste, who, after having frequently seen the boy, was so much pleased with his manners, as well as with the evidences of ingenuity which he already displayed, that he at last resolved to take him into his house, in order that he might enjoy some of those advantages of education which his grandfather's humble means could not afford him. A story has been told of Canova having first attracted the attention of the Falieri family by his having on one occasion, when some ornament was unexpectedly wanted for the Signora's table, modelled for the purpose a lion in butter, which excited such admiration that the artist was immediately inquired after, and orders given that he should be brought forward. But it appears certain that

this anecdote is a fable, in so far at least as the introduction of the sculptor to his early patron is attributed to the circumstance in question. Pasino had been long known to Signor Falieri, who had also had many occasions of remarking the promising talents of his grandson before he took him into his house.* That step, however, he appears to have adopted with no higher views, at first, than merely that the boy's general faculties might receive such cultivation as should, enable him to follow the trade of his father and grandfather with superior advantages. Nor did he probably entertain any other intentions with regard to the future destination of his *protégé*, when, after some time, he sent him to receive some instructions in the rudiments of sculpture from an artist of considerable eminence, who then happened to be residing in the neighbourhood, Giuseppe Bernardi, or Toretto, as he was otherwise called. In Toretto's workshop, however, Canova soon learned much more than it had been intended he should acquire. After he had been there somewhat above a year, he one day took an opportunity, in his master's absence, to make models of two angels in clay. When Toretto, on his return home, saw these figures, he could scarcely believe that they had been executed by his pupil, who had hitherto, in fact, received lessons merely in some of the mechanical processes of the art. Canova remained with Toretto about three years, and then returned to his native village and his original occupation. But, fortunately, Signor Falieri, who now resided in Venice, seized probably by some misgivings as to the fitness of the humble sphere to which he had consigned the talents of his young friend, after a short time again sent him an invitation to come to him. To Venice, accordingly, Canova repaired, being now in his sixteenth year. From this date it may be considered to have been fixed that he should become an artist. He therefore applied himself assiduously to all the necessary studies. In order, at the same time, that he might not be entirely dependent on his patron, although he lived in his palace, he formed an engagement to give his services during the afternoon to a sculptor in the city, from whom, however, he got very little for his work. "I laboured," says he, in one of his letters ("Memoirs," by Memes, p. 188), "for a mere pittance, but it was sufficient. It was the fruit of my own resolution; and, as I then flattered myself, the foretaste of more honourable rewards—for I never thought of wealth." His day, therefore, was thus divided: the morning was given to study in the academy or the galleries, the afternoon was spent in the workshop, and the evening was devoted to the improvement of his mind in general knowledge. The first commission which Canova ever obtained was from a Venetian nobleman, for two baskets containing fruits and flowers. This, his earliest performance, is still to be seen at Venice; but it is not thought to give much promise of the excellence which he afterwards attained. He next pro-

* *Vide* "Memoirs of Antonio Canova," by J. S. Memes, A. M., Edin. 1825, pp. 153, &c.

ceeded to the execution of a group on the subject of Orpheus and Eurydice for Signor Falieri: but this he did not finish till many years afterwards. Meantime he determined to set up in business for himself; and his first workshop was a small ground cell in the Monastery of the Augustine Friars, the use of which he obtained by a grant from the brotherhood. In this humble and obscure apartment Canova wrought for four years. But, although not much noticed by the world during this period, his mind was all the while making rapid progress in the study and mastery of his art. It was at this time that, left entirely in the pursuit of excellence to the guidance of his own reflections, he first began to perceive the necessity of founding the study of art upon the study of nature, in opposition to the notion which then prevailed that certain assumed principles and rules of operation were alone to be attended to. As soon as this new view dawned upon his mind he hastened to regulate his studies in conformity to it. Instead of merely examining and copying the works of other sculptors, he resorted for every part of his art to the works of nature. He studied anatomy. He attended the public spectacles and the theatres, that he might catch the finest attitudes of the human figure from the living exhibition. In walking the streets, in like manner, his eye was constantly on the watch to catch new forms of grace and power from the moving life around him. His art now became more than ever the sole object for which he lived. He laid down a rule for himself, which he strictly observed, never to pass a day without making some progress, or to retire to rest till he had produced some design. In the meantime he also pursued with ardour his studies in general knowledge, especially in those branches which he conceived to be the most important to him in his profession, such as poetry, antiquities, history, and the Greek and Roman classics, which, however, he could only read through the medium of translations. He likewise studied the French and Spanish languages. All this time, however, as we have mentioned, he was very little known. The first performance by which he attracted the notice of his fellow-citizens was his finished group of Orpheus and Eurydice, which he exhibited in 1776. Immediately after this orders began to flow in upon him, and he soon removed to a better workshop. In 1780 the Venetian senate bestowed upon him a pension of 300 ducats (about £60), in order that he might have it in his power to go to finish his studies at Rome. From this time the ecclesiastical capital became his chief residence. On his first arrival there, however, his novel principles of art revolted all the established authorities in such matters; and for a long time his works were the ridicule both of connoisseurs and of his brother sculptors. It was not till about the year 1800 that Canova's merits were fully and generally recognised. From this time, however, till his death, in 1822, he stood in universal estimation in the first rank of his art, and received all the honours that the admiration of the world

could bestow upon him, as one of the greatest sculptors that had appeared in modern times.

The last person we shall mention under this head is our countryman, THOMAS BEWICK, so deservedly celebrated for his admirable performances in wood-engraving, an art of which he may be said to have been not so much the improver as the reviver or re-inventor. Bewick was born in the year 1753, at a village called Cherryburn, in Northumberland. From his earliest years he delighted above all things in observing the habits of animals; and it was his fondness for this study that gave rise, while he was yet a boy, to his first attempts in drawing. Long before he had ever received any instruction in that art, he used to delineate his favourites of the lower creation with great accuracy and spirit. His introduction to the regular study of his future profession was occasioned by an accident, similar to that which has been mentioned a few pages back as having happened in the case of the French painter Greuze. Bewick also was in the habit of exercising his genius by covering the walls and doors of the houses in his native village with his sketches in chalk. Some of these performances one day chanced to attract the attention of a Mr. Bielby, a copper-plate engraver of Newcastle, as he was passing through Cherryburn; and he was so much struck, it is said, with the talent they displayed, that he immediately sought out the young artist, and obtained his father's consent to take him with him to be his apprentice. Mr. Bielby had not long had his young pupil under his charge, when Dr. Hutton, of Woolwich, happened to apply to him to furnish a set of copper-plate engravings for a mathematical work (his "Treatise on Navigation") which he was then preparing for the press. Bielby, however, who was a very intelligent man, suggested to the Doctor that, instead of having his diagrams engraved on copper, in which case they could only be given on separate plates, to be stitched into the volume, it would be much better to have them cut in wood, when they might be printed along with the letter-press, each on the same page with the matter which it referred to, or was intended to illustrate. This is one of the chief advantages of wood-engraving. In a copper-plate, as may be known to most of our readers, the parts which are intended to leave an impression upon the paper are cut into the copper, so that, after the ink is spread over the engraving, it has to be rubbed from all the prominent or uncut portion of the surface, in order that it may remain only in these hollows. The consequence is that, in the first place, the plate is very soon worn, or the fineness of the lines impaired, by the continual abrasions to which it is subjected; an inconvenience, however, which has been greatly reduced by the modern substitution of steel for copper. Secondly, from the method of inking being so different from that which is used in printing letter-press, where the parts of the type that make the impression are the prominences and not the hollows, and the ink, therefore, is allowed

to remain where it naturally adheres on being applied by the ball or roller, the copper-plate engraving must always be printed by itself, and generally on a separate page from the letter-press. The only way of giving both on the same page is to subject the paper to two successive impressions, which, beside the inconvenience of the operation, almost always produces an unpleasant effect from the difference of colour in the two inkings, and the difficulty of adjustment. A wood-cut has none of these disadvantages. As the impression is to be made by the prominent parts of the wood, these, which receive the ink directly from the roller, are allowed to retain it, just as in the case of ordinary types; and there is therefore nothing of that process of rubbing at every impression, which so soon wears out a copper-plate. The consequence is, that, while rarely more than two thousand impressions can be taken from a copper-engraving before it requires to be retouched, a wood-cut will yield perhaps fifty thousand. Then the latter, from the manner in which it is to be inked, admits of being set up, if necessary, just like any of the other types, in the midst of a common page, and so of being printed both in the most convenient place, and without any separate process. The block must, of course, for this purpose be made very exactly of the same thickness or depth as the other types along with which it is placed. In the early days of wood-engraving the pear-tree or apple-tree was the wood most commonly used; but box-wood is now generally employed, as being of a still firmer and more compact grain. The surface of the block is first shaved very even and smooth; and upon this the figure is then traced in pencilling as it is to be finally cut out in relief.

Dr. Hutton followed Bielby's advice with regard to the diagrams for his book, and it was arranged that they should be cut in wood. Many of them, accordingly, were put by his master into young Bewick's hands. The boy executed them with so much accuracy, and a finish so greatly beyond what had usually been attained in that species of work, that Mr. Bielby earnestly advised him to give his chief attention henceforward to wood-engraving, and to make it his profession. At this time that art had fallen into the lowest repute. Yet it had by no means been always so. In former times it had both counted several distinguished names among its cultivators, and had reached a very striking degree of effect in some of its productions. About the end of the fifteenth century, the celebrated painter Albert Dürer, who was also eminent as a copper-plate engraver, practised cutting in wood. When the art was first introduced it was employed chiefly to furnish ornamental borders for the title-pages of books; and these decorations were in general merely broad stripes of black, enlivened by a few simple figures, such as circles or hearts, which were left white upon a dark ground, by being, not raised, but scooped out in the wood. In the same manner, when any object, the shape of a human or of any other being, for instance, was to be represented, it was

the practice merely to cut away the block according to the requisite outline, leaving all the space within untouched, so that when inked and applied to the paper, it left its impression in a blot of unrelieved and uniform blackness throughout: the picture of the devil, in particular, used often to be exhibited in this sable, and as many no doubt deemed it in that case, peculiarly suitable, guise. It soon, however, became usual to introduce white lines, effected, of course, by the easy process of merely cutting grooves in the wood, to mark the shades at the knees, shoulders, and other parts of the figure; an improvement which made the representation both less sombre and also somewhat more natural. At a still later period the outline alone and the shaded parts were left prominent. This may be considered to have been the commencement of the existing style of the art. But the period during which wood-engraving was carried to the greatest perfection was about the end of the fifteenth century, when a method was followed by some of the more eminent artists, which gave to their performances an effect unattained by their predecessors, and which the best productions of succeeding times have perhaps scarcely surpassed. This was the method of cross-hatching, or cutting the wood into a congeries of squares or lozenges by two series of prominent lines running transversely to each other. By this means they produced not only shading, but gradations of shading, with as much perfection as is done in copper-plate engraving; for the different parts of the picture had only to be hatched more or less closely, according as they were intended to be dark or light. Many of Albert Dürer's performances are distinguished by this peculiarity. The difficulty, however, of carving these crossing lines upon the wood must have been exceedingly great; and indeed it has been supposed by some that the effect in question was produced by the paper being impressed, not upon one, but upon two blocks successively. The method of cross-hatching in wood has, at all events, been long abandoned: although some attempts that have been made in very recent times have shown that it is perfectly practicable to produce the same effect as in the works of the old masters by a single block, although at the expense of extraordinary labour and skill. If the old method had consisted in any such half-mechanical process as the application of successive blocks, it probably would not have fallen so completely into oblivion. It was no doubt the extraordinary pains it cost and the time it consumed that occasioned its disuse.

When the practice of cross-hatching was abandoned, however, wood-engraving may be said to have ceased to be cultivated as an art. In this country in particular it was seldom resorted to except to furnish a few of the simple ornaments used in common printing, such as a border for the title-page, a tail-piece, or a coarse cut to put at the head of a street ballad. From this state of contempt it was raised again to the

rank of one of the fine arts, by the genius and perseverance of the individual the mention of whose name has given occasion to this brief sketch of its history, and who, by his labours in its cultivation and improvement, raised himself also from obscurity to distinction. According to Mr. Bielby's advice, Bewick probably continued to give much of his attention to cutting in wood during the remainder of his apprenticeship. As soon as it was over he repaired to London, where he went into the employment of a person who practised this trade, such as it then existed, somewhere in the neighbourhood of Hatton Garden. It is probable, however, that he soon found he was not likely to learn much from his new master; for, in a very short time, he returned to the country. With his taste, too, for rural scenery and enjoyments, and the observation of nature, he found little in London in which he took much interest. When Mr. Bielby, therefore, now offered to take him into partnership, he at once resolved to retrace his steps to Newcastle. Nor even after he had obtained his highest celebrity did he ever again think of establishing himself in the metropolis. He spent the remainder of his life in his native district.

The first specimen of his talents by which Bewick made himself known was a cut of an old hound, which, being laid before the Society of Arts, obtained a prize which they had that year offered for the best wood-engraving. This was in 1775. The block had been cut for an edition of Gay's "Fables," which had been projected some time before by Mr. Thomas Saint, the printer of the "Newcastle Courant." The work itself appeared in 1779, and immediately attracted general attention by the striking superiority of its embellishments, which were all from woodcuts executed by Bewick and his younger brother John, who, when Bielby and he entered into partnership, had become their apprentice. From this time the reputation of the artist went on increasing steadily, and he produced a succession of works which very soon gave altogether a new character to his art itself.

The work, however, which established his fame was his "History of Quadrupeds," which appeared in 1790. He had been employed many years in preparing this publication, all the cuts in which were not only engraved by himself or his brother, but were all copied from his own drawings; for he had continued to cultivate his early talent for the delineation of animals with unwearied industry, having been in the habit of taking sketches of all the striking specimens that came under his notice; while, in order to obtain accurate representations of those of greater rarity, he never failed to visit whatever menageries came to Newcastle, and there to draw them from the life. His assiduous studies from nature no doubt greatly contributed to the excellence of the cuts in the "History of Quadrupeds." Many of the vignettes, also, with which this publication was adorned had uncommon merit as original

sketches ; for Bewick did not confine his attempts with his pencil to the mere delineation of animals.

But he was principally indebted for the great superiority of his productions over those of his predecessors to an entirely new mode of operation, which he introduced into the art. The secret of the old method of cross-hatching, as we have mentioned, had been long lost, or, at least, it had been entirely abandoned from the extraordinary difficulty of the only known manner of practising it. But Bewick produced nearly the same effects by another and much simpler contrivance. Till his time, the block, when prepared for the press, presented only two varieties of surface ; the parts which were intended to receive the ink and make the impression being left in relief, while all the rest of the wood was cut away to so great a depth as entirely to prevent it from touching the paper. The consequence was, that the dark portions of the engraving were all of one shade, while the only other colour introduced was the pure white of the paper. But Bewick secured a variety of tints, and thereby a much truer and more natural perspective, by leaving certain parts of his blocks not quite so prominent as those that were intended to produce the darkest lines, while at the same time he did not lower them so much as altogether to prevent them from coming in contact with the paper when applied to take off the cut. The portions of the surface which were left in this state, communicated an impression varying in depth of shade according to the degree in which the wood was scooped away ; and the cut thus exhibited upon the paper all the gradations to be found in a copper-plate engraving. It is said that this improvement was first suggested to Bewick by his friend, the late Mr. W. Bulmer (afterwards the eminent London printer), who was a native of Northumberland as well as himself, and, serving his apprenticeship in Newcastle at the same time, used always to take off the proofs of Bewick's cuts. To the skill and contrivance of the artist himself, however, we are doubtless to ascribe the first application and practical demonstration of the new method, as well as the subsequent improvements by which he eventually gave to it probably all the perfection of which it is now susceptible.

It would be out of place in a sketch like this, to follow up what has been said by a catalogue of the various works which Mr. Bewick gave to the world, after the period in his history at which we are now arrived, or which made their appearance illustrated by his embellishments.. We have traced the steps by which he rose, through the force of his own talents and industry, to the head of his profession ; and it is not necessary that we should pursue his career further. Suffice it to say, that he amply sustained throughout the remainder of his long life the promise of his early progress. No man was ever more devoted to his profession. Its labours were as much his enjoyment as his business.

He was always an early riser; and from the hour at which he got out of bed till evening he was generally to be found at work, and whistling merrily all the while. For what are called the pleasures of society he cared very little; his social hours were passed in the midst of his family, or occasionally among a small number of select friends when the task of the day was done. Everything in the least degree savouring of effeminate indulgence he despised. His ordinary exercise was walking; but he was fond of all the manly and invigorating sports of the country, and desired no better relaxation from the toils of the workshop than an occasional participation in such cheap and simple amusements. The whole economy of his life was regulated upon a principle of rigid temperance, as well as of the most steady and persevering exertion. He was remarkable at all times for the moderation with which he ate and drank; and with respect to other matters he showed such a contempt for luxury, that he generally slept, even in the depth of winter, with the windows of his chamber open, though in consequence he sometimes, on awaking, found the snow lying on his bed-clothes. For money, which men in general prize so highly, Bewick had all the indifference of a philosopher. The number of works which his unwearied application produced was, as might be expected, extraordinarily great. But he did not confine his studies and performances merely to the art in which he has chiefly earned his fame. He made himself competently acquainted with various branches of knowledge; and with natural history in particular he was intimately conversant. He also engraved occasionally on copper as well as on wood. Even the greater leisure which he was obliged to allow himself during the last few years of his life, when the infirmities of old age compelled him partially to relinquish his professional labours, was not given up to mere idleness. He availed himself of this release from his ordinary occupations to write a memoir of his own life, which is said to be composed with much minuteness of detail, and to be of considerable extent. But to the very last hour of his existence his art continued to occupy his thoughts. His last undertaking—directed, like most of those by which it had been preceded, mainly by an anxiety for the diffusion of sound knowledge and morality—was the preparation of a series of cuts for the labouring part of the population, which might supplant the tasteless and sometimes corrupting prints usually found among the embellishments of the cottage; and a proof impression of the first of this intended collection, a cut of an old horse, heading an address against cruelty to animals, was brought to him only two or three days before his death. This eminent artist and excellent man died on the 8th of November, 1828, in the 76th year of his age.

CHAPTER XXXIII.

USEFULNESS OF SUCH ENCOURAGEMENTS AS THE EXAMPLES HERE GIVEN ARE CALCULATED TO AFFORD TO YOUTHFUL GENIUS IN EVERY DEPARTMENT OF STUDY.—SELF-EDUCATED POETS:—JOHN TAYLOR; ANTONIO BIANCHI; RAMSAY; BLOOMFIELD.

THE individuals with whom our last three chapters have been occupied, have not earned their distinction by the cultivation of any branch of what is properly called science or literature; but their lives do not on that account furnish us with less suitable illustrations of the subject of the present work. Our object is to inculcate the importance, to demonstrate the practicability, and to point out the method, of intellectual improvement generally; and especially to make the young reader understand and feel, by an array of examples taken from every condition of society and every walk of mental exertion, that, in the pursuit of any description of knowledge, no difficulties arising from external circumstances can eventually resist a steady determination to excel; so that a man's success or failure in such an attempt depends, in fact, more upon himself than upon any circumstances in which he may be placed. We have not, therefore, hesitated to bring forward any case of extraordinary attainments made in despite of such obstacles as usually repress all endeavour after intellectual cultivation, whether it might be that of an individual who had distinguished himself in philosophy, in scholarship, or in art. What we have wished to establish and make evident is, the power which every man really desirous of education has, in the absence of all aid from others, to educate himself; and that this power is not confined to the case of any particular sort of acquirement, but exists in nearly an equal degree in regard to every species of knowledge or skill which any one may be ambitious to acquire. And a moment's consideration will show the vast importance of such a truth being generally diffused and felt in all its universality. How much apprehension and despondency, would even those of the children of poverty and neglect who have been eventually most successful in their efforts to educate themselves been saved from, had they all possessed such an assurance as these examples are calculated to afford, that many others had triumphed in the same or a harder struggle before them! Would not this of itself have helped to smooth the roughest of their difficulties, and carried them forward on their way with new strength, even when their hearts were most ready to fail them? Might not such an assurance have led many to high attainments, and perhaps to

achievements beneficial to themselves and to mankind, in some one of the various paths of intellectual enterprise, who, frightened by the apprehended arduousness of the task, have either never made an attempt to emancipate themselves from the ignorance in which they were reared, or, having begun the pursuit of knowledge, have stopped in their career ere they had made any considerable progress? Nor let it be said that the mere force of talent, where it really exists, will of itself be sufficient to overcome everything that may tend to repress it. Even genius of the highest order is often diffident, and easily dismayed; its quickness of sensibility makes it apprehensive, and prone both to exaggerate difficulties where they exist, and to create them where they do not. On these accounts it frequently needs encouragement where a coarser nature, and faculties of immeasurably less real power, might safely be left to make their way without any pains being taken to invigorate or sustain their possessor's confidence of success. We cannot then doubt the usefulness of diversifying our illustrations as much as possible, by selecting them from all the different departments of biography. We would offer to every aspirant, in every line of intellectual pursuit, an example by which he may at least learn that he is setting out upon no impracticable or hitherto unaccomplished journey, but that a road as difficult as his own, if not the very same, has been travelled by another before him. Whether it be literature, or science, or any branch of art, in which it is his desire to accomplish himself, let him be as destitute at the commencement of his career of all the ordinary means of instruction as he may, we would endeavour by the variety of our examples to strengthen him with the assurance that the way is still open for him, not only to mediocrity of attainment in his chosen pursuit, but even, it may be, to the highest distinction.

We propose now to notice a few of the more remarkable instances, not already adverted to, in which a genius for another of the fine arts, Poetry, which is, however, at the same time, a department of literature also, has burst through all the impediments of an unfavourable worldly lot, and prompted its possessor to the successful pursuit of that education which here, as everywhere else, can alone enable even the most extraordinary native powers of mind to produce anything of much value. For it is certainly a very unfounded, though by no means an uncommon notion, that the case of poetic talent forms an exception to this general rule, and that to be a great poet a man has *only* to be born such. There is no instance on record of an individual either securing or deserving any considerable or permanent distinction by his poetical productions, who had not stored his mind with much and various knowledge—in other words, who had not educated himself well, although never, it may be, matriculated in any university. The germ of a genius for poetry has no doubt sometimes made its appearance in indi-

viduals nearly altogether uneducated; but where is to be found the case of this description in which the seed, so buried in an uncultivated soil, has ever grown to anything worth gathering? It is indeed very much to be apprehended that this mistaken notion in regard to the uselessness of education to a poet, which is sometimes carried so far as to amount to a belief that a poet is actually spoiled by being educated, has not unfrequently had the effect of preventing persons who felt, or supposed, themselves to be gifted with poetic powers, from exerting themselves with so much ardour and perseverance as they otherwise might have done in the general cultivation of their faculties, or even, in some cases, from making any such attempt at all. Some poets of the humbler class, at any rate, might probably be mentioned, who would have written better if they had taken more pains to add other acquirements to their talent for versifying. We had in this country, in the seventeenth century, a famous popular writer, named JOHN TAYLOR, but who was generally called the Water Poet, from the occupation by which he won his livelihood, which was that of a waterman on the Thames. Taylor, whose parents were poor people, had learned a very little Latin at a school in the city of Gloucester, where he was born; but this, which was in truth merely a few pages of the rudiments very imperfectly conned, he soon forgot, and he never attempted to recover it. Yet he showed considerable industry in tagging rhymes, both while engaged in the laborious employment we have mentioned, and at an after period, when he kept a victualling-house at Oxford. During the civil wars he published a great many effusions on the royalist side, some of which show considerable powers of humour, and give ground for believing that, with more study and a larger acquaintance with literature, the author would have produced compositions of much greater value. The mention of Taylor reminds us of another water-poet, ANTONIO BIANCHI, a common Venetian gondolier, whose epic, entitled "David, King of Israel," in twelve cantos, made its appearance at Venice about the middle of the last century. From the accounts, however, given of this poem, which is written in the Venetian dialect, it appears to be, notwithstanding the provincial and unclassical character of the language, a work of a very superior order to anything that the English waterman ever produced, both in genius and in the evidence which it affords of the author's reading and information. Bianchi afterwards published a critical tract, which was deemed to display considerable ability. But an acquaintance even with the most classic poetical productions of their country is, or was, far from uncommon among the Venetian gondoliers. Sir J. Cam Hobhouse, in the notes to the fourth canto of "Childe Harold's Pilgrimage," tells us that many portions of Tasso's "Jerusalem" used to be familiar to most of them, and that editions of the entire poem, translated into the Venetian dialect, were formerly in general circulation. On

one occasion, in January, 1817, he mentions that he himself, accompanied by Lord Byron and another Englishman, went to an island a short way from the city in a boat rowed by two men, one of whom was a carpenter and the other a gondolier, the former of whom placed himself at the prow, the latter at the stern. "A little after leaving the quay of the Piazzetta," continues the account, "they began to sing, and continued their exercise until we arrived at the island. They gave us, among other essays, the death of Clorinda, and the palace of Armida; and did not sing the Venetian, but the Tuscan verses. The carpenter, however, who was the cleverer of the two, and was frequently obliged to prompt his companion, told us that he could *translate* the original. He added, that he could sing almost three hundred stanzas, but had not spirits (*morbin* was the word he used) to learn any more, or to sing what he already knew: a man must have idle time on his hands to acquire or to repeat, and, said the poor fellow, 'Look at my clothes and at me; I am starving.'" Bianchi, we ought to add, was also the author of a second poem, of considerable extent, entitled "Solomon, or The Temple," as well as of several minor productions.

In our own country we have had many writers of verse who have arisen among the ranks of the labouring population, but, with the exception of Burns, no great poet. Perhaps the name that should be placed next to that of Burns is that of his countryman, ALLAN RAMSAY, the author of the "Gentle Shepherd," certainly one of the most natural, if not most poetical, pastorals to be found in any language. Ramsay was the son of one of the common workmen in the lead-mines belonging to the Earl of Hopetoun, in the south of Scotland; and, as soon as his strength permitted, he was himself employed in the mines as a washer of ore. What education he had he must have obtained at the village school, and it probably extended little beyond the elements of reading and writing. Having come to Edinburgh about the year 1700, when he was fifteen years of age, he entered upon his apprenticeship to a barber; and this profession he afterwards exercised in that city for many years. Like John Folcz, of Nuremberg, who was mentioned at page 33, and the still more famous Burchiello, of Florence, whose sonnets, written in the fifteenth century, are still admired in Italy for the purity of their style, Ramsay did not find the business he had chosen so unfavourable as might be supposed to intellectual cultivation. During the day he had abundant opportunities for thought in his sedentary occupation of making wigs; and he used to spend the leisure of his evenings in composing songs and other short poetical pieces in his native dialect, with no higher aim at first than that of adding to the entertainment of the social parties in which he was wont occasionally to mix. These compositions, however, were often written with so much spirit, that, in a short time, they brought the author into general notice, and, humble as his condition was,

he began to be sought after by the most distinguished wits of the northern capital. The connections which he thus formed enabled him at length to escape from his original trade; and he commenced business in the more appropriate vocation of a bookseller. After this Ramsay wrote and edited various works, and took his rank in all respects as one of the literary characters of the day. He lived till the year 1758, when he died at the age of seventy-three. The fancy of this poet is not very brilliant, but he had the art of writing his native Doric mellifluously, and his humour, though sometimes coarse, has a genial vigour about it which is very effective. In many of his effusions, too, and especially in his principal work, "The Gentle Shepherd," there is a natural simplicity and faithfulness of delineation, which all hearts, even the least poetical, are sure to feel and appreciate. These qualities accordingly have secured to him a popularity which, instead of having suffered diminution with the lapse of years, is probably greater now than it was in his life-time; for his writings, it is likely, were then scarcely, if at all, known out of Scotland, whereas his Pastoral is now familiar, by reputation at least, to many English readers. As the immediate predecessor of Fergusson and Burns, Ramsay has every claim to be considered the father of modern Scottish poetry.

One of the most respectable names among the humbly-born and self-educated poets of the southern parts of the island, is that of ROBERT BLOOMFIELD, the author of the "Farmer's Boy." Bloomfield was born in 1766, at a small village in Suffolk. His father, who was a tailor, died before the infant was a year old, leaving his widow with the charge of five other children besides Robert. In these circumstances, in order to obtain a maintenance for herself and her family, she opened a school, and, of course, taught her own children the elements of reading with those of her neighbours. The only school education which Robert ever received, in addition to what his mother gave him, was two or three months' instruction in writing at a school in the town of Ixworth. At the time when he was sent to this seminary he was in his seventh year; and he was taken away so soon in consequence of his mother marrying a second husband, who probably did not choose to be at any expense in educating the offspring of his predecessor, especially as his wife, in due time, brought him a family of his own.

We have no account of how the boy spent his time from his seventh to his eleventh year; but at this age he was taken into the service of a brother of his mother, a Mr. Austin, who was a respectable farmer, on the lands of the Duke of Grafton. His uncle treated him as he did his other servants, but that was kindly, and just as he treated his own sons. Robert, like all the rest of the household, laboured as hard as he was able; but, on the other hand, he was comfortably fed and lodged, although his board seems to have been all he received for his work. His mother

undertook to provide him with the few clothes he needed; "and this," says his biographer, Mr. Capel Lofft, "was more than she well knew how to do." Indeed she found so much difficulty in fulfilling her engagement, that she at length wrote to two of her elder sons, who were employed in London as shoemakers, requesting them to assist her by trying to do something for their brother, "who was so small of his age," she added, "that Mr. Austin said he was not likely to be able to get his living by hard labour." To this application her son George wrote in reply, that if she would let Robert come to town, he would teach him to make shoes, and his other brother, Nat, would clothe him. The anxious and affectionate mother of the future poet assented to this proposal; but she could not be satisfied without accompanying her son to the metropolis, and putting him herself into his brother's hands. "She charged me," writes Mr. George Bloomfield, in giving an account of the incident, "as I valued a mother's blessing, to watch over him, to set good examples for him, and never to forget that he had lost his father."

When Bloomfield came to London he was in his fifteenth year. What acquaintance he had with books at this time is not stated, but it must have been extremely limited. We find no notice indeed of his having been in the habit of reading anything at all while he was with Mr. Austin. Yet it would appear from the sequel of his brother's account, that he had at least contrived to retain so much of what he had learned in his younger days, as still to be able to read tolerably. The place in which the boy was received by his two brothers was a garret in a court in Bell Alley, Coleman Street, where they had two turn-up beds, and five of them worked together. "As we were all single men," says George, "lodgers at a shilling per week each, our beds were coarse, and all things far from being clean and snug, like what Robert had left at Sapiston. Robert was our man to fetch all things to hand. At noon he fetched our dinners from the cook's shop; and any one of our fellow-workmen that wanted to have anything fetched in would send him, and assist in his work, and teach him, for a recompense for his trouble. Every day when the boy from the public-house came for the pewter pots, and to hear what porter was wanted, he always brought the yesterday's newspaper. The reading of the paper we had been used to take by turns; but, after Robert came, he mostly read for us, because his time was of least value." The writer goes on to state that, in this his occupation of reader of the newspapers, Robert frequently met with words which were new to him, and which he did not understand, a circumstance of which he often complained. So one day his brother, happening to see on a book-stall a small English dictionary, which had been very ill-used, bought it for him for fourpence. This volume was to Robert a valuable treasure; and by consulting and studying it he soon learned to comprehend perfectly whatever he read. The pronounciation of some of the hard words, however, still puzzled him

a good deal ; but by a fortunate accident he was at length put in the way of having his difficulties here also considerably diminished. One Sunday evening, after a whole day's stroll in the country, he and his brother chanced to walk into a dissenting meeting-house in the Old Jewry, where a preacher of extraordinary abilities and great popularity was delivering a discourse. This was Mr. Fawcet, a collection of whose sermons has been printed, and used to be very popular. Fawcet's manner was highly rhetorical, and "his language," says Mr. George Bloomfield, "was just such as the 'Rambler' is written in." Robert was so much struck by his oratory that, from this time, he made a point of regularly attending the chapel every Sunday evening. In addition to the higher improvement he derived from Mr. Fawcet's discourses, he learnt from him the proper accentuation of many difficult words which he had little chance of hearing pronounced elsewhere. He also accompanied his brother sometimes, but not often, to a debating society, which was then and for long afterwards, if it is not still, held at Coachmakers' Hall, and a few times to Covent Garden Theatre. Besides the newspapers, too, he had at this time read aloud to his brothers and their fellow-workmen several books of considerable extent—a "History of England," the "British Traveller," and a Geography, a sixpenny number of each of which, in folio, they took in every week. But these "he always read," says his brother, "as a task, or to oblige us who bought them." He calculates that Robert spent in this way about as many hours every week in reading as boys generally do in play.

These studies, however, even although somewhat reluctantly applied to, doubtless had considerable effect in augmenting the boy's knowledge and otherwise enlarging his mind. But it was a work of a different description from any of those that have been mentioned, which may be said to have first awakened his literary genius. "I at that time," continues Mr. George Bloomfield, "read the 'London Magazine,' and, in that work, about two sheets were set apart for a Review. Robert seemed always eager to read this Review. Here he could see what the literary men were doing, and learn how to judge of the merits of the works that came out. And I observed that he always looked at the 'poets' corner.' And one day he repeated a song which he composed to an old tune. I was much surprised that he should make so smooth verses ; so I persuaded him to try whether the editor of our paper would give them a place in poets' corner. He succeeded, and they were printed." This is the way in which many a young literary aspirant has first tried his strength. Thus, as we have seen, the "Ladies' Diary," was the repository of Thomas Simpson's earliest mathematical speculations ; and it was in the columns of a Philadelphia newspaper that Franklin commenced his career as an author. A Bristol journal, in like manner, received the earliest antiquarian lucubrations of Chatterton, then only a boy of fifteen, while much about the same time

the first of his Rowleian forgeries appeared in the "Town and Country Magazine."

After this Bloomfield contributed other pieces to the same publication into which his first verses had been admitted; and under the impulse of its newly-kindled ambition his mind would appear to have suddenly made a start forward, which could not escape the observation of his associates. "Indeed, at this time," says his brother, "myself and fellow-workmen in the garret, began to get instructions from him." Shortly after, upon removing to other lodgings, they found themselves in the same apartment with a singular character, a person named James Kay, a native of Dundee. "He was a middle-aged man," says Mr. George Bloomfield, "of a good understanding, and yet a furious Calvinist. He had many books, and some which he did not value; such as the "Seasons," "Paradise Lost," and some novels. These books he lent to Robert, who spent all his leisure hours in reading the "Seasons," which he was now capable of reading. I never heard him give so much praise to any book as to that."

It was the reading of the "Seasons," in all probability, which first inspired him with the thought of composing a long poem on rural subjects. The design was also in some degree favoured by a visit of two months which he was induced to pay about this time to his native district, in order to escape from the annoyance with which he was threatened, owing to a dispute that had taken place in the trade to which he belonged between those workmen who had and those who had not served a regular apprenticeship. As Bloomfield belonged to the latter class, the others, who had formed themselves into an association, talked of prosecuting his master for employing him, and he begged to be suffered to retire till the storm should blow over. On this occasion his old master, Mr. Austin, kindly invited him to make his house his home; and the opportunity he thus had of reviewing, with a more informed eye, the scenes in which he had spent his early years, could hardly fail to act with a powerful effect in exciting his imagination. It was at last arranged that he should be taken as apprentice by his brother's landlord, who was a freeman of the city; and he returned to town. He was at this time eighteen years of age. It was not intended that his master should ever avail himself of the power which the indentures gave him, and he behaved in regard to this matter very honourably. Robert therefore remained with his brother for about two years longer, by which time he had taught him to work as expertly as himself.

For some years after this, Robert's literary performances seem to have amounted merely to a few effusions in verse, which he used generally to transmit in letters to his brother, who had now gone to live at Bury St. Edmunds, in his native county. Meantime he studied music, and became a good player on the violin. In his twenty-fifth year he married, when "he told me in a letter," says his brother, "that he had sold his fiddle,

and got a wife. Like most poor men, he got a wife first, and had to get household stuff afterward. It took him some time to get out of ready-furnished lodgings. At length, by hard working, &c., he acquired a bed of his own, and hired the room up one pair of stairs, at 14, Bell Alley, Coleman Street. The landlord kindly gave him leave to sit and work in the light garret, two pair of stairs higher."

The frequency of the development of literary talent among shoemakers has often been remarked. Their occupation, being a sedentary and comparatively noiseless one, may be considered as more favourable than some others to meditation; but, perhaps, its literary productiveness has arisen quite as much from the circumstance of its being a trade of comparatively light labour, and therefore resorted to in preference to most others by persons in humble life who are conscious of more mental talent than bodily strength. Partly for a similar reason, literary tailors have been numerous. We have already mentioned the Italian writer Gelli, our learned countrymen Hill and Wild, &c.; and to these we might add many others, as, for example, George Ballard, author of "Memoirs of Learned British Ladies," who made himself a good Saxon scholar while practising his trade; the antiquaries, Stowe and Speed, who both flourished in the sixteenth century, the former the author of "The Survey of London," and other very elaborate works, and the latter of a valuable History of Great Britain; and the late celebrated French mathematician, Jean Henri Lambert, who, when young, after working all day with his father, who was a tailor, used often to spend the greater part of the night in reading, and in this manner, by the assistance of an old work which came by chance into his possession, instructed himself in the elements of mathematical science. Of literary shoemakers again, or persons who have contrived to make considerable progress in book-learning while exercising that handicraft, we have already noticed, among others, Benedict Baudouin, Anthony Purver, Joseph Pendrell, Gifford, and Holcroft. We may add to the list that extraordinary character, Jacob Behmen, the German mystic, of whose works we have an English translation in two volumes quarto, and who continued a shoemaker all his life. But Bloomfield, before entering upon the exercise of this trade, had had the education of his faculties begun while following the equally contemplative and much more poetical occupation of a keeper of sheep—a condition, the leisure and rural enjoyment of which had fed the early genius of the painter Giotti, the logician Ramus, the mechanician Ferguson, the linguist Murray, and other lights of modern literature and art, as in the ancient world it is said to have done that of the poet Hesiod. Bloomfield's literary acquirements, however, with the exception of his acquaintance with the mere elements of reading and writing, appear to have been all made during the time he was learning the business of a shoemaker, and afterwards while he worked at the same business as a journeyman.

It was while he sat plying his trade in his garret in Bell Alley, with six or seven other workmen around him, that Bloomfield composed the poem which first made his talents generally known, and for which principally he continues to be remembered, his "Farmer's Boy." It is a curious fact, that, notwithstanding the many elements of disturbance and interruption in the midst of which the author must in such a situation have had to proceed through his task, nearly the half of this poem was completed before he committed a line of it to paper. This is an instance of no common powers both of memory and of self-abstraction. But these faculties will generally exist in considerable strength when the mind feels a strong interest in its employment. They are faculties also which practice is of great use in strengthening. Bloomfield's feat on this occasion appears to have amounted to the composing and recollecting of nearly six hundred lines without the aid of any record; and the production of all this poetry, in the circumstances that have been mentioned, perhaps deserves to be accounted a still more wonderful achievement than its retention. Like his prototype, Thomson, whose general scheme he has followed, Bloomfield seems to have commenced his poem with the division relating to winter.

When the "Farmer's Boy" was finished, which it appears to have been in April, 1798, it was submitted to several booksellers and other persons in London, none of whom, however, probably took the trouble of even examining the unrecommended production. At last, in November of the same year, it was forwarded by Mr. George Bloomfield to Mr. Capel Lofft, who then resided on his estate in the immediate neighbourhood of the poet's birth-place. The poem was accompanied by a letter containing the narrative of the author's life from which we have extracted the particulars given above. Induced probably, in part, to look into the manuscript by the circumstance of its being the production of a native of Suffolk, Mr. Lofft soon found the work to be well deserving of attention on its own account. He forthwith entered into a correspondence with the author; and the result was the publication of the poem, after a few provincialisms and grammatical errors by which it was disfigured had been corrected, in the month of March, 1800. It immediately produced a considerable sensation; and although a portion of the interest which was felt in regard to it, is doubtless to be attributed to the extraordinary circumstances in which it was announced to have been written, it yet owed much of its popularity also to its intrinsic merits. Within three years after its appearance, seven editions, comprising in all twenty-six thousand copies, had been printed; and new impressions have since been repeatedly called for. It was early translated into French and Italian, and part of it even into Latin, which last circumstance drew from the poet a few verses printed among his minor productions.

The publication of the "Farmer's Boy" at once called forth the author

from obscurity to a fair prospect both of fame, and what to him must have been hitherto an unhopèd-for degree of worldly prosperity. The change in his condition and expectations is well and graphically described in the simple language of his brother, whose exertions in his behalf had so large a share in bringing about what had now taken place. "I have him," he writes to Mr. Lofft, in reference to Robert's first appearance in London, "in my mind's eye, a little boy; not bigger than boys generally are at twelve years old. When I met him and his mother at the inn, he strutted before us, dressed just as he came from keeping sheep, hogs, &c.—his shoes filled full of stumps in the heels. He, looking about him, slipped up, his nails were unused to a flat pavement. I remember viewing him as he scampered up, how small he was. I little thought that little fatherless boy would be one day known and esteemed by the most learned, the most respected, the wisest, and the best men of the kingdom." It is gratifying to know that those excellent and affectionate relations, his mother and brother, both lived to witness the prosperity of him who in other days had been to each the object of so much anxious care. It was the dearest of the poet's gratifications, when his book was printed, to present a copy of it to his mother, to whom upon that occasion he had it in his power, for the first time, to pay a visit, after twelve years' absence from his native village.

Bloomfield published several volumes of poetry after the "Farmer's Boy," among others a small volume entitled "Rural Tales, Ballads, and Songs," which were written, he tells us, during the interval between the completion of the composition of his first work and its appearance in a printed form. Soon after this, however, his health, which had never been very vigorous, began to give way; and he was obliged to resign an appointment in the Seal Office which had been given to him by the Duke of Grafton, and on receiving which he had relinquished his original trade. He now found his musical turn a resource, and realized a small income by manufacturing Æolian harps. But his health gradually grew so much worse, that he was at last obliged to leave London altogether, upon which he retired to Shefford, in Bedfordshire. Here he remained till his death, on the 19th of August, 1823, in the fifty-eighth year of his age.

Although he was an extraordinary instance of what the force of native talent will sometimes accomplish where education has been nearly altogether withheld, Bloomfield gave plentiful evidence, especially in his first production, of the disadvantages under which he laboured from the want of early cultivation. Considering the circumstances under which it was written, and the intellectual training its author had had—left to acquire his first notions of poetry from nothing better than the very indifferent magazine verses of that day, and with no one of more judgment or experience in such matters than himself even to converse with—the "Farmer's Boy" is a surprising performance. Its descriptions

of rural scenery and occupations are evidently taken, not from other books, but directly from nature; the tone of sentiment throughout is characterised by a manly and unaffected simplicity; the inspiration of true feeling reveals itself everywhere; and some passages—for example, the sketch of the mad girl in the *Autumn*—display pathos of a very high order. There is enough of faithfulness and vividness of delineation, and even of originality, to have furnished the soul and substance of a much better poem. But Bloomfield's skill in everything belonging to the department of execution, or workmanship, is of the very humblest order. Of the witchery of words he is nearly altogether destitute. He is remarkable for his deficiency in this respect even among uneducated or self-taught writers. Burns's felicities of expression play over his page like incessant outbreaks of sunshine; they are as frequent as in Horace, and not less brilliant; his style, wherever his genius is quite at its ease and working naturally, may be pronounced to be quite perfect; even Allan Ramsay often, when he has little other merit, pleases us by his mastery over the idioms and proprieties of his native Doric. But Bloomfield, in writing the English of books, was in truth struggling with the difficulties of a foreign language, and of one which he had never properly studied. His ordinary diction is fashioned after the very worst models. It is feeble and ineffective, not merely from being unpicturesque, but still more from being encumbered with a false and tawdry rhetoric, not more unlike the true language of poetry than that of common sense. It is not difficult to trace in this ambitious and unnatural style, an imitation of the fashionable poetry of our magazines in the latter part of the last century. He has also, as was natural, caught a good deal of what is worst in the style of his great predecessor, Thomson—that empty swell of verbiage of which we have a good deal in the “*Seasons*,” although it disappears so completely in the exquisite art of the “*Castle of Indolence*.” A better education in his youth would have saved the homely genius of Bloomfield from being thus misled into affectations so uncongenial to its true spirit. He afterwards, indeed, learned to write with more correctness—but rather with fewer faults than with more of real artistic life and power. Paradoxical as it may seem to say so, it is probable that he and some other self-taught writers, if they had been less self-taught, would have been more original. It is probably, indeed, a mistake to suppose that the circumstance of an individual having been what is called self-taught, is generally favourable to the originality of his literary productions. There is more reason for suspecting, that even those self-taught writers who have displayed most of this highest element of power, would have exhibited it in still greater abundance if they had enjoyed, in addition to their rare gifts of nature, the advantages of a regular education. It is certain, at any rate, that the literary performances of men who have been their own teachers have not, except in

a few extraordinary cases, been in any degree peculiarly distinguished by this quality. Of the numerous tribe of self-taught verse-makers, especially, the great majority have been the merest imitators. A fair specimen of this race, the individuals of which, although they some times excite a temporary attention, generally drop very speedily into oblivion, we have in a writer named STEPHEN DUCK, who flourished in the early part of the last century. Duck was born about the year 1700, at the village of Charlton, in Wiltshire. He was at school for a short time in his boyhood, when he learned a little reading, writing, and arithmetic. When about fourteen, however, he was sent to work as an agricultural labourer; and, being employed for several years in the lowest rural occupations, without ever opening a book, he soon forgot what little learning he had ever possessed. Still, as he used afterwards to tell, even at this time his thoughts were often engaged on subjects very foreign to his daily employments. At last he began to read a little, and this gradually inspired him with a desire to recover his lost knowledge, scanty as it had been. At this time he was about twenty-four years of age, with a wife and family to support; and, being engaged in hard work all day, he had but very little time for study. He was also without books, and had no money to buy any. Yet such was his ardour to obtain the means of instructing himself, that for some time, whenever he had an hour's release from his regular employment, he devoted it to extra work; and in this way he saved money enough to purchase, first, a treatise on vulgar fractions, then one on decimal fractions, and lastly, one on land-surveying. All these works he made himself master of, by studying them during the night, when everybody about him was asleep. Soon after this, he became intimately acquainted with a person in the same condition of life as himself, but who had passed some years in service in London, whence he had brought down a few dozens of books with him to the country. Of these some were treatises on arithmetic; among the others were the Bible, "Paradise Lost," the "Spectator," Seneca's "Morals," "Telemachus," an English dictionary and grammar, Ovid, Josephus, seven plays by Shakespeare, and a few more by other writers; Dryden's "Virgil," "Hudibras," and the works of Waller and Prior. Duck had, it seems, been always fond of poetry and music; though hitherto the best specimens of either which he had had an opportunity of enjoying had been only a few rustic ballads. But his perusal of some of the above works inspired him with new enthusiasm, and in no long time he began to attempt writing verses himself. The first poetical work by which he was greatly struck, was "Paradise Lost." Yet he read it through twice or thrice, with the aid of his dictionary, before he understood it. The new beauties he was continually discovering, however, made all this labour delightful. He studied the book we are told, as a student of Greek or

Latin would do one of the ancient classics, and making all the while almost as much use of his dictionary and grammar as if it had been written in a foreign language. These literary labours were still generally pursued during the night. Sometimes, however, he used to take a volume with him in his pocket when he went out to his daily work in the fields; and, if by working with more activity than usual, he could get through what he had to do in less than the usual time, he would devote the few precious moments he had gained to the perusal of his book, to which he would sit down all perspiring as he was, thinking of nothing but how he might make the most of his short and hard-earned respite.

Even while at work he often employed himself in composing verses. It was some time before he thought of committing any of his compositions to paper; but at last he was induced to address a letter in verse to a gentleman, who, having heard of his acquirements, had sought him out, and made his acquaintance; and this effusion, having been shown to several other persons, was generally regarded as a very surprising performance for one in his circumstances. Some clergymen, in particular, to whom it was submitted, were so much pleased with it, that they rewarded the author with a small gratuity. From this time his talents began to be generally talked of; and, encouraged by the praise he received, he did not suffer his poetical faculty to lie dormant. The consequence was, that in a short time he had accumulated a respectable store of verse. It seems to have been not long before the year 1730, that Duck attracted the notice of the Rev. Mr. Spence, already mentioned as the patron of Robert Hill, the learned tailor, and the blind poet Blacklock. Spence, who did himself great credit by the interest he took in these cases of indigent merit, immediately conceived the idea of bringing the claims of his *protégé* before the public in the most effective manner, through the press; and, accordingly, as many of his poems were collected as formed a quarto volume, which made its appearance in that year. Besides the general reputation which the author acquired by this publication, it procured for him the particular favour and patronage of Queen Caroline, who immediately settled upon him a pension of thirty pounds a year. In 1733 he was made one of the Yeomen of the Guard. He now applied himself to the study of the Latin language—in which having made some progress, he was admitted into holy orders. On this the queen appointed him, in the first instance, keeper of her library at Richmond, and in a short time after he was preferred to the living of Byfleet, in Surrey. Meanwhile, a second edition of his poems had appeared in 1736, to which we find the names of the queen and other members of the royal family prefixed as subscribers. Duck became much beloved and respected by the people of Byfleet in his capacity of pastor, and lived there happily for many years. But the termination of his history is very melancholy. He at last fell into

low spirits and drowned himself in the Thames, near Reading, in the year 1756. His poems have now long been forgotten. They had little merit, except considerable smoothness of versification, which even in those days the example of Pope had rendered a common quality.

CHAPTER XXXIV.

H. K. WHITE; HAWKESWORTH; GOLDSMITH; MENDELSON.

IN selecting our examples from the class at present under review of those who, in the midst of unfavourable circumstances, have distinguished themselves by their ardour in the pursuit of knowledge, there is one name not to be omitted, that of the gifted and amiable HENRY KIRKE WHITE. As it is probable, however, that most of our readers are acquainted with the narrative of his life which has been so delightfully written by Southey, we shall confine ourselves to a short notice of its leading incidents. He was born in 1785, at Nottingham, where his father followed the business of a butcher. He was sent to a school at



ROBERT SOUTHEY.

three years of age, and soon became so fond of reading, that, when he had got his book in his hand, it was difficult to get him to leave it even for a few minutes, that he might take his meals. When no more than seven, he began to attempt to express his ideas on paper; his first

composition being a tale, which, ashamed to show to anyone else, he communicated to the servant, to whom he had for some time been secretly giving instructions in writing. His school acquisitions, before the age of eleven, in addition to reading and writing, were arithmetic and French; in both of which studies he had already distinguished himself above all his schoolfellows. Soon after this he also began to write verse.

His father, however, who was anxious to bring him up to his own business, although very much against both the boy's own wish and that of his mother, now insisted that he should be employed one whole day in the week, and during his leisure hours on others, in carrying the butcher's basket. But he expressed so much dislike to this occupation, that it was at last arranged that he should be sent to learn the hosiery trade; and at the age of fourteen, accordingly, he began to work as a stocking-weaver. To a heart like his, full of the love of literature, and all whose young visions were already those of a student, this destination was a cheerless one enough. Yet he hardly dared to complain, for he knew that his family could scarcely afford to educate him to any higher employment. His mother, however, moved by his evident wretchedness, contrived, after he had been about a year at the loom, to prevail upon his father to allow him to be placed in the office of Messrs. Coldham and Enfield, attorneys in Nottingham, who agreed to take him without a premium, on condition of his serving two years before being articulated.

He now felt himself in something like his proper sphere, and his whole mind assumed new alacrity. Although nearly the whole day was necessarily given to the study of his profession, for he attended in the office, as he informs us himself in one of his letters, from eight in the morning till eight at night, he still found time to apply himself to the Greek and Latin languages; in the latter of which, with very little assistance, he enabled himself in ten months to read Horace with tolerable ease. This progress, however, was obtained at the cost of almost incessant application. He read during his walks, and at his meals; and not a moment, indeed, of his leisure was given to anything except the improvement of his mind. In this manner it is surprising how much he accomplished. The papers he left behind him showed, his biographer tells us, that he had applied himself to his legal studies with extraordinary industry. Beside the knowledge which he had acquired of Greek and Latin, he also made considerable progress at this time in Italian, Spanish, and Portuguese. Chemistry, electricity, astronomy, all shared largely in his attention. While pursuing these severer studies, he contrived to accomplish himself to a considerable extent in drawing and music; and he found an occasional amusement in practical mechanics, in which he showed much ingenuity and neatness of hand. An-

other accomplishment which he wished to acquire was the art of extempore speaking; and with this view he got himself elected a member of a debating society, which then existed at Nottingham. Here he very soon distanced all his competitors.

But this was not the only mode in which he had already begun to seek distinction. So early as the first year after his emancipation from the stocking-loom, he had sent a translation from Horace to a periodical work then existing, called the "Monthly Preceptor," the proprietors of which were in the habit of offering prizes for the best compositions on subjects which they proposed; and a silver medal had been awarded to him for his performance. This honour seems to have kindled his literary ambition to greater fervour than ever. He began to sigh for the advantages of a university education. After having thus frequently tried his powers in the "Preceptor," he became a correspondent to another magazine called the "Monthly Mirror." Some of the essays which he sent to this publication were of distinguished merit, and attracted considerable notice. Among other persons whose attention they excited was Mr. Capel Lofft, whose patronage of Bloomfield we have recorded in the last chapter; and the encouragement of this gentleman, whose exertions had recently been so fortunate in the case of another poet, determined Henry to commit a volume of his verses to the press. This was about the close of the year 1802.

The volume made its appearance in the end of 1803, or beginning of 1804. It was published by subscription, and dedicated by permission to the Duchess of Devonshire. What pecuniary return it brought the author is not stated; but the sale probably did not do a great deal more than defray the expenses of the publication. Although favourably noticed in several of the periodical works of the day, it was made the subject of a very harsh article in the "Monthly Review." This so stung the sensibility of the young poet, that he sent a remonstrance to the editors, which produced from them, in their next number, an expression of their regret that Mr. White should have been so much hurt by the severity of their criticism, but no acknowledgment of the poetical merit of the publication they had condemned. This treatment distressed Henry exceedingly. In one of his letters he says, "This review goes before me wherever I turn my steps; it haunts me incessantly; and I am persuaded it is an instrument in the hand of Satan to drive me to distraction. I must leave Nottingham." Fortunately, however, the poems had fallen into the hands of Mr. Southey, who, bringing to their perusal both a better judgment and a kinder heart than the writer in the "Monthly Review," considered them "to discover strong marks of genius." On afterwards seeing the review, this gentleman's indignation was so strongly excited by what he deemed its cruelty and injustice, that he immediately wrote to Henry a letter of encouragement and

advice, with an offer to do anything in his power to forward his views. This generous and seasonable interference contributed greatly to heal the poet's wounded feelings, and enabled him in a short time to forget the sneers of his anonymous critic.

No prospect, however, had yet opened of his desire of going to the University being gratified; while the desire itself was every day growing stronger. The reading of some religious works about this time had made a great impression upon him; and his feelings had become ardently devotional. He determined to give up his life to the preaching of Christianity. His friends exerted themselves in vain to shake his resolution; he had made up his mind, if he could not obtain admission at Oxford or Cambridge, to join some dissenting communion, and to endeavour to find the means of pursuing his studies at an academy, or at one of the Scottish universities. But we must refer to Southey's interesting narrative for a detail of the alternating hopes and disappointments by which both his mind and frame were racked, before he at last secured the object of his fond ambition. At one time he had given up all hopes of ever being able to escape from his present profession; and the view which he took of the line of conduct which it became him to pursue in these circumstances is in the highest degree creditable to his sense of propriety and duty. "All my hopes," says he, in a letter to his mother, "of getting to the University are now blasted; in preparing myself for it I have lost time in my profession; I have much ground to get up, and, as I am determined not to be a *mediocre* attorney, I must endeavour to recover what I have lost." He immediately set about a course of more severe application than ever, allowing himself rarely more than two or three hours of sleep during the night, and often never going to bed at all. This excessive application, after some time, brought on an alarming illness, from which his friends thought that he never entirely recovered.

But at last, through the influence of the Reverend Mr. Simeon, of King's College, Cambridge, to whom he had been recommended, a sizarship was procured for him at St. John's. His mother, who had for some years kept a boarding-school, and his elder brother, engaged each to allow him fifteen or twenty pounds yearly; and Mr. Simeon generously undertook to afford him thirty pounds more, with the aid of a friend, who is stated, in Gorton's "Biographical Dictionary," vol. ii. p. 1181, to have been Mr. Wilberforce, a name made venerable by a life spent in doing good. Accordingly, in October, 1804, he quitted his employers at Nottingham, who had most kindly agreed to give him up the remainder of his time, although his services were every day becoming more valuable to them. He did not, however, immediately proceed to Cambridge, but, by Mr. Simeon's advice, placed himself for the first year in the house of the Rev. Mr. Grainger, of Winterringham, in Lincolnshire. While residing

with this gentleman, he applied himself to classical learning with an ardour to which everything gave way, devoting often fourteen hours a day to hard study; and, though his unremitting toils soon laid him once more on a sick bed, convalescence came only to send him back to his books with as much zeal as ever. When he went to Cambridge, to use Southey's words, "the seeds of death were in him, and the place to which he had so long looked with hope served unhappily as a hothouse to ripen them."

The exertions of this extraordinary young man at the University were such as might have been expected from his previous career. A scholar-



W. WILBERFORCE.

ship having become vacant during his first term, he was advised to offer himself as a competitor for it; but after having studied for this purpose with his usual immoderate application till within a fortnight of the close of the term, he found himself so ill that he was obliged to decline coming forward. To add to his misfortune, he had now the general college examination before him; and, although far from well, he was urged, if it

was at all possible, to persevere in preparing himself for this occasion. He followed this counsel, and, having by the aid of strong medicines been enabled to hold out during the six days of the examination, he was at its close declared the first man of his year. Immediately after this he went to London with the view of benefiting his health by a temporary relaxation from study. But he did not make much progress in recovering his strength during this short excursion. Still, when he returned to Cambridge, his application continued unabated. It is mentioned as an instance of the manner in which he used to turn every moment to account—in his own phrase, to *coin* time—that he committed to memory a whole tragedy of Euripides during his walks. At the end of this term he was again pronounced first man, and also one of the best theme-writers. By exhibitions, too, which were procured for him, he was enabled to live without the assistance of his friends. At the end of the term a tutor in mathematics for the long vacation was provided for him by his college; but this unfortunately only induced him to continue his studies at a time when relaxation was becoming absolutely necessary to preserve his life. Finding himself very ill, he again proceeded to London; where, however, as before, he got no better. He returned to the University worn out both in body and in mind, and, after a short attack of delirium, died on Sunday, the 19th of October, 1806.

There has never, perhaps, been exhibited greater devotedness to the pursuit of knowledge than what we have here recorded; and the heart would be dead to all generous emotion that could follow without admiration the exertions of this enthusiastic and persevering spirit, as in the face of all that would have quenched its hopes, or driven it from its object, it still kept undismayed its onward path towards the far eminence it had so early resolved, if only life should not give way, to win. Never was there displayed by the most determined man, a nobler steadiness than was evinced by this boy in the battle he fought for so many long years with fortune, for the good prize on which he had set his heart. The unsuitable and scorned occupation that darkened his entrance upon active life—the incessant duties of his next profession, by which his whole day was consumed—the opposition of his friends when he proposed embracing his ultimate line of pursuit—the difficulties by which he was at the same time impeded by his want of pecuniary resources, and finally, the too manifest decay and sinking of his health under the labours which he deemed to be necessary to sustain the name he had acquired, and the expectations which had been formed of him, all, even when they pressed hardest upon him, had not the power to turn him from his purpose. Only death, striking him down as the soldier is struck down in battle, was able to subdue that aspiring heart.

A monument has been erected to the memory of Kirke White, in the Church of All Saints, Cambridge, at the expense of Mr. Boott, a native

of the United States of America. Mr. Boott, on visiting Cambridge, was disappointed on finding no tablet recording the talents and virtues of the young poet ; and he resolved to do what England had left undone. This circumstance deserves to be remembered as highly creditable to the American character, and as one among many evidences of the triumph of right feelings over those mutual jealousies which have too often separated nations sharing the same blood, and speaking the same language.

We shall conclude this chapter by the mention of one or two other individuals from the list of the cultivators of elegant literature, whose rise to eminence has been in like manner impeded for a time by untoward fortune. DR. HAWKESWORTH, one of the most popular writers of the last century, and whose periodical work, the "Adventurer," has given him a high place among the English essayists, was originally a watchmaker,



OLIVER GOLDSMITH.

and afterwards became clerk to a writing stationer, in which situation it was that he commenced his career as an author by some communications which he sent to the "Gentleman's Magazine." From this beginning he

made his way, by the persevering exertion of his talents, both to distinction and to considerable wealth. Hawkesworth must have been indebted for his literary acquirements almost entirely to himself. Together with his name may be quoted that of his much more esteemed contemporary, OLIVER GOLDSMITH, who was, however, more regularly educated. Goldsmith was one of nine children of a very poorly-endowed clergyman of the Church of Ireland, in which country he was born in the year 1728. Of academical instruction he had his full share; for he attended successively the Universities of Dublin, Edinburgh, and Leyden. At the two last-mentioned places he studied medicine, which he had chosen as his profession, after having been originally intended for trade, and then successively for the church and the law. His eccentric and thoughtless habits, however, which had been constantly involving him in one difficulty or another from his boyhood, acquired strength with his years; and he had not been long at Leyden when he found himself reduced to a state of destitution as bad as that which a short time before had forced him to take flight from Edinburgh. On this he left the University, and set out to travel over the Continent, possessed of nothing in the world but the clothes he wore and his flute. It was on the latter he depended for his support, his practice being, when, after walking all day, he arrived at a village in the evening, to assemble the inhabitants around him to dance to his music, in return for which they generally gave him lodgings for the night, and wherewithal to procure him food for the next day. In this manner he walked over a great part of Flanders, the south of France, Germany, Switzerland, and Italy. At last he arrived in London, with, it is said, only a few pence in his pocket. In this emergency he was fortunate enough to meet with his countryman and college acquaintance, Dr. Sleight, who had been one of Barry's first patrons when he came up to Dublin; and by the aid of this gentleman he obtained the situation of assistant teacher in a school at Peckham. Soon afterwards he offered his services to an apothecary in the metropolis, and with him he lived for some time. It was while in this situation that he first turned his thoughts to literary labour as a means of support. He began by writing for the "Monthly Review" and the "Public Ledger," to which last he contributed the series of essays in the form of letters from a Chinese residing in England to his friends in China, which were afterwards collected and published under the title of "The Citizen of the World." He had been employed in this manner for several years, gaining only a scanty and precarious livelihood, when, in 1764, he published his poem called "The Traveller." This immediately brought him into notice, and placed him among the first writers of the day. He had now better employment, and as much as he could undertake; but, his improvidence continuing as great as before, his difficulties were not much diminished. The very year following that in which "The Traveller" appeared, Dr. Johnson

found him unable to leave his lodgings in consequence of a debt he had contracted, and to pay which his kind friend disposed of the manuscript of his "Vicar of Wakefield." That exquisitely beautiful tale accordingly appeared in 1766; and soon after was published his "History of England, in a series of Letters from a Nobleman to his Son," which immediately excited great attention and became extremely popular. From this time till his death, Goldsmith gave to the world a succession of works which prove that with all his faults a want of industry cannot be laid to his charge. His comedy of the "Good-natured Man," a "History of Rome," and another "History of England," in four volumes, the poem of the "Deserted Village," the comedy of "She Stoops to Conquer," a "History of Greece," and his four volumes entitled a "History of Animated Nature," besides abridgments of his different historical works, and numerous minor pieces in prose and verse, all proceeded from his pen between the years 1768 and 1774, in the latter of which he died at the early age of forty-six. Nor are even those of the works we have enumerated which partake most of the character of mere compilations, unmarked by many traces of the author's genius. Goldsmith, as Johnson has said of him on his monument in Westminster Abbey, touched no subject which he did not adorn—*nullum tetigit quod non ornavit*. The purity and elegance of his style, and the chastity, in all respects, of his manner as a writer, form a remarkable contrast to what we are told of his general conduct and demeanour, which is represented as exhibiting to the last such a multitude of weaknesses and absurdities as made him, with all his powers, the object of ridicule to all his acquaintances. And the dissimilarity is said to have been equally great between the wit, spirit, and good sense of his literary productions, and the folly or inanity of his conversation. All this is the more remarkable when we remember how comparatively late in life it was that he first appeared as a public writer. We might rather expect to find that he had brought to his new occupation the same wild heedlessness which he had displayed in everything else, and which had become so much a part of his character. But Goldsmith was an extraordinary instance how perfect the reflective or meditative powers of the mind will sometimes be, while those which fit a man for the business of active life are weak or wanting. A mere child as he seemed when called upon to exert the latter, in the ease with which he wielded the former, he had few equals and no superior. As his friend Johnson used to say of him, with his pen in his hand he was a sage, without it a fool. Most of Goldsmith's follies, however, were the results of a simplicity and good nature, which did no dishonour to his heart, however they may have impeded his advancement in the world. From the time he rose into notice as a writer, till his death, he was the prey of his poorer brethren of the quill, who, when he had received any money for his works, borrowed or begged from him his last sixpence. Nay, he

was often wont, it is said, to borrow money in order to satisfy these plunderers. The consequence was, that he was always in difficulties, which he certainly needed not to have been if he could have taken better care of his gains; for he was both one of the most successful and, as we have seen, one of the most industrious literary labourers of the day. Considering, indeed, the idle and wandering life he had so long led, Goldsmith's comparatively steady application in the latter years of his life, as testified by what he actually accomplished, deserves to be accounted not a little remarkable. It is probable, however, from the knowledge and general cultivation of mind which he displayed even in his first literary works, that he must long have been a more diligent student than might be supposed from the general sketch that has been handed down to us of his early history.

It would be very interesting to learn how he actually pursued his studies, and acquired his literary taste and cultivation, in circumstances so different from those amid which the generality of literary men have been reared. We should doubtless find his case to be another of those which demonstrate that, to the mind which is ardently ambitious of knowledge, all varieties of situation are much more nearly the same than they outwardly seem to be—that of the art of acquiring, the chief secret is the determination to acquire—and that, this being possessed and steadily cherished, there are hardly any circumstances in which much may not be accomplished.*

At the same period with Goldsmith flourished the celebrated German Jew, MOSES MENDELSON. Mendelsohn was born at Dessau, the capital of the small principality of Anhalt, in 1729, the same year which gave birth to Heyne and Lessing. The copies of the Pentateuch which are used in the Jewish Synagogues are, as is well known, all in manuscript; and to transcribe these was the chief occupation of Mendelsohn's father. He also kept a day-school for the children of his Hebrew brethren. Nevertheless, with all his labours his gains were extremely scanty; and his son was accustomed from his earliest years to poverty and privation.

After being taught the elements of Hebrew scholarship by his father, Moses was sent at an early age to a public seminary, where the other young Jews of the place who were intended for a learned profession were educated. The system pursued at this establishment, however, was little calculated to nurture or strengthen the more important mental faculties—the chief or rather almost the only exercise of the pupils being to get by heart portions of the Rabbinical commentaries, which they could not understand. It is said that when no more than seven years old, Mendelsohn began to discern the absurdity of this method of study,

* Since this notice was first published, the biography of Goldsmith, after having had much new light thrown upon it by the late Mr. Prior, has been still further illustrated

by the multifarious knowledge and research of Mr. Forster, and woven by his sympathizing eloquence into one of the most interesting and delightful narratives in the language.

and applied himself of his own accord to the obtaining of a correct acquaintance with the grammar of the sacred tongue, as an indispensable preliminary to his further progress. So early as his tenth year he had begun to write verses in Hebrew. He was fortunate soon after this in obtaining the instructions of David Frankel, a man of profound learning, who was then chief Rabbi at Dessau, and whom the young student greatly attached to himself by his application and his thirst for knowledge. By Frankel's assistance and his own industry, the boy soon acquired a knowledge of the Scriptures and their principal commentaries, rare at that time even among the more learned classes of his nation.

The ardour with which he pursued his studies at this early age was too great for a frame which never had been very strong; and it brought on ere long a nervous disorder, the consequences of which remained with him during his life. It produced in particular a deformity of the spine, which was found to be incurable. The work which he had been most eagerly engaged in studying, when attacked with this illness, was the "*More Nevochim, or Guide for the Perplexed,*" of the great Moses Maimonides, the learned Spanish Jew of the twelfth century; and in allusion to this circumstance Mendelsohn would long afterwards remark that it was Maimonides who had spoilt his figure and ruined his constitution. "But still," he would add, "I doat on him for the many hours of delight he has afforded me; and, if he has unwittingly weakened my body, has he not made me ample amends by invigorating my mind?" (See "*Memoir of Mendelsohn,*" by M. Samuels.)

When Mendelsohn was about fourteen years of age, his friend and instructor Frankel left Dessau for Berlin, and he was now almost without an associate. It was time, besides, that he should think of doing something to gain his own subsistence. His father, accordingly, who was tenderly attached to him, and would willingly have kept him longer under his humble roof, was at last prevailed upon by his earnest entreaties to permit him to proceed to Berlin, in the hope that through Frankel's assistance he might procure some employment in that large city. The good Rabbi was scarcely able to do anything for him from his own resources: but he recommended him to a benevolent friend, who gave him an attic room in his house to sleep and study in, and allowed him two days' board every week. The only resource he possessed for a long time, in addition to this, was a little employment as a transcriber, which Frankel procured for him. With the proceeds of this he contrived to exist and pursue his studies; but his privations were often very great. It was his custom at this time, as he used afterwards to relate, when he bought a loaf, to notch it into portions that might last him till he counted upon obtaining his next supply of money; and, however hungry, he would never eat more at a meal than he had thus allowed himself.

It was not at this period the practice among the Jews to study the

classic languages; but Mendelsohn, inquisitive after all knowledge, and reading with avidity every accessible work which promised him any information, soon discovered that without an acquaintance with Greek and Latin his literary researches must remain extremely bounded. He therefore resolved to acquire these languages. But how he was to take the first step in this pursuit it was not very easy to understand. The Hebrew and the German were the only languages he knew, and there was no Greek or Latin grammar, as far as he was aware, written in either. In this difficulty a fortunate chance brought him acquainted with a brother Jew, a person of the name of Kish, from Prague, who was a medical practitioner, and knew something of Latin. Mendelsohn prevailed upon this man to give him gratuitously a quarter of an hour's instruction every day, till he had made himself master of the Latin nouns and verbs. When he had advanced thus far, he dispensed with his instructor. Having purchased for a trifle an old dictionary which had been very ill-used, he considered himself to be in possession of all the necessary aid for commencing the work of translation; which accordingly he forthwith essayed on the first Latin book he could obtain. This, it is related, happened to be no other than a Latin translation of Locke on the Human Understanding—the whole of which he toiled through. After this achievement he applied himself to the Roman classics, and he found that he could read them in general with ease and pleasure.

Mendelsohn's classical studies had probably already begun to subject him to unpleasant suspicions and imputations from the more bigoted among his Israelitish brethren. This may have been partly the reason that led him to attach himself about this time to a Polish Jew of the name of Israel Moses, who had come to reside in Berlin, having been obliged to leave his native country in consequence of being supposed to hold opinions too liberal for the taste of the great majority of his nation. This person, among his other acquirements, was a proficient in mathematics—a branch of learning of which as yet Mendelsohn knew nothing. On the other hand, Israel Moses was altogether ignorant of Latin. It was agreed therefore that the two friends should become each other's instructors. The Pole accordingly carried Mendelsohn through the elements of geometry by means of a Hebrew translation of Euclid; and in return received lessons from the latter in Latin and German. Such was the manner in which this ardent student availed himself of every chance opportunity of making a new acquisition in useful or liberal knowledge—rarely having it in his power to travel towards his object by the most direct and usual road, but not deterred on that account from seeking it by any by-path, however circuitous, that lay open to him.

During the time he remained at Berlin in obscurity and indigence, Mendelsohn's studies extended to many other subjects besides those we have mentioned. In particular he made himself familiar with both the

French and English languages. But, after several years had passed away without improving his worldly circumstances, a rich Jew of the name of Bernard, who resided in the city, fortunately heard of his talents and his worth, and, being at the time in want of a tutor for his children, determined to employ him in that capacity. To poor Mendelsohn this was at that time an elevation that satisfied his highest ambition. He had now not only a comfortable home, but a salary which enabled him to buy books, and to take lessons in those branches of scholarship of which he was yet ignorant. It was after this that he began the study of the Greek language, to which he had not ventured to apply himself so long as he was unable to obtain the assistance of a master. The duties of his situation allowed him considerable leisure, which he devoted, with his wonted ardour, both to various new departments of science and literature, and to the further prosecution of those upon which he had already entered. He thus extended his mathematical acquirements to algebra and fluxions; while natural philosophy, natural history, general history, and metaphysics, all came in for a share of his attention.

Among his other accomplishments were a remarkably beautiful handwriting and great skill in accounts. Trivial as these acquirements may be deemed, it so turned out that to them, principally, Mendelsohn was indebted for the prosperity of his future life. His diligence in the performance of his regular duties, and his excellent general conduct, soon raised him high in the favour of his employer; but that gentleman was particularly struck with the talent he displayed in the arts we have just mentioned; and he at last resolved to remove him from the school-room to the counting-house, and to employ him as one of his clerks. From this situation he afterwards promoted him to a higher place in his establishment, which was a large silk manufactory; and at last he appointed him manager of the whole concern.

Mendelsohn was now in the enjoyment of a handsome income; but neither this nor the laborious duties of his place relaxed his diligence as a student. His evenings, and a great portion of the night, were still regularly given to literature and philosophy. He had long looked with anxious and compassionate interest upon the general ignorance of his Hebrew brethren; and the desire of diffusing among them the light of modern literature and science had become, as it continued to be throughout his life, the first wish of his heart. With this view he projected, in conjunction with a friend, a Hebrew periodical work, to consist of short essays on such parts of science and morals as could most easily be made popular and interesting, to be entitled "The Moral Preacher." Of this work, however, the first in which Mendelsohn tried his powers as a public writer, only two numbers appeared, when he felt it prudent to discontinue it, in consequence of the outcry raised against it by his

more bigoted brethren, to whom such an attempt to displace their ancient rabbinical manuals of instruction seemed fraught both with presumption and profanity. But Mendelsohn, though turned from his course for the moment, was not thus to be driven to relinquish finally what he deemed to be as much the path of his duty as it was of his ambition.

About the year 1754, an event took place which greatly influenced Mendelsohn's future career; we mean his introduction to Gotthold Ephraim Lessing, afterwards so celebrated among the literary ornaments of his country, but who was then, like his new friend, a young man of five-and-twenty, and only beginning to be known as a writer. Mendelsohn is said to have been first made known to Lessing by a Jewish medical practitioner of the name of Gumpertz, by whom he had been assisted in learning some of the modern languages. They had also occasionally played at chess together; and it was as a proficient in this game that the young Jewish philosopher was first recommended to the acquaintance of the future author of "Nathan the Wise." But these two congenial minds soon turned their intercourse to higher ends. To Mendelsohn this connection was especially important, inasmuch as it speedily introduced him to various other literary men then residing in Berlin, to whose society, from their difference of religious creed, he would not otherwise have had access. In this manner he became the intimate associate of Nicolai, Abbt, and others, who afterwards greatly distinguished themselves in the regeneration of the literature of their country. These young men were the principal supporters of various periodical works which were then carried on at Berlin; and Mendelsohn now joined his contributions to theirs. He had not yet, however, published any work in his own name; when one day, his friend Lessing brought him a philosophical treatise which had just come out, and requested him to read it and give his opinion of it. On returning the book some days afterwards, Mendelsohn observed that he thought he could without much difficulty refute the author's positions. Encouraged by his friend, he accordingly sat down to the composition of his reply. When he had finished it, he brought the manuscript to Lessing, and requested him to be kind enough to read it, which the latter promised to do as soon as he should be at leisure. At their next interview, however, somewhat to Mendelsohn's surprise, the matter was never mentioned by Lessing; and Mendelsohn was too modest to introduce it himself. This happened several times—till at last the anxious author ventured to ask his friend if he had found time to look at the manuscript. Lessing again complained of want of leisure; but promised him that he should certainly contrive to find time to read it immediately. "In the meantime," he added, "here is a small volume on the same subject, which has just appeared; take it home with you, and let me know what you think

of it." Mendelsohn's surprise may be conceived when on opening this volume he found it to be his own work already in print—his "Philosophical Dialogues," as he had entitled it. "Put it into your pocket," said Lessing, enjoying his amazement, "and this Mammon along with it; it is what I got for the copyright."

From this time Mendelsohn took his place in the very front rank of the literary men of Germany. It does not, however, belong to so slight and rapid a sketch as the present even to enumerate the long succession of works by which, during almost every year of his remaining life, he sustained and added to his fame. For the classical elegance of his German style he was considered as ranking with the first of his contemporaries. His treatise, in particular, on the immortality of the soul, entitled "Phaedon," attracted, immediately on its appearance, universal attention, and, being translated into English, French, Dutch, Italian, Danish, and Hebrew, spread the fame of the author over all Europe. But the great effort of his life still continued to be the moral and intellectual improvement of his brethren of the house of Israel. For this purpose he brought all the resources of his learning and genius to the illustration of the Hebrew Scriptures; and his translations of the books of Moses and the Psalms, the latter in verse, are reckoned among his ablest performances. The incessant literary labours of this remarkable man were often carried on under the pressure of ill-health, and always amidst the interruptions of business or of society. He eventually became the partner of Mr. Bernard in his silk-manufacturing establishment, and lived in the enjoyment of opulence. In his thirty-third year he married, and had the happiness before his death of seeing his family growing up around him. One of his publications, which he entitles "Morning Hours," consists of a series of lectures on natural philosophy, which he was for some years in the habit of delivering to his children every morning for two or three hours after sunrise. His habits of living were extremely simple and abstemious. "It was inconceivable," says Mr. Samuels ("Memoir," pp. 139, 140), to whose memoir we have been principally indebted for the above facts, "that the quantity of food to which he restricted himself could sustain a human being; and at the same time it was affecting to see him press his guests good humouredly to partake of viands and liquors which himself, though ever so desirous, durst not venture to taste. * * * He was very fond of company, and never courted solitude, except from four or five o'clock in the morning till about eight or nine, when he adjourned to his counting-house, and remained there till noon. After dinner he generally attended to business again, till about four in the afternoon. About this hour his friends and pupils used to meet him at his house; and, on his return, he usually found a numerous assembly in his room, who anxiously awaited his appearance. There were theologians, literati, philosophers, public

functionaries, merchants, natives, foreigners, old and young, in promiscuous groups, with whom he conversed till eight o'clock, on various topics." Mendelsohn died, in consequence of a cold which he caught in returning one morning from the synagogue (in his attendance on which he was always extremely regular), on the 4th of January, 1786, in the fifty-eighth year of his age.

CHAPTER XXXV.

JOHN OF SALISBURY; ROGER BACON.

THE persons with whom we have been occupied in the chapters immediately preceding the present have all belonged to what may almost be called our own times; or, at least, their pursuits have been such as to indicate an advanced state of literature, philosophy, and civilization generally. It is only within the last two or three centuries that anything like a spirit of independent speculation has formed a pervading characteristic of the literature of modern Europe. Up to that period the intellect of our forefathers may be said, in most of its efforts, to have walked in leading-strings. The peculiar circumstances in which literature sprung up a second time in western Europe, after the subversion of the Roman empire, sufficiently explain why it remained so long in a state of pupilage. But the extended period in modern history called the Dark Ages was only the night of the human mind, and by no means its sleep, as it has sometimes been described. The numbers of those who then applied themselves to literary pursuits were very great, and their zeal and industry in many cases such as has never been surpassed. As an evidence of the assiduity with which it was customary for men to devote themselves to the studies then in fashion, we may quote the account which our countryman JOHN OF SALISBURY, who flourished in the twelfth century, gives us of the education he had received. "He says" (we quote the version of the original Latin which Mr. Turner has given in his "History of England," vol. i. p. 507), "that, in the year after Henry I. died, he went to the Peripatetic School at Paris,* on the Mount of St. G enevi e, and there studied logic; he afterwards adhered to Master Alberic, as *opinatissimus dialecticus* (a dialectician in the highest repute), and an *acerrimus impugnator* (most keen impugner) of the Nominal sect. He was two years with him and Robert Metridensis, an Englishman, both men *acuti ingenii* and *studii pervicacis* (of acute genius and resolute studiousness). He then for three years transferred

* So translated by Mr. Turner; but the phrase in the original is *Ad Peripateticum Palatinum*, which means "to the Peripatetic

of Palais," the common name by which the celebrated Abelard was known in that age, from his place of birth, Palais, in Bretagne.

himself to William de Conches, to imbibe his grammatical knowledge. After this he followed Richard called the Bishop, retracing with him all he had learned from others, and the Quadrivium,* and also heard the German Harduin. He restudied rhetoric, which he had learned from Master Theodoric, and more completely from Father Helias. Being poor, he supported himself by teaching the children of the noble, and contracted an intimate acquaintance with Master Adam, an Englishman, and a stout Aristotelian. He prosecuted afterwards the study of logic with William of Soissons. Returning at the end of three years, he heard Master Gilbert on logic and on divine subjects; then Robert Pullen, and also Simon Periacensis, a faithful reader, but a heavy disputer. These two last were his only teachers in theology. Thus, he adds, I passed twelve years, occupied by these various studies."

One of the most extraordinary individuals that appeared during the Dark Ages was our countryman ROGER BACON; and his history affords us so admirable an example of the successful pursuit of knowledge in the midst of all sorts of difficulties and discouragements, that we shall devote a few pages to present it with some fulness of detail. Bacon was born at Ilchester, in Somersetshire, in the year 1214. After remaining for some years at the University of Oxford, he went to finish his education at that of Paris, then the most distinguished seat of learning in Europe. Here he received his doctor's degree; after which he returned to his own country, and, entering himself a brother of the Franciscan order, again took up his residence at Oxford. At this time all the four orders of mendicant friars had establishments both at Oxford and Cambridge; and their members were, in truth, especially the Franciscans, the great support and ornaments of both Universities. At the period, however, when Bacon commenced his career, the Aristotelian metaphysics and logic, although they had begun to be studied, had scarcely acquired in this country that extraordinary ascendancy of which we find them only a few years after in possession. He, at all events, applied himself from the first chiefly to the mathematical and natural sciences, the principal of which, as cultivated at this time, may be distributed under the heads of chemistry or alchemy, astronomy or astrology, medicine, and mechanics. To these may be added, as having engaged a considerable share of Bacon's attention, the minor departments of geography, music, and optics; which last especially was one of his favourite studies, and that in which he displayed, more perhaps than in any other, his brilliant and inventive genius. Nearly all these sciences were as yet mixed up with the wildest errors and follies, which were, however, universally looked upon as their most fundamental and unques-

* In the middle ages all the branches of elementary education were considered as comprehended in the two great divisions called the *Trivium* and the *Quadrivium*: the for-

mer of which embraced grammar, logic, and rhetoric; the latter, arithmetic, astronomy, geometry, and music.

tionable principles, and were accordingly steadily kept in view by all who taught or studied either the theory or the practical applications of any of them. The grand object of chemistry, at the time to which we refer, was the discovery of the philosopher's stone, or the secret of manufacturing gold; but the experiments which were constantly making with a view to this end had incidentally given birth to some real discoveries, especially in regard to the fusibility, malleability, and other properties of the different metals. Of these we may just state, that lead and copper were the two which the most persevering efforts were made to convert into gold, the former exciting the hope of a favourable result by its great weight, and the latter by its colour; no bad example of the purely imaginary grounds which formed the whole theory and foundation of this art. Medicine was in much the same condition with chemistry, being studied, also, chiefly in the writings of the Arabian doctors, who had taken a particular pleasure in mystifying this science with all manner of occult speculations, and bedizening it with their frivolous fancies and inventions. Its natural alliance with chemistry, in the first place, subjected it to be corrupted by all the absurdities of the Hermetic philosophy.* But, as these had originated chiefly in one of men's strongest passions, the love of wealth, so another passion still stronger, the fear of disease and death, operated in the case of medicine to give birth to a variety of other delusions, which retained their hold upon the public credulity with even yet more invincible obstinacy. In the unphilosophical times to which we now refer, the science of healing was little more than a heap of quackeries and superstitions; or at least the truths which it taught were so intermixed with the merest dreams and imaginations, and these latter were held to be so much the more important and essential part of it, that, if not the very vainest and falsest of all the sciences of the period, there certainly was no other, even as then studied, which was disfigured upon the whole by more frivolity and nonsense. As the chemists thought of nothing but their elixir, or universal solvent, of the metals, so the physicians had their elixir vitæ, or universal medicine, which was to cure all diseases, and, if not altogether to put an end to the custom of dying, at least to protract life to more than antediluvian longevity. Then, the Arabian writers, in whose works the science was principally studied, had introduced into it a cloud of mystical and metaphysical notions from those other departments of inquiry to which they were almost all of them attached. One of the greatest of the Arabian physicians, Avicenna, was one of the most devoted admirers that ever lived of the metaphysical works of Aristotle;

* The science occupied with the pursuit of the philosopher's stone was so called in memory of the Egyptian philosopher Hermes, styled also Trismegistus, or the thrice-great (supposed by some to be the same personage with the heathen god Mercury), who, it was

pretended, had first cultivated it about two thousand years before the birth of Christ, and to whom several existing works upon the subject were ascribed, although, it is needless to say, without any foundation.

which, however, he ingenuously confesses he had perused no fewer than forty times before he understood them. Another of these doctors, Averroes, had written so many commentaries on the Greek philosopher, that he obtained the name of the most *Peripatetic** of the Arabians. Another of them, Alcendi (or Alchindus), had a strange theory with regard to the virtues of medicines, maintaining that they could only be properly mixed according to the principles of music—a notion which seems intended to defy all explanation or comprehension. But it was the intimate connection it had formed with the philosophy of the stars, as then received, which gave to the medical science of the thirteenth and some succeeding centuries the greater part of its weakness and absurdity. Medicine, in truth, was for a long time considered as only one of the branches of astronomy or astrology, terms which in those days were synonymous. One of Roger Bacon's own expressions is, that the most important department of astronomy is the science of medicine. Operations, accordingly, used to be performed, and remedies administered, not so much in conformity to the appearance or nature of the disease, as according to the aspect of the constellations. For it was the study of the influence which the heavenly bodies were supposed to exert over human affairs and the fortunes of individuals, that constituted the favourite astronomy of the times; or rather no part of astronomy was studied at all, except with a view principally to the observation and detection of this imaginary sympathy between the stars and men. In those days this was not the belief merely of a few of the most ignorant and credulous of the vulgar, but the nearly universal creed even of the learned. The science of judicial astrology, as it was called, from the judgments with respect to the future which its professors pretended by means of it to draw from the stars, was imported into Europe much about the same time with that of alchemy, and from the same Arabian school. The Arabian writers, however, had found it in the works of their predecessors, the disciples at the Greek school of Alexandria; and especially in their commentaries on a celebrated work by the geographer Ptolemy, now commonly known by the name of his "*Almagestum*," or "*Almagest*," although that is only an Arabic term, signifying The Great Work, which was bestowed upon the book as a complimentary title by those who translated it into that language. The "*Almagest*" of Ptolemy may therefore be considered as the grand source of all the astrological superstitions both of the East and of modern Europe.

Bacon himself informs us in one of his works that, notwithstanding the state of unreclaimed barbarism in which all the more important departments of learning still remained, there never had been known such an intellectual excitement as had arisen in his time. We have a grati-

* The philosophy of Aristotle was called the *Peripatetic*, from a Greek word signifying to walk about, because its founder was wont to walk about while he conversed with and instructed his disciples.

fying proof of the zeal now felt in behalf of philosophy, and the honour in which it was held, in the reception Bacon is recorded to have met with on his return from France to his own country, to which he was welcomed as one of the glories of the age; while a sum of money was immediately collected and given to him, to enable him to prosecute those scientific investigations by which he had already acquired so much celebrity. He tells us himself that in the course of twenty years he had been enabled by this liberality of his friends to expend, in collecting books, performing experiments, and constructing instruments, no less than two thousand pounds—a much larger sum in those days than in our own. Thus encouraged and supported he pursued his researches in natural science for some time without interruption, and with a zeal and indefatigable application to which the works he has left us furnish abundant testimony. Unfortunately, however, for his peace, though nothing that is recorded of him is more honourable to the purity and intrepidity of his moral character, he could not remain a silent witness of the disgraceful ignorance and profligacy of the generality of his ecclesiastical brethren; and his denunciations upon this subject became at last so loud and unguarded, that they reached the ears of those who were most certain both to feel their justice and never to forgive them. He immediately felt what it was to have provoked the hostility of so all-powerful a community as the church then was, and to stand as a mark for both the open fury and concealed rancour of a body of men, kept united and powerful by their common interests and common fears, and having in their hands, not only many of the terrors of civil authority, but the whole of that still more formidable power which belonged to an absolute supremacy over the creed, the consciences, and the passions of the people. The life of the philosopher becomes now, with little intermission, only a tale of persecution and cruel suffering. The ignorance and stupid bigotry of the times made it unhappily too easy a matter for his enemies to find the means of amply avenging themselves. Two centuries before this the pope himself had experienced how perilous a task he attempted when he set about reforming the corruptions of the clergy. Gregory VII. had, about the time to which we refer, signalized his accession to the chair of St. Peter by some strenuous endeavours to repress the abounding irregularities which had long pervaded all ranks of the priesthood; when both the inferior clergy and many of the bishops themselves openly and indignantly repelled his interference, sarcastically replying to his exhortations and threatenings by asking him if he expected they were to live like angels. Nor was this all. The superior virtue and learning of the pontiff served only to expose him to the blackest imputations. The first was represented as a mere show of austerity, artfully kept up to cover a life of real dissoluteness. Of the other, advantage was taken to point him out to popular horror as a

magician or necromancer, a charge under which his memory long laboured, in common with that of some of the greatest men who were unfortunate enough to have lived in those dark times. This was the very calumny of which the enemies of Bacon availed themselves in order to destroy him. His great reputation as a master of the secrets of natural science, and the fame of his many ingenious experiments and contrivances, easily enabled them, in that ignorant age, to represent him both to the people and to the court of Rome as working his wonders by supernatural means, and as actually in league with the devil. Nothing more was necessary to effect his ruin. An order arrived from the pope, in the first instance, to restrain him from teaching, as he had been in the habit of doing, in the University; and, a short time after, he was put in confinement, secluded from all intercourse with his friends, and, as we find him complaining himself, subjected to such cruel privations that he was often near perishing of hunger. In this state he remained probably for some years. Luckily, however, in the year 1264, the excellent and learned Cardinal Fulcodi, who had previously been Papal Legate in England, where he had known or heard of Bacon, became pope under the title of Clement IV.; and he, immediately on his accession, not only ordered the release of the philosopher, but took him under his especial protection. It was at the request of this pontiff that Bacon made that collection of his principal writings known by the title of his "Opus Majus," or Greater Work, which, after remaining in manuscript for nearly five hundred years, was printed at London in the earlier part of last century. It consists, in fact, of a discourse on the various subjects to which the author's studies had been directed, written in the form of a letter to the pope; and, while it repeats, as was to be expected, many things to be found in his other works, may be considered as the most complete and connected account of his whole system of philosophy which has come down to us. But Clement reigned only about three years and a half; and with him expired Bacon's only security against the malevolence of his enemies. It does not appear that he was positively molested for some time; but soon after the accession of Nicholas III., the general of his order, Jerome of Ascoli, ventured again to interdict the reading of his works, and to consign him to a prison, by a sentence which was confirmed by that pontiff. Bacon was at this time in the sixty-fourth year of his age, and he remained in confinement for ten years. At last Jerome of Ascoli became himself pope, under the title of Nicholas IV., and the persecuted old man, in the hope of being permitted to spend his few remaining days in freedom, stooped to appeal to the magnanimity of his former enemy, by addressing to him a treatise which he had composed in his prison on the means of avoiding the infirmities of old age, as a sample of the speculations to which he was wont to devote himself, and an evidence of the innocence and usefulness

of those studies which had been so much calumniated. Whether the vanity or better feelings of Nicholas were actually touched by this submission to his judgment and compassion; does not very distinctly appear. It has been affirmed that the appeal was powerfully backed by the intercession of some of Bacon's most distinguished countrymen; but it is certain, at all events, that he soon after regained his liberty, and returned to his old residence at Oxford. Nor was he yet so completely worn out by age, hard study, and the cruelty of his oppressors, that he was ready only to lay himself down and die. On the contrary, he appears to have lived about six years after his deliverance, in the course of which he composed and published his work entitled "A Compendium of Theology," a manuscript of which is preserved in the King's Library, now forming part of that of the British Museum. He is commonly stated to have died in the year 1294, at the age of eighty, but another account fixes his death in the latter part of the year 1292.

For the age in which he flourished Bacon was a miracle, and altogether deserving of the title by which his contemporaries distinguished him—"the Wonderful Doctor." In his genius and intellectual character, indeed, he did not belong to his age. He scarcely participated in its prevailing tastes, or gave himself at all to its favourite studies. He complains, in one of his treatises, of the futile speculations which passed under the name of learning and philosophy in his time; when the Roman law was the sole object of attention among secular scholars, and those of his own order occupied themselves about nothing except the most perplexing subtleties of theology. Elegant literature and true science were alike neglected on all hands. Even those, he tells us, who professed the warmest admiration and most earnest study of the works of Aristotle, had no acquaintance with that philosopher except through the medium of translations so wretched, that they seldom conveyed the meaning of their originals nor any other meaning. He asserts, in another place, that there were not above four scholars in Christendom who knew even the rudiments of either Greek or Hebrew, much less of Arabic; while the Latin itself was so imperfectly understood that there was scarce one living writer who expressed himself in it with any degree of elegance or purity. Nor was the number of even tolerable mathematicians greater. Of those who applied themselves to that study, most stopped, he says, at the fifth proposition of Euclid. Hence this proposition used to be called the "Pons Asininus," or Asses' Bridge, a name by which it is still known.

His own attainments, even as a scholar, to say nothing of his discoveries, were very extraordinary. He had travelled, indeed, the whole circle of literature and the sciences, in so far as it had been extended in those days, and surpassed his contemporaries as much in the depth and accuracy as in the universality of his knowledge. His Latin style,

though by no means perfectly classical, is distinguished by an ease, neatness, and perspicuity, not to be found in any other writer of that dark era. He was distinguished besides for his knowledge of both the Greek and Hebrew languages, of the former of which he wrote a Grammar, which still exists in manuscript. It is remarkable for a curious passage it contains, in which it is gravely proposed, as a piece of ecclesiastical reform, that every bishop, in consecrating a church, should be obliged to write the characters of the Greek alphabet on the floor with the end of his pastoral staff, or, if that were too much for his scholarship, at least the three marks which were employed by the Greeks, in addition to their alphabetical characters, in the notation of numbers. The study of languages was one, indeed, to which Bacon had given a great deal of attention. It forms the subject of the third book of his "Opus Majus," and its importance is there vindicated by much ingenious and philosophical reasoning.

Ethics, theology, logic, and metaphysics, enjoyed each of them its share of the attention of this universal genius, as we learn either from those of his works that still exist, or from others, now lost, that are recorded to have been written by him. But it is his scientific researches and discoveries that make the most brilliant part of his fame.

Some have gone so far as to consider Bacon the greatest mechanical genius that has appeared since the days of Archimedes. It is evident, from the testimony of his own writings, that he had at least speculated profoundly as to what might be done by mechanic power, and meditated many curious contrivances, some of which we can hardly doubt that he had actually executed, from the terms in which he speaks of them. In a little work, which he calls his "Discovery of the Miracles of Art and Nature, and of the Nullity of Magic," and which has been translated into English, he has a chapter on "Admirable Artificial Instruments," which, in reference to this point, is in the highest degree interesting. Among other machines which he speaks of here, although he does not describe their construction, are a ship which might be managed by one man as well as one of the common construction could by a whole crew; a chariot which ran with inconceivable swiftness entirely by machinery; an apparatus for flying; and an engine for depressing or elevating the greatest weights by the application of a very small force, which he describes as only three fingers high and four broad. Another instrument, he says, may be easily made whereby one man may, in despite of all opposition, draw a thousand men to himself, or any other thing that is tractable. A contrivance to serve the same purpose as the modern diving-bell is also mentioned. "Such engines as these," he remarks, "were of old, and are made even in our days." All of them, he tells us, he has himself seen, "excepting only," he adds, "that instrument of flying" (we use the words of the old English translation),

“which I never saw, or know any who hath seen it, though I am exceedingly acquainted with a very prudent man who hath invented the whole artifice.”

The errors into which this great man occasionally falls read us a valuable lesson in the right method of philosophizing. He was, to an extent very remarkable when we consider the age in which he lived, an experimental philosopher;* but still he had not learned by any means the whole importance of that diligent inquisition of nature which was, some centuries later, demonstrated by his illustrious namesake to be the one sure foundation of philosophy. There is one thing, accordingly, with which we cannot fail to be struck in following his speculations. His experiments are almost all directed, not to the *ascertainment* of principles, but only to their *exemplification*. It may sometimes have chanced that he did in this way discover, or rather obtain a hint of, a new truth in science, or a hitherto unsuspected property in the substances or instruments he was employing; but this was always merely an accidental result, and never the direct object of his examination of them. Hence, although he made some important additions to the truths of philosophy, he effected no diminution in the long list of errors and falsehoods by which it was in his time encumbered. With him, as with all his contemporaries, all was true that was generally believed, or that was to be found in any of those works which it was customary to regard as authorities. It is abundantly plain that he had no clear conception of the true grounds of belief in philosophy. With all the ingenious and original views, accordingly, in which his writings abound, they contain at the same time, it must be admitted, not a little of both hasty and extravagant inference. For not only does it never enter his imagination to doubt the correctness of anything that has been stated by his predecessors, or to examine nature with a view to ascertain the reality of those properties which they have imputed to her, but, with a corresponding ignorance or disregard of the true laws of evidence as to such matters, he continually advances to his general conclusions from much too limited an induction of particulars, and without anything like a sufficient consideration of the whole circumstances even of the cases to which his attention is directed. Thus, there can be little doubt that some even of the mechanical designs we have just mentioned were merely his imaginations of what might be accomplished by the most perfect combinations of certain natural powers, which, however, he had never actually applied so as to produce such effects, nor contemplated very attentively in any case with reference to all the conditions of his supposed invention. It is with the same looseness that we find him in another place asserting the possibility of making lamps that would burn for ever, and talking, on the authority of Pliny,

* “Whoever,” says Mr. Hallam, “reads the sixth part of the ‘Opus Majus,’ upon experimental science, must be struck by it as

the prototype, in spirit, of the ‘Novum Organon.’”—*History of the Middle Ages*, ii. § 81.

of a certain stone which attracts gold, silver, and all other metals; "the consideration whereof," he remarks with some simplicity, "makes me think there is not anything, whether in divine or outward matters, too difficult for my faith." And, indeed, it appears to be so; for many of the stories which he quotes, especially those from Aristotle's "*Secretum Secretorum*,"* which is one of his greatest authorities, are such as one would think could hardly have failed to prove too monstrous for his belief, if it had not been of this infinite capacity.

The influence of this sanguine and over credulous disposition is very discernible in his optical speculations. He was here blinded and misled in the most extraordinary manner by certain notions he had imbibed from the prevailing philosophy, upon the subject of what were called the *species* of objects, which were certain shadows, or images of themselves, which bodies of all kinds were imagined to be continually throwing off, and which, when received into the mind, constituted the *ideas* of the things from which they had come. In conformity with this singularly absurd theory (built up, however, by the schoolmen upon principles laid down or admitted both by Aristotle and Plato), Bacon contends, that any object may reflect upon another the *species* or image of whatever power or quality is inherent in itself; that a man, for example, may by means of words spoken under strong emotion, transmit to another object, no matter whether sentient or not, such an emanation of the passion under which he labours, that a certain effect which he desires to operate on that object shall be thereby immediately produced. If such a phenomenon as this has never been actually exhibited, he conceives that it is owing solely to the emotion never having existed in sufficient intensity when the experiment was attempted. After this we need not wonder at what he says about the reflective powers of mirrors. Glasses, he assures us, "may be framed to send forth species, and poisonous infectious influences, whither a man pleaseth; and this invention Aristotle showed Alexander, by which he erected the poison of a basilisk upon the wall of a city," &c., &c. In another place we are informed, in a jargon which will scarcely bear translation, "that all things are to be known by the science of Perspective, since all the doings of nature take place through the multiplication of species and virtues from the agents of this world into the patients." And many other passages might be quoted in the same style.

These were the prejudices of education, which even such a mind as that of Bacon was not powerful enough altogether to escape from. They were in part, too, the natural produce of that sanguine temperament which appertained to him as a man of inventive genius, and one given rather to look forward to the future than back upon the past. The minds

* Literally, "The Secret of Secrets"—a spurious production, attributed to Aristotle, in high favour in the dark ages, and filled with the most ridiculous marvels and absurdities.

that have enlarged the bounds of science by positive discoveries, seem to be of a different order from those to which we are indebted for the demolition of ancient systems of imposture or delusion. Francis Bacon, who finally overthrew the despotism of Aristotle, and rid philosophy of the standard superstition by which it had so long been encumbered and overshadowed, achieved nothing beyond the old border-line of the territory which he had thus cleared. Newton, on the other hand, whose conquests were all on the outer side of this hitherto untraversed bourne, might, possibly, had he lived in another age, have failed to detect those consecrated errors in the method of philosophizing which were so happily exposed by Bacon.

Astronomy is another of the departments of mathematical physics in which Friar Bacon had made wonderful proficiency for his age. As a proof of this, we may mention, that he suggested, in a letter to his patron Clement IV., the same reformation of the Calendar which was introduced three hundred years afterwards by Pope Gregory XIII., and which has been long adopted by nearly all Christendom, our own government having formally recognised and enacted it in the year 1752; and Russia being now the only country in which the old reckoning prevails. Geography and chronology were also favourite studies of Bacon; and both are ably and learnedly treated of in sundry of those of his works which still exist.

We have already mentioned the extraordinary imaginations which in those days formed so important a part of physical science; and observed that, in regard to most of these, this great man had not risen above the universal faith of his age. He was a believer in all the wild pretensions both of astrology and alchemy. Of the latter art, indeed, he was one of the earliest disciples among the Latins, as the inhabitants of Western Christendom used then to be called, although it had been cultivated for several centuries before by the Jews and Saracens. But it is unnecessary to refer more particularly to any of his unintelligible disquisitions on these subjects, which, couched as they generally are in a most peculiar and mystical style, seem in truth hardly intended to convey any meaning even in the original, and certainly were never meant to be translated. It is sufficient to remark, that the influence of the stars upon human affairs is one of the fundamental laws of his astronomy; and that he has no doubt of the existence of a universal menstruum, or solvent, having the power both of converting all other metals into gold, and of purifying the human body from all its corruptions, and prolonging life through many ages. His knowledge in regard to the search of the *Elixir Vitæ*, gravely observes the author of a very elaborate life of him in the "Biographia Britannica," "it is very probable he would have laid open more fully if his discourses upon these and other important subjects had been received with the candour they deserved. As it is, he has said enough to show that he was no pretender to this art,

but understood as much of it (in this respect at least) as any who have lived since his time." The learned biographer, writing in the light of the eighteenth century, has not wholly escaped, we see, from the faith of the thirteenth.

In his pursuit of the philosopher's stone, however, Bacon had undoubtedly acquired a considerable knowledge of the properties of various natural substances, and made several real discoveries in chemistry. Of these, the most remarkable of which his works give us any notice is his discovery of gunpowder. We have no account from himself of the manner in which he arrived at this discovery; but nothing can be more probable than the statement of another old writer, that he was indebted for it merely to the accident of a vessel, in which the different ingredients of the composition happened to be mixed, exploding on being heated. The way in which he himself mentions the matter is exceedingly curious, and very characteristic of the philosophy of the times. He describes the wonderful properties of his secret mixture in various parts of his works. For example, in his "Treatise on the Miracles of Art and Nature," he enumerates, among his "strange experiments," "the making of thunder and lightning in the air, yea, with a greater advantage of horror than those which are only produced by nature; for a very competent quantity of matter, rightly prepared (the bigness of one's thumb), will make a most hideous noise and coruscation." In another place he ventures so far as to intimate that the preparation in question is a compound of "nitre, or saltpetre, and *other ingredients.*" In one passage only, however, and that in a chapter thrown in by way of appendix at the end of one of his works, does he actually record the names of these other ingredients. And even on this occasion, instead of declaring them plainly and at once, he wraps them up in a mysterious *anagram*, or series of syllables formed by an intricate transposition of the letters of which the words meant to be understood are composed. "The substance is prepared," says he, "from the *luru mope can ubre*, of saltpetre, and of sulphur." The sentence, of course, is in Latin; and the letters in italics, when restored to their proper order, make exactly the words *pulvere carbonum*, in English the *powder of charcoal*; so that the meaning of the whole is, that the composition is formed by mixing together the powder of charcoal, of saltpetre, and of sulphur, the three ingredients, as is well known, from which gunpowder is generally made. This curious passage proves incontestibly Bacon's possession of the secret; but it is not at all probable that it is to him or his writings that the world at large has been indebted for the knowledge of it: for it is singular enough, that the barbarous syllables to which he thus confided it retained their trust so faithfully, that they continued an unexplained riddle for nearly five hundred years, when their meaning was at last discovered by Dr. John Campbell, the ingenious author of the article on his life in the "Biographia

Britannica.”* It may be added, that this mode of recording scientific discoveries was common long after the time of Bacon, as might be proved by many examples which it would be easy to cite. Newton himself first announced an important portion of his doctrine of fluxions by an anagram.

Bacon's renown as a mighty magician, however, was the part of his fame that lived longest in the popular memory. It is entirely in this character that he figures in a very curious production which appears to have been a great favourite with our ancestors about the beginning of the seventeenth century, entitled “The Famous History of Friar Bacon, containing the wonderful things that he did in his life; with the lives and deaths of the two conjurors, Bungey and Vandermast: very pleasant and delightful to be read.”† In this veracious chronicle we are informed, that his father was a small farmer or peasant, who wished to bring up his son in his own condition of life, but that young Bacon, after a while, ran away to a cloister twenty miles off, where, under the tuition of the monks, he in a short time became the most wonderful scholar that was ever known. His reputation for necromantic skill, in particular, speedily waxed so great, that the king himself, being on a visit at the house of a gentleman in the neighbourhood, sent for Bacon from his monastery that he might see a sample of his enchantments. Instead, however, of quoting the account of his performances on this occasion, when he astonished and delighted all the five senses of the company in succession, we will pass on to the story of his fabrication of the marvellous brazen head, of which we read so much in all the old histories of the philosopher and his inventions. He took, as his coadjutor in this work, his friend Bungey (who is understood to have been Provincial of the order of St. Francis, in England), according to tradition an adept in the magical art, as well as himself; and the idea of the contrivance was suggested to them, we are told, by their anxiety to find out a mode of surrounding England with a wall of brass, to serve it for a perpetual protection against its enemies. After long deliberation about the way in which this was to be done, they resolved at last, the story proceeds, to construct a man's head of brass, in the hope that it would inform them. So to work they set, and some accounts affirm, we believe, that they were no less than seven years about their task before they finished it. But the most mortifying part of the business was, that, after the machine was completed, notwithstanding that (to use the words of the authority before us) “in the inward parts thereof there was all things like as in a natural man's head,” not a syllable or a sound would it reply

* Nor is it probable that Bacon was either the only or the first person even in the Western world who had hit upon the composition of gunpowder; and it had been known in the East from time immemorial.

† Not to be confounded with Robert

Greene's blank verse play entitled “The Honourable History of Friar Bacon and Friar Bungey,” some of the scenes in which, however, are evidently founded upon the prose tract.

to all their questionings. In this extremity, they luckily bethought them of the simple expedient of raising a spirit to give them its advice in the matter ; which they did accordingly ; but the spirit threatened at first to prove almost as obstinately dumb as the image, till, by dint of reasoning and menacing together, it was prevailed upon to remember its duty, when it "told them that with the continual fume of the six hottest simples it (the head) should have motion, and in one month space speak, the time of the month or day he knew not ; also he told them, that, if they heard it not before it had done speaking, all their labour should be lost." Possessed of this information, the two friends took their places before the image, and sat watching it day and night for three weeks, when, feeling somewhat drowsy, they determined upon going to bed for a few hours, which they did not do, however, before they had placed Miles, Bacon's man, on guard in their stead, with strict injunctions to call them the first moment it should break silence. Miles, who acts a very conspicuous part throughout the whole history, had not watched long, when the head did, to be sure, open its lips, but only to utter the words "Time is," which he in his wisdom thought greatly too commonplace a remark to warrant his interrupting his master's slumbers in order to notify it. Upon the same principle, when, half an hour later, it again found its tongue, and exclaimed "Time was," he still remained at his post, not doubting that it would ere long commence something like a speech worth hearing, when it would be time enough to let the two philosophers know what was going on. Little did he dream of the catastrophe that was rapidly approaching. After the expiration of another half hour, the head for the last time lifted its voice, and, calling out "Time is past," "therewith fell down, and presently followed a terrible noise, with strange flashes of fire, so that Miles was half dead with fear." His master, awakened by the turmoil, was at first, when he saw the ruin of all his hopes, in such a tremendous passion, that he had well-nigh killed him outright ; but, on Bungey's entreaty, he was prevailed upon at last to content himself with striking him dumb for a month, in order, we may suppose, to teach him for the future a higher and sounder appreciation of the gift of speech.

This fabrication of a brazen head, we may remark, is a feat which we find attributed to most of the few other individuals who were distinguished as cultivators of science in those times. William of Malmesbury, among the other wonders he relates of the famous Gerbert, who became pope in the year 999, under the title of Sylvester II., mentions such an image of his constructing, which was in the habit of answering many difficult questions. The same story is told of another very remarkable man, William of Paris, or of Auvergne, as he is sometimes called, who was born some years before Bacon, and has probably a better claim than the English philosopher to be accounted the father of alchemy

among the Latins, while he is at the same time honourably known as a most profound and original thinker on moral and metaphysical subjects, in an age when these departments of philosophy were especially under the control of routine and authority. We read, too, of a brazen head made by one of Bacon's patrons and most intimate friends, the celebrated Robert Grosstête, or Greathead, Bishop of Lincoln, a prelate of great talent and learning, but who had made himself obnoxious by his independent conduct, not only to the general body of the clergy, of whose corrupt manners he was a severe censor, but to the reigning pope Innocent IV. himself, some of whose impositions he had resisted with a boldness that might surprise those who have so read the history of the Roman Catholic Church, as to have gathered no other notions with regard to it except that of the unlimited authority of its head, and the uniform and unquestioning obedience of its inferior members. Bishop Greathead, often called Robert of Lincoln, wrote several works, which still exist, both in theology and science; and was distinguished, like his friend Bacon, for his philosophical as well as his mathematical knowledge. Lastly, we may mention the complete man of brass made by the famous Albertus Magnus, or Albert the Great, of which it is recorded that it was so fond of talking that Thomas Aquinas, while a pupil of Albert, one day knocked it to pieces as a disturber of his studies. Albert was a contemporary of Friar Bacon, and, like him, long enjoyed the reputation of profound skill in the art of magic. He was undoubtedly a very extraordinary man. The extent and variety of his attainments seem to have been wonderful, for the age in which he flourished; and his industry and fertility as a writer must be regarded as almost unparalleled if he really composed the whole of that immense mass which was printed at Lyons in the middle of the seventeenth century, under the title of his "Collected Works," in twenty-one volumes folio. A large portion of it consists of Commentaries on Aristotle, whose works, however, he knew only through the medium of the wretched Latin translations then existing.

Attached as Friar Bacon was to those vain speculations known under the names of the sciences of astrology and alchemy, he was so far from ever pretending to operate by supernatural means, that one of his works, his "Treatise on the Miracles of Art and Nature," to which we have already referred, is written principally for the purpose of proving the nullity or absurdity of what was called the "Art of Magic," and exposing the tricks of its professors. In the beginning of this little work, after enumerating the various methods by which these impostors pretended to perform their wonders, he affirms that "no true philosopher did ever regard to work by any of these ways." And, immediately after, nothing can be more sensible than the manner in which he expresses himself on the subject of charms, spells, &c. "Without doubt," says he, "there is

nothing in these days of this kind, but what is either deceitful, dubious, or irrational, which philosophers formerly invented to hide their secret operations of nature and art from the eyes of an unworthy generation." The domination which he imagined the heavenly bodies to possess over human affairs was certainly an absurd dream; and so was his other favourite fancy about the tincture which possessed the power of curing all diseases, and turning everything into gold; but neither of them proceeded upon the idea of anything like supernatural or magical agency. The moral influence which he attributed to the stars, he conceived to be as truly a law of nature as that which directed their motions, or retained them in their orbits; and one, the operation and effects of which equally admitted of being made matter of calculation and science. In the same manner, his universal solvent was merely one of the yet undiscovered essences or compounds of natural chemistry, the expectation of ever finding which might be wild and unwarrantable enough, and the properties ascribed to it such, in fact, as nothing existing did actually possess; but still there was not necessarily anything magical, either about the supposed nature of the substance itself, or the manner in which it was to be applied, or even the processes and experiments by which it was sought to be discovered. It is quite true that some of the other cultivators of these visionary sciences professed to avail themselves of the aid of spells or spirits, or other supernatural means, in prosecuting their researches; but Bacon never did. The worst that can be said of him is, that his language, when he is speaking of his subject, is occasionally somewhat mystical—which arises, in a great part, it is but fair to observe, merely from his employment of the peculiar and technical phraseology of which the sciences in question, as well as all others, have their share. Nothing, therefore, could be more undeserved than the opprobrium to which he was exposed as a student of necromancy, or as one who ever even professed to work enchantments. It has been said that this calumny only arose many years after his death, and that he himself never was annoyed by it; but both his history and his writings, we cannot help thinking, prove the contrary. In his treatise on "Old Age," he distinctly complains of being hindered from making such experiments as he would have wished by "the rumours of the vulgar." And in various other passages we find him alluding to the difficulties and dangers which philosophy had to encounter from the same cause. It is gratifying, however, to observe, that in whatever spirit this accusation may have been originally brought against him, and with however much affected horror his name may have long been regarded by his brother churchmen, who used to nail his books, we are told, to the shelves of their libraries, and to allow them to remain in that state covered with dust, and a prey to the moths and worms, he seems, even in his character of a magician, to have been a favourite with the people in general. In "The Famous History of Friar

Bacon," instead of being represented as in league with the powers of evil, we find him on various occasions opposing and foiling them in a style that would do honour to any legendary saint in the calendar; and when his fellow-conjurors, Bungey and Vandermast, are consigned, at the close of their career, to the usual fate of persons of their craft, he is, by an extraordinary piece of indulgence on the part of the chronicler, released from the dreadful penalty, by being made, in a fit of repentance, to burn his books of magic, to turn anchorite, and to study divinity. Everything that is told of him, too, in this popular delineation, speaks in favour of the kind and generous manner in which he used to dispense his enchantments; and, upon the whole, he is represented to us, in point of moral character, very much in the same light in which his own writings, so evidently the produce of a simple, benevolent, and philosophic spirit, would lead us to regard him. He was, indeed, a genuine lover of knowledge and philosophy, for which he was ever ready to suffer all things—preferring them infinitely to all things. He unfolds to us, in short, very clearly, what manner of man he must have been, by a single remark; when, speaking of one of his projects or contrivances, he calls it, with enthusiasm, "an invention of more satisfaction, to a discreet head, than a king's crown."

CHAPTER XXXVI.

PROGRESS OF OPTICAL DISCOVERY:—DOLLOND; RAMSDEN; HERSCHEL; FRAUNHOFER; THOMAS PHELPS AND JOHN BARTLETT; PALITZCH.

THE truth, as we have already remarked, with regard to many of the inventions mentioned by Friar Bacon, probably is, that he had rather deduced them as possibilities from the philosophical principles in which he believed, than actually realized them experimentally. Among others, certain optical instruments to which he attributes very wonderful powers existed merely, there can be little doubt, as conceptions of his mind, and had never been either fashioned or handled by him. His description of their properties is apparently nothing more than the sanguine prediction of an understanding enamoured of science, and confident in the truth of the views it has adopted, but which has not yet learned the difficult habit of scrupulously limiting its conclusions to the legitimate scope of its premises.

Bacon, however, certainly was acquainted with that important property of light termed its refrangibility, or that which makes it break from the straight line of its course, and turn into a new direction, on passing from one medium into another of different density. This pro-

perty, indeed, had been long before noticed both by the Arabic writer Alhazen, whom Bacon repeatedly quotes under the name of Alharen; and also, there is reason to believe, by Ptolemy, who lived in the second century, in a work on Optics, likewise referred to by Bacon, but now lost. Nearly all that had been formerly known of this branch of science, however, appears to have been forgotten in Western Europe when the fundamental fact of the refraction of light was again announced in the writings of our countryman, and proposed by him to be turned to account as affording the means of presenting objects to the eye in magnified dimensions. It is true that he uses extravagant language, and such as shows that he had never actually constructed the instrument of which he speaks, when he tells us that lenses may be so arranged as to enable a person, from an incredible distance, to count the grains in a plain of sand—to give to a man the appearance of a mountain—and to make the sun and moon seem to descend upon the earth. Nor does he even express himself very accurately, when, in another place, he notices the apparent enlargement of an object which may be produced by simply viewing it through a spherically-shaped piece of glass or crystal.* But all this only goes to show that he allowed his reasonings on the subject to be too much influenced by his imagination, and that he either did not conduct his experiments with much care, or at least did not always correctly note or record the circumstances. The partial errors that occur in his accounts ought not to deprive him of the honour he deserves as having been the first to reawaken the attention of men to inquiries so curious, and destined to conduct to such important results.

The invention of spectacles may be considered as having been traced, on evidence of unusual clearness in such matters, to about the time of the death of Bacon. By the testimony of more than one contemporary writer this useful contrivance is assigned to a Florentine named Salvini degl' Armati; although he, it is said, would have kept the secret to himself, had it not been for another subject of the same state, Father Alexander de Spina, who, having found it out by the exertion of his own ingenuity and penetration, was too generous to withhold from the world so useful a discovery. This was about the close of the twelfth century. From this time magnifying or burning lenses continued to be made of various sizes. But nearly three hundred years more elapsed before any additional discovery of much importance was made in optical science; although in the early part of the sixteenth century Mamolicus of Messina, and soon after him Baptista Porta, began once more to direct attention to its principles by their writings and experiments. The latter is said to have first performed the experiment of producing a picture of external objects on the wall of a darkened chamber by the

* See the passages quoted in the original Latin in Montucla's "*Histoire des Mathématiques*," l. 514—517.

admission of the light through a lens fixed in a small circular aperture of the window-shutter, the origin of the modern camera obscura; and the former made an imperfect attempt to explain the phenomenon of the rainbow, as Roger Bacon had also done long before. The fortune of determining the true principles of this phenomenon, however, was reserved for Antonio de Dominis, Archbishop of Spalatro, who published his exposition of them in the year 1611.

It appears to have been about this time, also, or not long before, that the telescope was invented; although the accounts that have come down to us regarding this matter are extremely contradictory. As magnifying lenses had been long known, and were commonly in use, nothing is more probable than that, as has been suggested, more than one person may, ere this, have accidentally placed two lenses in such a position as to form a sort of rude telescope; and this may account for various evidences that have been adduced of something resembling this invention having been in use at an earlier period. But what is certain is, that the discovery of the telescope which made it generally known took place only about the close of the sixteenth century. It seems also to be generally agreed, that it was in the town of Middleburg, in the Netherlands, that the discovery in question was made; and, moreover, that it was made by chance, although the accounts vary as to who was the fortunate author of it. The story commonly told is, that the children of a spectacle-maker, while playing in their father's shop, having got possession of two lenses, happened accidentally to hold them up at the proper distance from each other, and to look through them at the weathercock on the top of the steeple; when, surprised at seeing it apparently so much nearer and larger than usual, they called to their father to come and witness the phenomenon: after observing which he was not long in fabricating the first telescope. The wonderful powers of the new instrument were soon rumoured over Holland and other countries, and the account excited everywhere the greatest interest and curiosity. At last, as we have mentioned in a preceding chapter, it reached Galileo at Venice; and he reinvented the instrument by the application of his own sagacity and scientific skill.

The microscope was also discovered about the same time—but by whom is equally uncertain. These instruments, however, contributed greatly to revive a taste for optical investigations; and some of the greatest philosophers of the time, especially Kepler and Des Cartes, successively distinguished themselves in this branch of science, so that some of its most important principles were, ere long, much more accurately ascertained than they had hitherto been, and the phenomena depending upon them more correctly explained. The early part of the seventeenth century, indeed, exhibits one of the busiest periods in the whole history of optical discovery; nor did the almost constant advance

of the science stop till the publication of the *Dioptrics* of Des Cartes in 1637.

Its next distinguished cultivator was James Gregory, Professor of Mathematics, first at St. Andrews, and afterwards at Edinburgh, whose Latin treatise on Optics (entitled "*Optica Promota*") appeared in 1663. It was he, as is well known, who, in this work, published when he was only four-and-twenty, first proposed the reflecting telescope—which, on that account, is often called by his name, although he did not actually construct such an instrument. This was first accomplished, a few years afterwards, by Sir Isaac Newton, whose investigations on the subject of light, in its whole extent, were destined to create, in regard to that department of physics, nearly as complete a change in the opinions of the age as that which he subsequently effected, by the publication of his "*Principia*," in regard to the mechanism of the heavens. By his celebrated experiment of interposing a prism, or triangular bar of glass, in the way of the solar beam, admitted through a small hole into an otherwise darkened chamber, he made it produce on the wall, not a white circle, as it would have done if allowed to pass on without interruption, but an elongated image, or spectrum, as he called it, displaying a series of seven different colours, namely, red, orange, yellow, green, blue, indigo, and violet—hence often spoken of as the seven prismatic colours. This phenomenon proved the hitherto unsuspected facts, first, that white or common light is, in reality, composed of seven different species of rays; and, secondly, that each of these several rays is refrangible in a different degree from the others, that is to say, that, on passing into a new medium, they do not proceed together in one direction, but each, starting from the common point of entrance, takes a separate course of its own, so that the beam spreads out into the resemblance of a fan. This is called the divergence, or *dispersion*, of the rays of light; and, from some other experiments which Newton made, he was induced to believe that whatever transparent substances or media *refracted* a beam of light in the same degree, or, in other words, changed in the same degree its general direction, were also equal in their *dispersive* powers, or made the different rays separate from one another to the same extent. From this followed a very important consequence. The magnifying powers of the common telescope depended entirely upon the refraction of the light in its passage through the several lenses; but it could not undergo this operation without the rays being at the same time dispersed; and this necessarily threw a certain indistinctness over the image which such telescopes presented to the eye. Here therefore was, apparently, a defect in the refracting telescope which admitted of no cure; for the dispersive, bearing the same relation in all substances to the refractive power, you could not obtain the requisite refraction without its inseparable companion, the same amount of dispersion. It

was this consideration which made Newton give up all thoughts of improving the refracting telescope, and apply himself, as Gregory had done, to the construction of one which should present its image, not by refracting, but by reflecting, the light from the object.

This rapid sketch of the progress made in the improvement of the telescope up to the beginning of the eighteenth century will be sufficient to enable the unscientific reader to understand the general nature and importance of a very happy discovery, which, since that time, has greatly improved that instrument, and of the author of which, one of the most remarkable examples of self-educated men, we are now about to give some account.

JOHN DOLLOND was born, in Spitalfields, on the 10th of June, 1706. His parents had come to this country from Normandy, on the revocation of the Edict of Nantes, in 1685; and, along with many thousands more of their countrymen, had established themselves in the above-named district of the English metropolis in their original business of silk-weavers. Dollond's earliest years, also, were spent at the loom; and it had become the more necessary that he should apply himself to his trade with his utmost industry, in consequence of his father having died while he was yet an infant. Even during his boyhood, however, we are told, he began to show an inclination for the study of mathematics; and before he was fifteen he used to amuse himself, during what little leisure he could command, in constructing sun-dials and solving geometrical problems, although at this time he had scarcely had an opportunity of looking into any book on these subjects. These early habits of study he continued as he grew up towards manhood; so that, notwithstanding the disadvantages under which he laboured, he had, ere long, accumulated a considerable store of learning on his favourite subject of inquiry. He married early, and an increasing family forced him to make still more unremitting exertions for their support—so that, although he seems now to have become a master manufacturer, he had still less time for private study than ever. But the leisure which business deprived him of during the day, he procured for himself, as many other ardent students have done, by stealing it from the hours usually allotted to sleep. In this manner he continued to improve himself in geometry and algebra: after which he applied himself to different branches of natural philosophy, and with especial ardour, it is recorded, to the kindred departments of astronomy and optics. But Dollond's studies at this time were not confined even to what is commonly called science. He found time to attain a competent knowledge of anatomy, to read a great deal of divinity, and even, without any instructor, to make himself so far master of the Greek and Latin languages as to enable himself to translate the New Testament from the one into the other. His studious reading, indeed, extended over many more subjects than we have here

enumerated, and an excellent memory kept its hold of an unusually large portion of whatever he read.

Such a man was destined for something above the handicraft to which he had been bred. Dollond, however, pursuing all the while his solitary studies, continued in his original business even for some years after his eldest son Peter was come to an age to join him in it. But Peter had also been his father's associate in his philosophical inquiries and experiments; and the tastes, as well as the knowledge, which he had thus acquired, naturally made him feel ambitious of entering upon some other line of exertion, in which his talents and attainments might find a more appropriate employment than his father's business afforded. So, after having been for some time in partnership with his father, he determined to set up on his own account as an optician. He was at this time only about twenty years of age, and does not appear to have received any other instructions in the art he had resolved to follow than those which his father had given him. But his ingenuity, skill, and diligence, were speedily crowned with the success they deserved. So great was the encouragement he received, indeed, that after a short while it was arranged that his father should join him; and, accordingly, in the year 1752, John Dollond gave up his old business of a silk-manufacturer, and entered again into partnership with his son as an optician.

Being now free to devote his whole attention to the art, and the sciences connected with it, which had for so many years occupied his scanty leisure, he was not long in displaying the powers of his cultivated and inventive genius by various improvements on the instruments which he fabricated. Of these, however, we shall only notice the one from which his name derives its chief distinction.

We have stated above the conclusion to which Newton had arrived in regard to the dispersive power of different substances, namely, that it always bore a certain relation to the refractive power; and the inference which he thence drew as to the impossibility of improving the common or refracting telescope. In consequence of this decision of Newton, the attention of the students of optical science was, for a considerable time after, principally directed to the simplification of the reflecting telescope. But this instrument, especially when constructed of a large size, was attended with many inconveniences in the management, and, from the difficulty of keeping the mirrors clean, was extremely liable to get out of order. The reflected light, besides, was never so strong as that obtained by refraction. Notwithstanding, therefore, the coloured fringe in the image formed by the refracting telescope, that instrument still continued to be generally used for ordinary purposes. At length the distinguished mathematician, Euler, undiscouraged by the circumstance which had made Newton give up the same task in despair, resolved once more to make some attempt to correct the peculiar imperfection which

had hitherto attached to it. He began his experiments about the year 1747; but, after continuing them for several years, he failed in obtaining any success. He published, however, several speculations upon the subject in the "Berlin Memoirs," which excited very general interest in the scientific world. In these papers he announced and proceeded upon a certain law with regard to the relation between the refractive and dispersive powers; and it was on the subject of this assumed principle of calculation that he was first opposed by Dollond. The ground which the English optician took was, that Euler's asserted law was irreconcilable with one of the experiments recorded by Newton—as in truth it was; but the experiment in question, and Dollond's inference from it, Euler attempted to show were alike inadmissible, on considerations which appeared to him to demonstrate the self-contradiction to which they led. Dollond's paper, with Euler's reply, appeared in the "Philosophical Transactions," for 1752; so that the controversy must have been commenced by Dollond some time before he set up as a regular optician.

It was some years after this that the Swedish mathematician, Klingentierna, in a paper which he sent to the French Academy of Sciences, demonstrated on purely geometrical considerations the inadmissibility of the law which Dollond had deduced from the experiment made by Newton. Dollond, who had not been convinced by Euler's calculations, could not resist this new proof of the incorrectness of the principle which he had hitherto advocated; but, as it was a direct consequence, and acknowledged by all to be so, of what Newton had stated as the result of his experiment, it followed of course, that this great observer had, for once, deceived himself; and that the only way to determine the point was to have recourse again to the fountain head of all philosophy, the testimony of Nature. It is a striking evidence of the habitual reverence felt for Newton's accuracy, that, during all the time this dispute had been carried on, no one had till now ventured upon the task of following his footsteps over this intricate ground, and so tracing out where he had erred. This, however, Dollond at last attempted to do; and, having begun his experiments in the year 1757, he prosecuted them in the spirit, as he says himself, of "a resolute perseverance;" till at length, after he had devoted nearly all his time to that one object for about a year and a half, in June, 1758, he found himself in a condition to lay before the Royal Society, as the result of his investigations, a new discovery of the most interesting nature. The experiments which he had made had refuted, not only the law which he had himself advanced with regard to the relation between the refractive and dispersive powers, but also, and as completely, that which had been propounded by his opponent. Both these deductions had been equally founded on the assumption, sanctioned by the authority of Newton, that these two powers actually did always bear a certain relation to each other; but Dollond

had now discovered that the amount of the one was, in fact, altogether independent of that of the other—that where two substances, in other words, had the same, or nearly the same, refracting power, their powers of dispersion might nevertheless be widely different; and conversely. Crown-glass and flint-glass, for instance, he found to differ very slightly in their power of refracting, or turning aside from its original course the entire beam of light which entered them from another medium; while, in dispersing the several rays of which it was composed, or, to repeat the figure we have already used, spreading them out into a fan, the former produced only two-thirds of the effect produced by the latter, so that when the rays were allowed to arrange themselves in a coloured spectrum, that image was in the one case a third longer than it was in the other.

The discovery of this hitherto unsuspected principle gave a new aspect to the whole subject of refraction, and at once pointed out the method to be adopted in order to remedy the great defect of the refracting telescope. To retain the requisite degree of refraction, and at the same time to get rid of the dispersion of the rays, it was necessary only to form the lens of two different glasses, or other transparent substances, so arranged that the dispersive powers of the one should counteract those of the other, while the refraction, or at least a sufficient amount of it, remained undestroyed. There were many experiments, it is true, to be made, before the idea thus suggested could be practically realized; but the perseverance and ingenuity of the same mind which had discovered the principle, at length succeeded also in triumphing over the difficulties that lay in the way of its application. Dollond was not long in producing refracting telescopes which presented images retaining scarcely a perceptible remnant of that coloured border always existing in the old instruments. When the successful result of his attempts was first reported abroad, many of the continental mathematicians refused for some time to give credit to his alleged discovery; and Euler, in particular, was still so prepossessed in favour of his own hypothesis, which the new doctrine overthrew, that he continued for several years to hold that the greater distinctness of the image in Dollond's telescopes, arose from some other cause than the correction of the unequal refrangibility of the differently coloured rays. This illustrious philosopher, however, at last became convinced of his error, and frankly acknowledged it.

For this great discovery the Royal Society presented Dollond with the Copley Medal. The new telescope, to which the name of *Achromatic* (or Colourless) has been given, was afterwards considerably improved by its inventor; and has, since his time, been brought by others to still greater perfection. Meantime it spread the fame of the English optician over Europe, and gave him at once a high rank among the philosophers of his age. In 1761 he was elected a fellow of the Royal Society, and

appointed optician to his Majesty. But he did not live long to enjoy these honours. On the 30th of November, in the same year, while absorbed in the study of a newly-published mathematical disquisition, he was suddenly struck with apoplexy, and died in a few hours. His son, who had been so long associated with him, carried on the business for many years, in such a manner as fully to sustain the reputation of the establishment, and it still subsists in his family.

The mention of Dollond naturally recalls the name of another of the most eminent of our English opticians, the late MR. JESSE RAMSDEN, who, in like manner, was not originally bred to the profession which he followed with such distinguished success. Ramsden was born in 1735, at Salterhebble, near Halifax, where his father kept an inn. The education he received in his boyhood embraced both a little Latin and the elements of geometry and algebra. But, when he was of the usual age for being put to a business, his father took him from school, and bound him apprentice to a clothier in Halifax; and in this line he continued till he reached his twentieth year, when he came up to London, and obtained employment as a clerk in a wholesale warehouse. He held this situation for about two years and a half; but in the meantime he had industriously availed himself of what leisure he could command to renew and extend his acquaintance with science; and so enamoured did he gradually become of these pursuits, that he at last resolved to make an effort to establish himself in some line more closely connected with his favourite studies than that which he had heretofore followed. With this view, notwithstanding that he was now so far beyond the age at which the learning of a business is usually begun, he bound himself apprentice for four years to Mr. Burton, of Denmark court, a mathematical instrument maker. On the expiration of this term, he and a fellow-workman of the name of Cole entered into business together, Ramsden serving the other as journeyman at a salary of twelve shillings per week. This connection, however, did not last long; and on its termination Ramsden opened a shop of his own. His chief employment for some time consisted in repairing optical and other mathematical instruments which had got out of order; and in this the industry and ability he displayed soon brought him into notice, and procured him a rapidly increasing business. But he did not rest satisfied with merely performing in a superior manner such work as he undertook of this description; the different instruments which passed through his hands forcibly attracted his attention to the imperfections by which they were severally characterised, and called his powers of contrivance into exercise in devising how they might be improved. In order to accomplish himself the more completely for this task, he laboured assiduously till he acquired, entirely by his own application, the art of grinding glass, and of handling the file, the lathe, and the other instruments used by opticians. Thus furnished with the practical skill and

dexterity requisite to enable him to apply his ingenuity and mathematical knowledge, he proceeded to enter upon a regular and comprehensive examination of all the different optical instruments in use, with a view to the remedying of their several defects.

This resolution, and the perseverance with which it was followed up, eventually made Ramsden one of the greatest optical mechanics, that any country has produced. The list of the instruments which are indebted to him for the most ingenious and valuable improvements embraces nearly all those of greatest importance and most common use in astronomy and the connected sciences. Hadley's quadrant, the sextant, the theodolite, the barometer, the transit instrument, and many others too numerous to specify, all came out of his hands, it might almost be said, with new powers, and certainly, at all events, with much more in every case than they before possessed, both of manageableness and of accuracy. In this last respect, especially, the instruments constructed by him far surpassed any that had before been known; and they were indebted for much of their superiority to a new dividing or graduating engine which he had contrived, the principle of which was extremely ingenious. It consisted essentially of a marker moving forward by the turning of a very fine-threaded screw. It is easy to make a screw with a hundred turns of the thread in an inch; and by attaching to it a handle or index of sufficient length, so that the extremity may be over a properly divided circle of considerable magnitude, the movement of such a screw may be regulated with perfect precision to the thousandth part of one of its entire revolutions. Now, as by such a revolution it would only advance the marker the hundredth part of an inch, it is evident that, by being turned only the thousandth part of an entire revolution every time the marker is allowed to descend and make an impression upon the plate of metal or other surface to be divided, a hundred thousand equidistant lines may actually be drawn upon every inch of that surface. For this most useful contrivance the Board of Longitude awarded him a premium of 615*l.*, and in return he engaged to graduate whatever sextants were put into his hands for that purpose, at the rate of three shillings a piece. His engine, indeed, enabled him to perform the operation in about twenty minutes, whereas it had been wont to occupy many hours.* But the additional accuracy which was given to the instrument to which it was applied by the new method was of still greater importance than its comparative expedition and cheapness. Hadley's quadrant, for instance, used to be so coarsely divided, and in other respects so defectively made, before it received Ramsden's improvements, that, in endeavouring to ascertain the longitude by it, the obser-

* See a letter, dated London, 1st September, 1788, from Professor Piazzi, of Palermo, to M. de Lalande, containing an account of Ramsden, in the "Journal des Savans" for Novem-

ber of that year. There is a translation of this letter, with a few notes, in vol. xvi. of Tilloch's "Philosophical Magazine."

vation might in some cases lead to an error of fifty leagues; but Ramsden constructed it in so superior a manner, that even his commonest instruments did not admit of an error being fallen into of more than the tenth part of that amount, and with those of a more expensive description accuracy was insured in all cases to within a single league.

Soon after he commenced business, Ramsden married Miss Dollond, daughter of the inventor of the achromatic telescope, part of the patent for which came in this way into his possession. In 1786 he was elected a Fellow of the Royal Society, having been proposed by his friends without his knowledge, after his diffidence in his claims to such a distinction had made him long withhold his consent to their taking that step. In 1794 he was chosen a member of the Imperial Academy of Sciences at Petersburg; and in 1795 the Royal Society awarded him the gold medal annually bestowed by them for eminence in science.

The Reverend Lewis Dutens, the author of the "Researches on the Origin of Discoveries," who was intimately acquainted with Ramsden, has given us an account of his friend, which contains some interesting particulars of his character and habits. After noticing his great activity, the uncommon force of his reasoning powers, and the accurate and retentive memory with which he was endowed, the writer proceeds to remark, that perhaps, after all, the most distinguishing quality of his mind was a certain elegance, and taste for precision and high finish, which appeared not more in the instruments he manufactured than in everything he did. "This feeling for perfection," Mr. Dutens goes on to say, "led him, in the most minute and insignificant parts of his instruments, to a polish and grace, which sometimes tempted those to smile who did not perceive that the same principle which enabled him to carry the essential parts of his instruments to a degree of perfection unknown, and considered as impossible, before his time, induced him to be dissatisfied if a blemish of any sort, even the most trifling, appeared to his exquisite eye. To these uncommonly strong natural endowments he added all that the most constant and intense study could bestow. Temperate to abstemiousness in his diet, satisfied with an extremely small portion of sleep, unacquainted with dissipation or amusement, and giving but very little time even to the society of his friends, the whole of those hours which he could spare from the duties of his profession were devoted either to meditation on further improvements of philosophical instruments, or to the perusal of books of science, particularly those mathematical works of the most sublime writers which had any connection with the subjects of his own pursuits. Mr. Ramsden's only relaxation from these constant and severe studies was the occasional perusal of the best authors both in prose and verse; and, when it is recollected that at an advanced age he made himself so completely master of the French language as to read with peculiar pleasure the

works of Boileau and Molière, he will not be accused of trifling even in his lighter hours. Short and temperate as were his repasts, a book or a pen were the constant companions of his meals, and not seldom brought on a forgetfulness of hunger; and, when illness broke his sleep, a lamp and a book were ever in readiness to beguile the sense of pain, and make bodily sickness minister to the progress of his mind. Of the extent of his mathematical knowledge he was always from innate modesty averse to speak, although I have heard him say that he never was at a loss when his profession required the application of geometry. His knowledge in the science of optics is well known to have been perfect; and, when we add that the works of Bouguer and the great Leonard Euler were his favourite study, we shall not lightly rate his proficiency in mathematics. Of his skill in mechanics it is unnecessary to speak. Nor let it be supposed that his science in this profession was limited to the higher branch of invention and direction of the labours of others. It is a well-known fact, that such was his own manual dexterity, that there was not any one tool, in any of the numerous branches of his profession, which he could not use with a degree of perfection at least equal to that of the very best workman in that particular branch; and it is no exaggeration to assert that he could with his own hands have begun and finished every single part of his most complicated instruments. It may not be foreign to this part of his character to observe, that his drawings were singularly neat and accurate, and his handwriting so beautiful, that when he chose to exert his skill few writing-masters could equal it."

In order to insure that perfect accuracy which it was his object to give to every instrument he sold, Ramsden had all the parts of the work done under his own inspection; and for this purpose he kept men of every necessary branch of trade in his establishment. He availed himself also to the utmost of the advantages to be derived from the division of labour—allotting to every workman his particular department, from which he was never called away to another. He employed about sixty men in all; but such was his reputation over all Europe, and so numerous were the orders he received, that even with this large establishment he found it impossible to execute them with the requisite expedition. About this, indeed, he did not give himself much trouble; what alone he cared for was, that every instrument which bore his name should be worthy of his reputation, no matter what time or pains it should cost to make it so. No man was ever more nobly indifferent to the mere pecuniary gains of his art. If he had been anxious to enrich himself, he might have easily accumulated a large fortune; but for that object he would have had to enlarge his already extensive establishment so much further, that his personal superintendence of every part of it would have been impossible. So far was he from being influenced by

any views of this kind, that it is asserted he never executed any one of the many great works for which he received commissions from public bodies, both in his own and other countries, without being a loser by it as a tradesman. When an instrument did not answer his expectations, he never hesitated to take it to pieces, or to destroy it, whatever had been the cost bestowed upon its construction. Admirable as all his instruments were, too, for their accuracy, their high finish, their durability, and all the other qualities that make up the excellence of such productions, he generally put a less price upon them—in some cases a much less price—than was charged for inferior works of the same kind by other artists. The making of money was a very subordinate object with a mind so much elevated above the motives by which men are ordinarily governed, and sustained in a purer and freer atmosphere of its own by the love of science and philosophy.

Mr. Ramsden died on the 5th of November, 1800, at Brighton, to which place he had gone a short time before with the view of recovering his health, which, never vigorous, had latterly been greatly impaired by his unremitting exertions. He died possessed of only a small fortune; and, in the spirit in which he had lived, he left the greater part of it to be divided among his workmen, in proportion to their merits and their length of service.

One of the very greatest names in the modern history of astronomical discovery is that of the late illustrious SIR WILLIAM HERSCHEL; and he



SIR W. HERSCHEL.

also was self-instructed in the science in which he earned his high reputation. Herschel was born at Hanover, in 1738, and was the son of a

musician in humble circumstances. Brought up, as well as his three brothers, to his father's profession, for which it has been said that he qualified himself without much teaching, he was placed, at the age of fourteen, in the band of the Hanoverian Guards. A detachment of this regiment having been ordered to England, in the year 1757 (or, according to another account, in 1759), he and his father accompanied it; but the latter returned to Germany in the course of a few months, and left his son, in conformity with his own wish, to try his fortune in London. For a long time the young man had to struggle with many difficulties; and he passed several years principally in giving lessons in music to private pupils in the different towns of the north of England. At last, in 1765, through the interest of a gentleman to whom his merits had become known, he obtained the situation of organist at Halifax; and next year, having gone to fulfil a short engagement at Bath, he gave so much satisfaction by his performances, that he was appointed to the same office in the Octagon Chapel of that city; upon which he went to reside there. The place which he now held was one of some value; and, from the opportunities which he enjoyed, besides, of adding to its emoluments by engagements at the rooms, the theatre, and private concerts, as well as by taking pupils, he had the certain prospect of deriving a good income from his profession, if he had made that his only or his chief object.

But long before this his active and aspiring mind had begun to direct its attention to other pursuits offering a wider scope for the exercise of his talents. While yet only an itinerant teacher of his art in country towns, Herschel had assiduously devoted his leisure, not only to the making himself more completely master of the language of his adopted country, but also to the acquiring of a knowledge of the Italian, the Latin, and even the elements of the Greek. At this time, probably, he looked to these attainments principally with a view to the advantage he might derive from them in the prosecution of his professional studies; and it was no doubt with this view also that he afterwards applied himself to the perusal of Dr. Robert Smith's "Treatise on Harmonics," one of the most profound works on the science of music which then existed in the English language. But the acquaintance he formed with this work was destined ere long to change altogether the character of his pursuits. He soon found that it was necessary to make himself a mathematician, before he could make much progress in following Dr. Smith's demonstrations. He now, therefore, turned with his characteristic alacrity and resolution to the new study to which his attention was thus directed; and it was not long before he became so attached to it, that almost all the other pursuits of his leisure hours were laid aside for its sake.

During his residence at Bath, although greatly occupied with profes-

sional engagements, the time he devoted to his mathematical studies was rather increased than diminished. Often, we are told, after a fatiguing day's work of fourteen or sixteen hours among his pupils he would, on returning home at night, repair for relaxation to what many would deem these severer exercises. In this manner, in course of time, he attained a competent knowledge of geometry, and found himself in a condition to proceed to the study of the different branches of physical science which depend upon mathematics. Among the first of these latter that attracted his attention were the kindred departments of astronomy and optics. It has been stated (by Lalande, in his continuation of Montucla's "*Histoire des Mathématiques*," iii. 502), that Herschel's first attempts in the fabrication of magnifying-glasses were occasioned by his reading something upon that subject in a copy of Smith's "*Optics*," which accidentally fell in his way; but this story is perhaps nothing more than a version of the fact already mentioned, that his acquaintance with mathematics began in his study of the "*Treatise on Harmonics*," by the writer in question. Another account of the matter, which has been given (in the "*Annual Biography*," vol. vii.), is, that, having in the course of his philosophical studies applied himself to the sciences of optics and astronomy, he became desirous of beholding with his own eyes those wonders of the heavens of which he read so much, and for that purpose borrowed from an acquaintance a two-foot Gregorian telescope. This instrument interested him so greatly, that he determined to procure one of his own, and commissioned a friend in London to purchase one for him, of a somewhat larger size. But he found the price was beyond what he could afford. To make up for this disappointment, he resolved to attempt to construct a telescope for himself; and, after encountering innumerable difficulties in the progress of his task, he at last succeeded, in the year 1774, in completing a five-foot Newtonian reflector. This was the beginning of a long and brilliant course of triumphs in the same walk of art, and also in that of astronomical discovery.

Herschel now became so much more ardently attached to his philosophical pursuits, that, regardless of the sacrifice of emolument he was making, he began gradually to limit his professional engagements and the number of his pupils. Meanwhile he continued to employ his leisure in the fabrication of still more powerful instruments than the one he had first constructed; and in no long time he produced telescopes of seven, ten, and even twenty feet focal distance. In fashioning the mirrors for these instruments his perseverance was indefatigable. For his seven-feet reflector, it is asserted that he actually finished and made trial of no fewer than two hundred mirrors before he found one that satisfied him. When he sat down to prepare a mirror, his practice was to work at it for twelve or fourteen hours, without quitting his occupa-

tion for a moment. He would not even take his hand from what he was about to help himself to food; and the little that he ate on such occasions was put into his mouth by his sister. He gave the mirror its proper shape more by a certain natural tact than by rule; and when his hand was once in, as the phrase is, he was afraid the perfection of the finish might be impaired by the least intermission of his labours.

It was on the 13th of March, 1781, that Herschel made the discovery to which he owes, perhaps, most of his popular reputation. He had been engaged for nearly a year and a half in making a regular survey of the heavens, when, on the evening of the day that has been mentioned, having turned his telescope (an excellent seven-feet reflector, of his own constructing) to a particular part of the sky, he observed among the other stars one which seemed to shine with a more steady radiance than those around it; and, on account of that and some other peculiarities in its appearance, which excited his suspicions, he determined to observe it more narrowly. On reverting to it after some hours he was a good deal surprised to find that it had perceptibly changed its place—a fact which, the next day, became still more indisputable. At first he was somewhat in doubt whether or not it was the same star which he had seen on these different occasions; but, after continuing his observations for a few days longer, all uncertainty upon that head vanished. He now communicated what he had observed to the Astronomer Royal, Dr. Maskelyne, who concluded that the luminary could be nothing else than a new comet. Continued observation of it, however, for a few months, dissipated this error; and it became evident that it was, in reality, a hitherto undiscovered planet. This new world, so unexpectedly found to form a part of the system to which our own belongs, received from Herschel the name of the *Georgium Sidus*, or Georgian Star, in honour of the King of England; but by continental astronomers it has been more generally called either *Herschel*, after its discoverer, or *Uranus*. Subsequent observations, made chiefly by Herschel himself, have ascertained many particulars regarding it, some of which are well calculated to fill us with astonishment at the powers of the sublime science which can wing its way so far into the immensity of space, and bring us back information so precise and various. The diameter of this new globe has been found to be nearly four and a half times larger than that of our own. Its size altogether is about eighty times that of our earth. Its year is as long as eighty-three of ours. Its distance from the sun is nearly eighteen hundred millions of miles, or more than nineteen times that of the earth. Its density, as compared with that of the earth, is nearly as twenty-two to one hundred; so that its entire weight is not far from eighteen times that of our planet. Finally, the force of gravitation near its surface is such, that falling bodies descend only through fourteen feet during the first second, instead

of thirty-two feet, as with us. Herschel afterwards discovered, successively, no fewer than six satellites, or moons, belonging to his new planet.

The announcement of the discovery of the *Georgium Sidus* at once made Herschel's name universally known. In the course of a few months the king bestowed upon him a pension of three hundred a year, that he might be enabled entirely to relinquish his engagements at Bath; and upon this he came to reside at Slough, near Windsor. He now devoted himself entirely to science; and the constructing of telescopes, and the observation of the heavens, continued to form the occupations of the remainder of his life. Astronomy is indebted to him for many other most interesting discoveries beside the celebrated one which we have just noticed, as well as for a variety of speculations of the most ingenious, original, and profound character. But of these we cannot here attempt any detail. He also introduced some important improvements into the construction of the reflecting telescope—besides continuing to fabricate that instrument of dimensions greatly exceeding any that had been formerly attempted, and with powers surpassing, in nearly a corresponding degree, what had ever before been obtained. The largest telescope which he ever made was his famous one of forty feet long, which he erected at Slough, for the king. It was begun about the end of the year 1785, and on the 28th of August, 1789, the enormous tube was poised on the complicated but ingeniously contrived mechanism by which its movements were to be regulated, and ready for use. On the same day a new satellite of Saturn was detected by it, being the sixth which had been observed attendant upon that planet. A seventh was afterwards discovered by means of the same instrument. This telescope has since been taken down, and replaced by another of only half the length, constructed by Sir John Herschel, the distinguished son of the subject of our present sketch. Herschel himself eventually became convinced that no telescope could surpass in magnifying power one of from twenty to twenty-five feet in length. The French astronomer, Lalande, in his continuation of Montucla's "*Histoire des Mathématiques*," states, that he was informed by George III. himself, that it was at his desire that Herschel was induced to make the telescope at Slough of the extraordinary length he did, his own wish being that it should not be more than thirty feet long.

So extraordinary was the ardour of this great astronomer in the study of his favourite science, that for many years, it has been asserted, he never was in bed at any hour during which the stars were visible. And he made almost all his observations, whatever was the season of the year, not under cover, but in his garden, and in the open air, and generally without an attendant. There was much that was altogether peculiar to himself, not only in the process by which he fabricated his telescopes, but also in his manner of using them. One of the attendants in the

king's observatory at Richmond, who had formerly been a workman in Ramsden's establishment, was forcibly reminded, on seeing Herschel take an observation, of a remark which his old master had made. Having just completed one of his best telescopes, Ramsden, addressing himself to his workmen, said, "This, I believe, is the highest degree of perfection that we opticians by profession will ever arrive at; if any improvement of importance shall ever after this be introduced in the making of telescopes, it will be by some one who has not been taught his art by us."

Some years before his death the degree of Doctor of Civil Law was conferred upon Herschel by the University of Oxford; and in 1816 George IV., then Prince Regent, bestowed upon him the Hanoverian and Guelphic Order of Knighthood. He died on the 23rd of August, 1822, when he was within a few months of having completed his eighty-fourth year.

To this distinguished name, and those of Dollond and Ramsden, it would be easy, if our space permitted, to add those of many other self-taught cultivators of the same departments of science. Among more recent opticians, no one has attained a higher eminence, either as an artist or as a scientific experimentalist and speculator, than **FRAUNHOFER**, late superintendent of the establishment for the manufacture of optical glasses at Munich, who rose from the condition of a common workman. Of astronomical observers, again, some might also be mentioned who have been of very humble station. There is a print—a copy of which may be seen in the rooms of the Astronomical Society—of two very remarkable individuals who were employed during a considerable part of the last century in the Earl of Macclesfield's observatory at Sherburn. The elder of these, as the inscription below the engraving informs us, was named **THOMAS PHELPS**, and he, it is stated, "from being a stable-boy, in the year 1718, to the then Lord Chief Justice Parker, afterwards Earl of Macclesfield, rose by his merit to the upper employments in the family, and at last, for his uncommon genius, was promoted to be Observer in the observatory at Sherburn Castle." Phelps, it is added, was born at Chalgrove, in Oxfordshire, in January, 1694, and was in his eighty-second year when his portrait was taken. The other, **JOHN BARTLETT**, is described as having been "originally a shepherd, in which station he, by books and observation, acquired such a knowledge in computation, and of the heavenly bodies, as induced the late George, Earl of Macclesfield, to appoint him Assistant Observer in his observatory at Sherburn Castle." Bartlett was born at Stoke Talmage, in Oxfordshire, August 22, 1721, o. s., and was in his fifty-fourth year at the time his picture was taken. In the print Phelps is represented as standing looking through a telescope, while Bartlett is sitting by him with his tablets, or a sheet of paper, in the one hand, and a pen in the other, ready, seemingly, to note down what his associate may announce.

There is a penetrating eagerness and sagacity in the eye and general aspect of the old man ; and that of the other is also a striking head, with a less keen and vivacious physiognomy than Phelps, but more massive, and indicating, perhaps, more of a meditator and calculating mind. In a manuscript note on the back of the copy of this print, which belongs to the Astronomical Society, it is stated that "Phelps was the person who, on the 23rd of December, 1743, discovered the great comet, and made the first observation of it; an account of which is contained in the 'Philosophical Transactions,' but not the name of the observer." The comet of 1758, so famous in consequence of its return having been predicted more than half a century before by the great astronomer Halley, was also, it may be remarked, first perceived by an observer in an humble rank of life. It was on the 25th of December in that year that the luminary in question was detected with only the naked eye, at Prohlis, near Dresden, by a Saxon peasant of the name of PALITZCH, at a time when all the greatest astronomers in Europe were seeking for it in vain with their telescopes. Nor did Palitzch owe his discovery merely to his superior powers of vision. This Saxon peasant was really an astronomer. "George Palitzch," says Lalande, "born in the obscure condition of a common labourer, had succeeded both in finding happiness in his humble lot, and in acquiring various branches of knowledge which are rarely found possessed by men of higher stations who have had the advantage of a careful education. More in the way of being struck with the spectacle of the heavens than if he had lived in a town, he had, by his own efforts, studied and made himself master of astronomy, as well as those parts of geometry, such as plain and spherical trigonometry, upon which it depends. By the exertion of a meritorious economy he had formed for himself an observatory, furnished with the instruments most important for the pursuit of his favourite study. Few opportunities of making interesting observations escaped him; and notwithstanding this his occupations as an agriculturist were duly attended to. Natural History and Botany were also among the studies in which he took great delight; and he had a very well arranged cabinet of natural productions, as well as a garden full of rare plants, which he carefully cultivated. He was distinguished by such exceeding modesty, that he always refused even to give any details of his life, notwithstanding they must have been so full of interest. Such was the astronomer and philosopher Palitzch, to whom was reserved the honour of being the first of all the astronomers of Europe in the discovery of the return of this anxiously expected comet." Palitzch, we may add, who was born in 1723, continued to cultivate astronomy, as well as his garden and his fields, for many years after this event, and died at last in his native village in 1788. He had been for some time a corresponding member both of the Royal Society of London and of the Imperial Academy of St. Petersburg.

CHAPTER XXXVII.

DISCOVERY AND IMPROVEMENT OF THE STEAM-ENGINE:—

JAMES WATT.

ALL the inventions and improvements of recent times, if measured by their effects upon the condition of society, sink into insignificance when compared with the extraordinary results which have followed the employment of steam as a mechanical agent; and the merit and honour of having first rendered it extensively available for that purpose are pre-eminently due to one individual, the illustrious JAMES WATT. The force of steam, now so important an agent in mechanics, was nearly altogether overlooked until within the last two centuries. The only application of it which appears to have been made by the ancients was in the construction of the instrument which they called the *Æolipile*, that is, the Ball of *Æolus*. The *Æolipile* consisted of a hollow globe of metal, with a long neck, terminating in a very small orifice, which, being filled with water and placed on a fire, exhibited the steam, as it was generated by the heat, rushing with apparently great force through the narrow opening. A common tea-kettle, in fact, is a sort of *Æolipile*. The only use which it was proposed to make of this contrivance was to apply the current of steam, as it issued from the spout, by way of a moving force—to propel, for instance, the vans of a mill, or, by acting immediately upon the air, to generate a movement opposite to its own direction. But it was impossible that any useful purpose should have been effected by such methods of employing steam. Steam depends so entirely for its existence in the state of vapour upon the presence of a large quantity of heat, that it is reduced to a mist or a fluid almost immediately on coming into contact either with the atmosphere, or anything else which is colder than itself; and in this condition its expansive force is gone. The only way of employing steam with much effect, therefore, is to make it act in a close vessel. The first known writer who alludes to the prodigious energy which it exerts when thus confined is the French engineer Solomon de Caus, who flourished in the beginning of the seventeenth century. This ingenious person, who came to England in 1612 in the train of the Elector Palatine, afterwards the son-in-law of James I., and resided here for some years, published a folio volume at Paris in 1623 on moving forces; in which he states, that, if water be sufficiently heated in a close ball of copper, the air or steam arising from it will at last burst the ball, with a noise like the going-off of a petard. In another place, he actually describes a method of raising water, as he expresses it, by the aid of

fire, which consists in the insertion, in the containing vessel, of a perpendicular tube, reaching nearly to its bottom, through which, he says, all the water will rise when sufficiently heated. The agent here is the steam produced from part of the water by the heat, which acting by its expansive force upon the rest of the water, forces it to make its escape in a jet through the tube.* The supply of water is kept up through a cock in the side of the vessel. Forty years after the publication of the work of De Caus appeared the Marquis of Worcester's famous "Century of Inventions." Of the hundred new discoveries here enumerated, the sixty-eighth is entitled "An admirable and most forcible way to drive up water by fire." As far as may be judged from the vague description which the Marquis gives us of his apparatus, it appears to have been constructed upon the same principle with that formerly proposed by De Caus; but his account of the effect produced is considerably more precise than what we find in the work of his predecessor. "I have seen the water run," says he, "like a constant fountain-stream forty feet high; one vessel of water rarefied by fire driveth up forty of cold water." This language would imply that the Marquis had actually reduced his idea to practice; and if, as he seems to intimate, he made use of a cannon for his boiler, the experiment was probably upon a considerable scale. It is with some justice, therefore, that, notwithstanding the earlier announcements in the work of the French engineer, he is generally regarded as the first person who really constructed a steam-engine.

About twenty years after this, namely, in the year 1683, another of our countrymen, Sir Samuel Morland, appears to have presented a work to the French king, containing, among other projects, a method of employing steam as a mechanic power, which he expressly says he had himself invented the preceding year. The manuscript of this work is now in the British Museum; but it is remarkable that when the work, which is in French, was afterwards published by its author at Paris, in 1685, the passage about the steam-engine was omitted. Sir Samuel Morland's invention, as we find it described in his manuscript treatise, appears to have been merely a repetition of those of his predecessors, De Caus and the Marquis of Worcester; but his statement is curious as being the first in which the immense difference between the space occupied by water in its natural state, and that which it occupies in the state of steam, is numerically designated. The latter, he says, is about two thousand times as great as the former; which is not far from a correct account of the expansive force that steam exerts under the ordinary pressure of the atmosphere. One measure of water, it is found, in

* In the same work De Caus proposes another apparatus for raising water simply by the pressure upon its surface in a close vessel of the air rarefied by the heat of the sun. This process may be often observed taking place on a small scale in what is

called the Fountain Ink-glass, in which, in a warm day or a heated room, the liquid will be forced up sometimes to the very lip of the spout, by the expansion of the superjacent air within the vessel.

such circumstances, will produce above seventeen hundred measures of steam.

The next person whose name occurs in the history of the steam-engine is Denis Papin, who was a native of France, but who, as his predecessor and fellow-countryman De Caus had probably also done, spent the part of his life during which he made his principal pneumatic experiments in England. Up to this time, the reader will observe, the steam had been applied directly to the surface of the water, to raise which, in the form of a jet, by such pressure, appears to have been almost the only object contemplated by the employment of the newly discovered power. It was Papin who first introduced a piston into the tube or cylinder which rose from the boiler. This contrivance, which forms an essential part of the common sucking pump, is merely, as the reader probably knows, a block fitted to any tube or longitudinal cavity, so as to move freely up and down in it, yet without permitting the passage of any other substance between itself and the sides of the tube. To this block a rod is generally fixed; and it may also have a hole driven through it, to be guarded by a valve opening upwards or downwards, according to the object in view (*see p. 332*). Long before the time of Papin it had been proposed to raise weights or heavy bodies of any kind by suspending them to one extremity of a handle or cross-beam, attached at its other end to the rod of a piston moving in this manner in a hollow cylinder, and the descent of which, in order to produce the elevation of the weights, was to be effected by the pressure of the superincumbent atmosphere after the counterbalancing air had been by some means or other withdrawn from below it. Otto Guericke used to exhaust the lower part of the cylinder, in such an apparatus, by means of an air-pump. It appeared to Papin that some other method might be found of effecting this end more expeditiously and with less labour. First he tried to produce the requisite vacuum by the explosion of a small quantity of gunpowder in the bottom of the cylinder, the momentary flame occasioned by which he thought would expel the air through a valve opening upwards in the piston, while the immediate fall of the valve, on the action of the flame being spent, would prevent its reintrusion. But he never was able to effect a very complete vacuum by this method. He then, about the year 1690, bethought him of making use of steam for that purpose. This vapour, De Caus had long ago remarked, was recondensed and restored to the state of water by cold; but up to this time the attention of no person seems to have been awakened to the important advantage that might be taken of this one of its properties. Papin for the first time availed himself of it in his lifting machine, to produce the vacuum he wanted. Introducing a small quantity of water into the bottom of his cylinder, he heated it by a fire underneath, till it boiled and gave forth steam, which, by its powerful expansion, raised the piston from its original position in contact

with the water, to a considerable height above it, even in opposition to the pressure of the atmosphere on its other side. This done, he then removed the fire, on which the steam again became condensed into water, and, occupying now about the seventeen-hundredth part of its former dimensions, left a vacant space through which the piston was carried down by its own gravitation and the pressure of the atmosphere.

The machine thus proposed by Papin was abundantly defective in the subordinate parts of its mechanism, and, unimproved, could not have operated with much effect. But, imperfect as it was, it exemplified two new principles of the highest importance, neither of which appears to have been thought of, in the application of the power of steam, before his time. The first is the communication of the moving force of that agent to bodies upon which it cannot conveniently act directly, by means of the piston and its rod. The second is the deriving of the moving force desired, not from the expansion of steam, but from its other equally valuable property of condensibility by mere exposure to cold. Papin, however, it is curious enough, afterwards abandoned his piston and method of condensation, and reverted to the old plan of making the steam act directly by its expansive force upon the water to be raised. It is doubtful, however, whether he ever actually erected any working-engine upon either of these constructions. Indeed, the improvement of the steam-engine could scarcely be said to have been the principal object of those experiments of his which, nevertheless, contributed so greatly to that result. It was, in fact, as we have seen, with the view of perfecting a machine contrived originally without any reference to the application of steam, that he was first induced to have recourse to the powers of that agent. The moving force with which he set out was the pressure of the atmosphere; and he employed steam merely as a means of enabling that other power to act. Even by such a seemingly subordinate application, however, of the new element, he happily discovered and bequeathed to his successors the secret of some of its most valuable capabilities.

We may here conveniently notice another ingenious contrivance, of essential service in the steam-engine, for which we are also indebted to Papin—we mean the safety-valve. This is merely a lid or stopper, closing an aperture in the boiler, and so loaded as to resist the expansive force of the steam up to a certain point, while at the same time, it must give way and allow free vent to the pent-up element, long before it can have acquired sufficient strength to burst the boiler. The safety-valve, however, was not introduced into the steam-engine either by Papin, or for some years after his time. It was employed by him only in the apparatus still known by the name of his *digestor*, a contrivance for producing a very powerful heat in cookery and chemical preparations by means of highly concentrated steam.

We now come to the engine invented by Captain Savery in 1698.

This gentleman, we are told, having one day drunk a flask of Florence wine at a tavern, afterwards threw the empty flask upon the fire, when he was struck by perceiving that the small quantity of liquid still left in it very soon filled it with steam, under the influence of the heat. Taking it up again while thus full of vapour, he now plunged it, with the mouth downwards, into a basin of cold water, which happened to be on the table, by which means, the steam being instantly concentrated, a vacuum was produced within the flask, into which the water immediately rushed up from the basin. According to another version of the story, it was the accidental circumstance of his immersing a heated tobacco-pipe into water, and perceiving the water immediately rush up through the tube, on the concentration by the cold of the warm and thin air, that first suggested to Savery the important use that might be made of steam, or any other gas expanded by heat, as a means of creating a vacuum. He did not, however, employ steam for this purpose in the same manner that Papin had done. Instead of a piston moving under the pressure of the atmosphere through the vacuum produced by the concentration of the steam, he availed himself of such a vacuum merely to permit the rise of the water into it from the well or mine below, exactly as in the common sucking-pump. Having thus raised the water to the level of the boiler, he afterwards allowed it to flow into another vessel, from whence he sent it to a greater height by the same method which had been many years before employed by the Marquis of Worcester—namely, by making the expansive force of the steam act upon it directly, and so force it up in opposition to its own gravity and the resistance of the atmosphere.

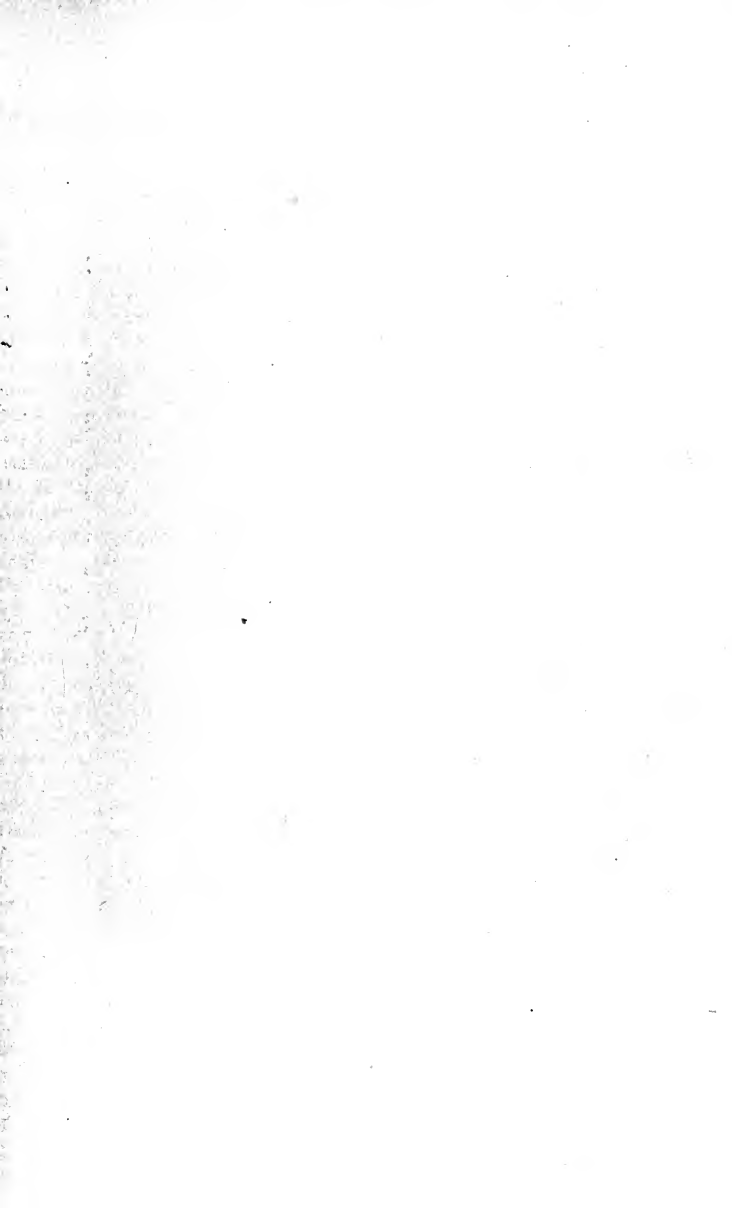
Savery showed much ingenuity and practical skill in contriving means of facilitating and improving the working of the apparatus which he had devised upon these principles; and many of his engines were erected, for supplying gentlemen's houses with water and other purposes, in different parts of the country. The machine also received many improvements after the death of the original inventor. It was considerably simplified, in particular, by Dr. Desaguliers, about the year 1718; and this gentleman also contrived a method of concentrating the steam by the injection of a small current of cold water into the receiver, instead of the old method employed by Savery, of dashing the water over the outside of the vessel, which cooled it to an unnecessary degree, and occasioned, therefore, a wasteful expenditure of fuel. It was Desaguliers who first introduced the safety-valve into the steam-engine, although Papin had previously suggested such an application of the contrivance. Engines upon Savery's principle have continued to be constructed down to our own times; and, as they can be made at a comparatively small expense, they are found to answer very well in situations where water has to be raised only a short way. This engine is, in fact, merely a combination of the common suck-

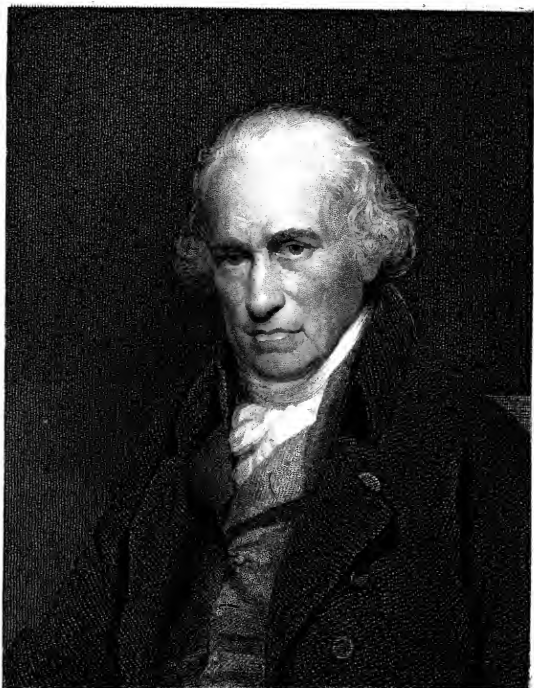
ing-pump (except that the requisite vacuum is produced by the condensation of steam, and without the aid of a piston), with the contrivance proposed by De Caus and the Marquis of Worcester for the application of the expansive force of steam; and, wherever the machine can be economically employed, the former part of it is that which operates with by far the most effect.

Not long after Savery had invented his engine, Thomas Newcomen, an ironmonger, and John Calley, a glazier, both of Dartmouth in Devonshire, began also to direct their attention to the employment of steam as a mechanic power. The first engine was constructed about the year 1711. This contrivance, which is commonly known by the name of Newcomen's engine, proceeded mainly upon the principle formerly adopted by Papin, but subsequently abandoned both by him and those who immediately followed him in the cultivation of this department of mechanics, of making the moving power of the machinery the weight of the atmosphere acting upon a piston, so as to carry it down through a vacuum created by the condensation of the steam. Newcomen's apparatus is, on this account, often distinguished by the name of the atmospheric engine. Its inventors, however, instead of adopting Papin's clumsy method of cooling his steam by the removal of the fire, employed, in the first instance, the expedient of pouring cold water on the containing vessel, as Savery had done before them, though without being aware, it is said, of his prior claim to the improvement. They afterwards exchanged this for the still better method, already described as introduced by Desaguliers into Savery's engine, of injecting a stream of water into the cylinder, which is said to have been suggested to them by the accident of some water having found admission to the steam through a hole which happened to have worn itself in the piston. This engine of Newcomen, which, in the course of a very few years after its invention, was brought to as high a state of perfection as the principle seems to admit of, afforded the first important exemplification of the value of steam in mechanics. Savery's, the only other practical contrivance which had been proposed, had been found quite inadequate to the raising of water from any considerable depth; its principal power, as we have already remarked, lying, in fact, in the part of it which acted as a sucking-pump, and by which, as such, water could only be raised till its column was of equal weight with a column of the atmosphere of the same base. It was nearly useless, therefore, as an apparatus for pumping up water from mines, the grand object for which a moving force of extraordinary power was at this time in demand. But here Newcomen's engine proved of essential service. Many mines that had long remained unwrought were, immediately after its invention, again rendered accessible, and gradually excavated to great depths; while others were opened, and their treasures sought after with equal success, which, but for its

assistance could never have been attempted. It was applied also to various other important purposes.

Newcomen's engine, however, notwithstanding its usefulness, especially in cases where no other known power could be applied, was still in some respects a very defective contrivance, and by no means adapted to secure the complete command of the energies of steam. The great waste of fuel in particular; which was still occasioned by the degree to which the cylinder was cooled after every stroke of the piston, from the cold water injected into it, rendered it scarcely any saving of expense to employ this engine in circumstances where animal power was available. Its whole force too, the reader will observe, as a moving power, was limited to what could be obtained by atmospheric pressure alone; which, even could the vacuum under the piston have been rendered quite perfect, and all obstructions from friction annihilated, could only have amounted to about fifteen pounds for every square inch of the surface of the piston. The expansive force of steam was not, in fact, at all employed in this contrivance as a moving power: could the vacuum necessary to permit the descent of the piston have been as expeditiously and conveniently produced by any other agency, that of steam might have been dispensed with altogether. An air-pump, for instance, attached to the lower part of the cylinder, as originally proposed by Otto Guericke, might have rendered all the service which steam was here called upon to perform; and in that case, this element, with the fuel by which it was generated, might have been dispensed with, and the machine would not have been a steam-engine at all. This view of the matter may in some degree account for the complete neglect of steam as a moving power which so long prevailed after Newcomen's engine was brought into use, notwithstanding the proofs of its capabilities in that character which had been afforded by the attempts of the earlier speculators. It was now regarded simply as supplying the easiest means of obtaining a ready vacuum, in consequence of its property of rapid condensation on the application of cold: its other property of extraordinary expansion, which had first attracted to it the attention of mechanics, and presented in reality a much more obvious application of it as a mechanical agent, had been entirely neglected. The only improvements of the engine which were attempted or thought of, were such as referred to what may be called its subordinate mechanism; that is to say, the contrivances for facilitating the alternate supplies of the steam and the water on which its action depended; and after Mr. Beighton had, about the year 1718, made the machine itself shut and open the cocks by which these supplies were regulated, instead of having that service performed, as at first, by an attendant, there remained little more to be done even in this department. The steam might be applied with more ease and readiness, but not with any augmentation of effect;





Painted by Sir W. Beechey, R.A.

Engraved by T. Wright.

JAMES WATT.

the power of the engine could be increased only by a more plentiful application of atmospheric pressure. It was with propriety, therefore, that Newcomen's invention was called, not a steam, but an atmospheric, engine.

For half a century, accordingly, after the improvements introduced by Beighton, who may be considered as the perfecter of this engine, no further progress worth mentioning was made in the application of steam as an agent in mechanics. The engine itself was more and more extensively employed, notwithstanding its defects; but no better method was proposed of calling into exercise the stupendous powers of the element which, by means of only one of its remarkable properties, was here shown to be capable of rendering such valuable service. Our knowledge of what might be done by steam was in this state when the subject at last happily attracted the attention of Mr. Watt.

JAMES WATT was born at Greenock on the 19th of January, 1736. His father was a merchant, and also one of the magistrates, of that town. He received the rudiments of his education in his native place; but, his health being even then extremely delicate, as it continued to be to the end of his life, his attendance at school was not always very regular. He amply made up, however, for what he had lost in this way by the diligence with which he pursued his studies at home, where without any assistance he succeeded at a very early age in making considerable proficiency in various branches of knowledge. Even at this time his favourite study is said to have been mechanical science, to a love of which he was probably in some degree led by the example of his grandfather and his uncle, both of whom had been teachers of mathematics, and had left a considerable reputation for learning and ability in that department. Young Watt, however, was not indebted to any instructions of theirs for his own acquirements in science, the former having died two years before, and the latter the year after, he was born. At the age of eighteen he was sent to London to be apprenticed to a maker of mathematical instruments; but in little more than a year the state of his health forced him to return to Scotland; and he never received any further instruction in his profession. A year or two after this, however, a visit which he paid to some relations in Glasgow suggested to him the plan of attempting to establish himself in that city in the line for which he had been educated. In 1757, accordingly, he removed thither, but, not being a burgess, was prevented from opening a shop within the limits of the burgh by the Incorporation of Trades; on which he was immediately appointed mathematical instrument maker to the College. In this situation he remained for some years, during which, notwithstanding almost constant ill health, he continued both to prosecute his profession, and to labour in the general cultivation of his mind, with extraordinary ardour and perseverance. Here also he

enjoyed the friendship and intimacy of several distinguished persons who were then members of the University, especially of the celebrated Dr. Black, the discoverer of the principle of latent heat, and Mr. (afterwards Dr.) John Robison, so well known by his treatises on mechanical science, who was then a student and about the same age with himself. Honourable, however, as his present appointment was, and important as were many of the advantages to which it introduced him, he probably did not find it a very lucrative one; and, therefore, in 1763, when about to marry, he removed from his apartments in the University to a house in the city, and entered upon the profession of a general engineer.

For this his genius and scientific attainments admirably qualified him. Accordingly, he soon acquired a high reputation, and was extensively employed in making surveys and estimates for canals, harbours, bridges, and other public works. His advice and assistance indeed were sought for in almost all the important improvements of this description which were now undertaken or proposed in his native country. But another pursuit, in which he had been for some time privately engaged, was destined ere long to withdraw him from this line of exertion, and to occupy his whole mind with an object still more worthy of its extraordinary powers.

While yet residing in the College his attention had been directed to the employment of steam as a mechanical agent by some speculations of his friend Mr. Robison, with regard to the practicability of applying it to the movement of wheel-carriages; and he had also himself made some experiments with Papin's digester, with the view of ascertaining its expansive force. He had not prosecuted the inquiry, however, so far as to have arrived at any determinate result, when in the winter of 1763-4, a small model of Newcomen's engine was sent to him by the Professor of Natural Philosophy to be repaired and fitted for exhibition in the class. The examination of this model set Watt upon thinking anew, and with more interest than ever, on the powers of steam.

The first thing that attracted his attention about the machine before him, the cylinder of which was only two inches diameter, while the piston descended through six inches, was the insufficiency of the boiler, although proportionably a good deal larger than in the working engines, to supply the requisite quantity of steam for the creation of the vacuum. In order to remedy this defect he was obliged, in repairing the model, to diminish the column of water to be raised; in other words, to give the piston less to do, in compensation for its having to descend, not through a perfect vacuum, but in opposition to a considerable residue of undisplaced air. He also soon discovered the reason why in this instance the steam sent up from the boiler was not sufficient to fill the cylinder. In the first place, this containing vessel, being made, not of cast-iron, as in the larger engines, but of brass, abstracted more of the heat from the

steam, and so weakened its expansion; and secondly, it exposed a much larger surface to the steam, in proportion to its capacity, than the cylinders of the larger engines did, and this operated still more strongly to produce the same effect. Led by the former of these considerations, he made some experiments in the first instance with the view of discovering some other material whereof to form the cylinder of the engine which should be less objectionable than either brass or cast-iron; and he proposed to substitute wood, soaked in oil, and baked dry. But his speculations soon took a much wider scope; and, struck with the radical imperfections of the atmospheric engine, he began to turn in his mind to the possibility of employing steam in mechanics in some new manner, which should enable it to operate with much more powerful effect. This idea having got possession of him, he engaged in an extensive course of experiments, for the purpose of ascertaining as many facts as possible with regard to the properties of steam; and the pains he took in this investigation were rewarded with several valuable discoveries. The rapidity with which water evaporates, he found, for instance, depended simply upon the quantity of heat which was made to enter it; and this again on the extent of the surface exposed to the fire. He also ascertained the quantity of coals necessary for the evaporation of any given quantity of water, the heat at which water boils under various pressures, and many other particulars of a similar kind which had never before been accurately determined.

Thus prepared by a competent knowledge of the properties of the agent with which he had to work, he next proceeded to take into consideration, with a view to their amendment, what he deemed the two grand defects of Newcomen's engine. The first of these was the necessity, arising from the method employed to concentrate the steam, of cooling the cylinder, before every stroke of the piston, by the water injected into it. On this account a much more powerful application of heat than would otherwise have been requisite, was demanded for the purpose of again heating that vessel when it was to be refilled with steam. In fact, Watt ascertained that there was thus occasioned, in the feeding of the machine, a waste of not less than three-fourths of the whole fuel employed. If the cylinder, instead of being thus cooled for every stroke of the piston, could be kept permanently hot, a fourth part of the heat which had been hitherto applied would be found to be sufficient to produce steam enough to fill it. How, then, was this desideratum to be attained? De Caus had proposed to effect the condensation of the steam by actually removing the furnace from under the boiler before every stroke of the piston; but this, in a working engine, evidently would have been found quite impracticable. Savery, the first who really constructed a working engine, and whose arrangements, as we have already remarked, all showed a very superior ingenuity, employed

the method of throwing cold water over the outside of the vessel containing the steam—a perfectly manageable process, but at the same time a very wasteful one; inasmuch as, every time it was repeated, it cooled not only the steam, but the vessel also, which, therefore, had again to be heated, by a large expenditure of fuel, before the steam could be reproduced. Newcomen's method of injecting the water into the cylinder was a considerable improvement on this; but it was still objectionable on the same ground, though not to the same degree: it still cooled not only the steam, on which it was desired to produce that effect, but also the cylinder itself, which, as the vessel in which more steam was to be immediately manufactured, it was so important to keep hot. It was also a very serious objection to this last-mentioned plan, that the injected water itself, from the heat of the place into which it was thrown, was very apt to be partly converted into steam; and, the more cold water was used, the more considerable did this creation of new steam become. In fact, in the best of Newcomen's engines, the perfection of the vacuum was so greatly impaired from this cause, that the resistance experienced by the piston in its descent was found to amount to about a fourth part of the whole atmospheric pressure by which it was carried down, or, in other words, the working power of the machine was thereby diminished one-fourth.

After reflecting for some time upon all this, it at last occurred to Watt to consider whether it might not be possible, instead of continuing to condense the steam in the cylinder, to contrive a method of drawing it off, to undergo that operation in some other vessel. This fortunate idea having presented itself to his thoughts, it was not very long before his ingenuity also suggested to him the means of realizing it. In the course of one or two days, according to his own account, he had all the necessary apparatus arranged in his mind. The plan which he devised, indeed, was an extremely simple one, and on that account the more beautiful. He proposed to establish a communication by an open pipe between the cylinder and another vessel, the consequence of which evidently would be, that when the steam was admitted into the former, it would flow into the latter so as to fill it also. If then the portion in this latter vessel only should be subjected to a condensing process, by being brought into contact with cold water, or any other convenient means, what would follow? Why, a vacuum would be produced here—into that, as a vent, more steam would immediately rush from the cylinder—that likewise would be condensed—and so the process would go on till all the steam had left the cylinder, and a perfect vacuum had been effected in that vessel, without so much as a drop of cold water having touched or entered it. The separate vessel alone, or the Condenser, as Watt called it, would be cooled by the water used to condense the steam—and that, instead of being an evil, manifestly tended to promote and quicken the condensa-

tion. When Watt reduced these views to the test of experiment, he found the result to answer his most sanguine expectations. The cylinder, although emptied of its steam for every stroke of the piston as before, was now constantly kept at the same temperature with the steam (or 212° Fahrenheit); and the consequence was, that one-fourth of the fuel formerly required sufficed to feed the engine. But, besides this most important saving in the expense of maintaining the engine, its power was greatly increased by the more perfect vacuum produced by the new construction, in which the condensing water, being no longer admitted within the cylinder, could not, as before, create new steam there while displacing the old. The first method which Watt adopted of cooling the steam in the condenser was to keep that vessel surrounded by cold water—considering it as an objection to the admission of the water into its interior, that it might be difficult in that case to convey it away as fast as it would accumulate. But he found that the condensation was not effected in this manner with so much rapidity as was desirable. It was necessary for him, too, at any rate to employ a pump attached to the condenser, in order to draw off both the small quantity of water deposited by the cooled steam, and the air unavoidably introduced by the same element—either of which, if allowed to accumulate, would have impaired the perfect vacuum necessary to attract the steam from the cylinder. He therefore determined eventually to admit also the additional quantity of water required for the business of condensation, and merely to employ a larger and more powerful pump to carry off the whole.

Such, then, was the remedy by which the genius of this great inventor effectually cured the first and most serious defect of the old apparatus. In carrying his ideas into execution, he encountered, as was to be expected, many difficulties, arising principally from the impossibility of realizing theoretical perfection of structure with such materials as human art is obliged to work with; but his ingenuity and perseverance overcame every obstacle. One of the things which cost him the greatest trouble was, how to fit the piston so exactly to the cylinder as, without affecting the freedom of its motion, to prevent the passage of the air between the two. In the old engine this end had been attained by covering the piston with a small quantity of water the dripping down of which into the space below, where it merely mixed with the steam introduced to effect the condensation, was of little or no consequence. But in the new construction, the superiority of which consisted in keeping this receptacle for the steam always both hot and dry, such an effusion of moisture, although only in very small quantities, would have occasioned material inconvenience. The air alone, besides, which in the old engine followed the piston in its descent, acted with considerable effect in cooling the lower part of the cylinder. His attempts to overcome this difficulty, while they succeeded in that object, conducted

Watt also to another improvement, which effected the complete removal of what we have called the second radical imperfection of Newcomen's engine, namely, its non-employment, for a moving power, of the expansive force of the steam. The effectual way, it occurred to him, of preventing any air from escaping into the part of the cylinder below the piston, would be to dispense with the use of that element above the piston, and to substitute there likewise the same contrivance as below, of alternate steam and a vacuum. This was of course to be accomplished by merely opening communications from the upper part of the cylinder to the boiler on the one hand, and the condenser on the other, and forming it at the same time into an air-tight chamber, by means of a cover, with only a hole in it to admit the rod or shank of the piston, which might, besides, without impeding its freedom of action, be padded with hemp, the more completely to exclude the air. It was so contrived, accordingly, by a proper arrangement of the cocks and the machinery connected with them, that, while there was a vacuum in one end of the cylinder, there should be an admission of steam into the other; and the steam so admitted now served not only, by its susceptibility of sudden condensation, to create the vacuum, but also, by its expansive force, to impel the piston. Steam, in fact, was now restored to be, what it had been in the early attempts to use it as a mechanical agent, the moving power of the engine; but its efficiency in this capacity was for the first time both taken full advantage of, by means of contrivances properly arranged for that end, and combined with, and aided by, its other equally valuable property which had alone been called into action in the more recent machines.

These were the great improvements which Watt introduced in what may be called the principle of the steam-engine, or, in other words, in the manner of using and applying the steam. They constitute, therefore, the grounds of his claim to be regarded as the true author of the conquest that has at last been obtained by man over this powerful element. But, original and comprehensive as were the views out of which these fundamental inventions arose, the exquisite and inexhaustible ingenuity which the engine, as finally perfected by him, displays in every part of its subordinate mechanism is calculated to strike us perhaps with scarcely less admiration. It forms undoubtedly the best exemplification that has ever been afforded, of the number and diversity of services which a piece of machinery may be made to render to itself, by means solely of the various application of its first moving power, when that has once been called into action. Of these contrivances we may notice one or two, by way of specimen. Perhaps the most remarkable is that called the *governor*. This consists of an upright spindle, which is kept constantly turning, by being connected with a certain part of the machinery, and from which two balls are suspended

in opposite directions by rods, attached by joints, somewhat in the manner of the legs of a pair of tongs. As long as the motion of the engine is uniform, that of the spindle is so likewise, and the balls continue steadily revolving at the same distance from each other. But as soon as any alteration in the action of the piston takes place, the balls, if it has become more rapid, fly farther apart under the influence of the increased centrifugal force which actuates them—or approach nearer to each other in the opposite circumstances. This alone would have served to indicate the state of matters to the eye; but Watt was not to be so satisfied. He connected the rods with a valve in the tube by which the steam is admitted to the cylinder from the boiler, in such a way, that, as they retreat from each other, they gradually narrow the opening which is so guarded, or enlarge it as they tend to collapse; thus diminishing the supply of steam when the engine is going too fast, and, when it is not going fast enough, enabling it to regain its proper speed by allowing it an increase of aliment. Again, the constant supply of a sufficiency of water to the boiler is secured by an equally simple provision, namely, by a *float* resting on the surface of the water, which, as soon as it is carried down by the consumption of the water to a certain point, opens a valve and admits more. And so on through all the different parts of the apparatus, the various wonders of which cannot be better summed up than in the forcible and graphic language of a living writer:—“In the present perfect state of the engine it appears a thing almost endowed with intelligence. It regulates with perfect accuracy and uniformity the *number of its strokes* in a given time, *counting or recording* them moreover, to tell how much work it has done, as a clock records the beats of its pendulum;—it regulates the *quantity of steam* admitted to work;—the *briskness of the fire*;—the *supply of water* to the boiler;—the *supply of coals* to the fire;—it *opens and shuts its valves* with absolute precision as to time and manner;—it *oils its joints*;—it *takes out any air* which may accidentally enter into parts which should be vacuum; and, when anything goes wrong which it cannot of itself rectify, it *warns its attendants* by ringing a bell; yet with all these talents and qualities, and even when exerting the power of six hundred horses, it is obedient to the hand of a child;—its aliment is coal, wood, charcoal, or other combustible—it consumes none while idle—it never tires, and wants no sleep; it is not subject to malady when originally well made, and only refuses to work when worn out with age; it is equally active in all climates, and will do work of any kind; it is a water-pumper, a miner, a sailor, a cotton-spinner, a weaver, a blacksmith, a miller, &c., &c.; and a small engine, in the character of a *steam pony*, may be seen dragging after it on a railroad a hundred tons of merchandise, or a regiment of soldiers, with greater speed than that of our fleetest coaches. It is the king of machines, and a permanent realization of the *Genii* of

Eastern fable, whose supernatural powers were occasionally at the command of man.”—(“*Arnott’s Physics*,” fourth edition, vol. i. p. 384.)

In addition to those difficulties which his unrivalled mechanical ingenuity enabled him to surmount, Watt, notwithstanding the merit of his inventions, had to contend for some time with others of a different nature, in his attempts to reduce them to practice. He had no pecuniary resources of his own, and was at first without any friend willing to run the risk of the outlay necessary for an experiment on a sufficiently large scale. At last he applied to Dr. Roebuck, an ingenious and spirited speculator, who had just established the Carron iron-works, not far from Glasgow, and held also at this time a lease of the extensive coal-works at Kinneal, the property of the Duke of Hamilton. Dr. Roebuck agreed to advance the requisite funds on having two-thirds of the profits made over to him; and upon this Mr. Watt took out his first patent in the beginning of the year 1769. An engine with a cylinder of eighteen inches diameter was soon after erected at Kinneal; and, although, as a first experiment, it was necessarily in some respects of defective construction, its working completely demonstrated the great value of Watt’s improvements. But Dr. Roebuck, whose undertakings were very numerous and various, in no long time after forming this connection, found himself involved in such pecuniary difficulties, as to put it out of his power to make any farther advances in prosecution of its object. On this Watt applied himself for some years almost entirely to the ordinary work of his profession as a civil engineer; but at last, about the year 1774, when all hopes of any farther assistance from Dr. Roebuck were at an end, he resolved to close with a proposal which had been made to him through his friend Dr. Small, of Birmingham, that he should remove to that town, and enter into partnership with the eminent hardware manufacturer, Mr. Boulton, whose extensive establishments at Soho had already become famous over Europe, and procured for England an unrivalled reputation for the arts there carried on. Accordingly, an arrangement having been made with Dr. Roebuck, by which his share of the patent was transferred to Mr. Boulton, the firm of Boulton and Watt commenced the business of making steam-engines in the year 1775.

Mr. Watt now obtained from Parliament an extension of his patent for twenty-five years from this date, in consideration of the acknowledged national importance of his inventions. The first thing which he and his partner did was to erect an engine at Soho, which they invited all persons interested in such machines to inspect. They then proposed to erect similar engines wherever required, on the very liberal principle of receiving as payment for each only one-third of the saving in fuel which it should effect, as compared with one of the old construction. As this saving, however, had been found to amount in the whole to fully

three-fourths of all the fuel that had been wont to be employed, the revenue thus accruing to the patentees became very great after their engines were extensively adopted. This they very soon were, especially in Cornwall, where the numerous mines afforded a vast field for the employment of the new power, partly in continuing or commencing works which only an economized expenditure could make profitable, and often also in labours which the old engine was altogether inadequate to attempt.

But the draining of mines was only one of many applications of the steam-power now at his command which Watt contemplated, and in course of time accomplished. During the whole twenty-five years, indeed, over which his renewed patent extended, the perfecting of his invention was his chief occupation; and, notwithstanding a delicate state of health, and the depressing affliction of severe head-aches to which he was extremely subject, he continued throughout this period to persevere with unwearied diligence in adding new improvements to the mechanism of the engine, and devising the means of applying it to new purposes of usefulness. He devoted, in particular, the exertions of many years to the contriving of the best methods of making the action of the piston communicate a rotatory motion in various circumstances; and between the years 1781 and 1785 he took out four different patents for inventions having this object in view. In the midst of these scientific labours, too, his attention was much distracted by attempts which were made in several quarters to pirate his improvements, and the consequent necessity of defending his rights in a series of actions, which, notwithstanding successive verdicts in his favour, did not terminate till the year 1799, when the validity of his claims was finally confirmed by the unanimous decision of the Judges of the Court of King's Bench.

Watt's inexhaustible ingenuity displayed itself in various other contrivances beside those which make part of his steam-engine. An apparatus for copying letters and other writings, now in extensive use; a method of heating houses by steam; a new composition, for the purposes of sculpture, having the transparency and nearly the hardness of marble; a machine for multiplying copies of busts and other performances in carving or statuary—are enumerated among his minor inventions. But it is his steam-engine that forms the great monument of his genius, and that has conferred upon his name its imperishable renown. This invention has already gone far to revolutionize the whole domain of human industry; and almost every year is adding to its power and its conquests. In our manufactures, our arts, our commerce, our social accommodations, it is constantly achieving what, little more than half a century ago, would have been accounted miracles and impossibilities. "The trunk of an elephant," it has been finely and truly said, "that can pick up a pin, or rend an oak, is as nothing to it. It can engrave a seal,

and crush masses of obdurate metal like wax before it—draw out, without breaking, a thread as fine as gossamer—and lift a ship of war like a bauble in the air. It can embroider muslin and forge anchors; cut steel into ribands, and impel loaded vessels against the fury of the winds and waves.* But another application of it, which had only begun to be made when the above sketch was originally published, has since been productive of still greater changes on the condition of society than had resulted from any of its previous achievements. It had been employed, several years before, at some of our collieries, in the propelling of heavily-loaded carriages over railways; but the great experiment of the Liverpool and Manchester Railway, opened in September, 1830, for the first time practically demonstrated with what hitherto almost undreamt-of *rapidity* travelling by land might be carried on through the aid of steam. Coaches, under the impetus communicated by this, the most potent, and at the same time the most perfectly controllable of our mechanical agencies, were now drawn forward at the flying speed of thirty and thirty-five miles an hour. Nor did it seem that even this was to be our ultimate limit of attainment. Even in navigation, although there the resistance of the water increases so much more rapidly than the force opposed to it, it was impossible to say what might not yet be accomplished. On land, the thin medium of the air presents no such formidable obstacle to a force making its way through it; and a rapidity of movement might perhaps be eventually attained here, which was as yet inconceivable. But even when the rate of land travelling already shown to be quite practicable should have become universal, in what a new state of society should we find ourselves! When we should be able to travel a hundred miles in any direction in three or four hours, into what comparative neighbourhood would the remotest extremes even of a large country be brought, and how little should we think of what we had hitherto called distance! A nation, it was said, will then be indeed a community; and all the benefits of the highest civilization, instead of being confined to one central spot, will be diffused equally over the land like the light of heaven. This improvement, in short, when fully consummated, will confer upon man nearly as much new power and new enjoyment as if he were actually endowed with wings.

It is gratifying to reflect that, even while he was yet alive, Watt received from the voice of the most illustrious of his contemporaries the honours due to his genius. In 1785 he was elected a Fellow of the Royal Society; the degree of Doctor of Laws was conferred upon him by the University of Glasgow in 1806; and in 1808 he was elected a member of the French Institute. He died on the 25th of August, 1819, in the 84th year of his age.

* Article on Watt, by Lord Jeffrey, in the "Encyclopædia Britannica."

We cannot better conclude our sketch of the life of this great inventor than by the following extract from the character that has been drawn of him by the eloquent writer (the late Lord Jeffrey) whom we have already quoted. "Independently of his great attainments in mechanics, Mr. Watt was an extraordinary, and, in many respects, a wonderful man. Perhaps no individual in his age possessed so much and such varied and exact information—had read so much, or remembered what he had read so accurately and well. He had infinite quickness of apprehension, a prodigious memory, and a certain rectifying and methodizing power of understanding, which extracted something precious out of all that was presented to it. His stores of miscellaneous knowledge were immense, and yet less astonishing than the command he had at all times over them. It seemed as if every subject that was casually started in conversation had been that which he had been last occupied in studying and exhausting; such was the copiousness, the precision, and the admirable clearness of the information which he poured out upon it without effort or hesitation. Nor was this promptitude and compass of knowledge confined in any degree to the studies connected with his ordinary pursuits. That he should have been minutely and extensively skilled in chemistry and the arts, and in most of the branches of physical science, might perhaps have been conjectured; but it could not have been inferred from his usual occupations, and probably is not generally known, that he was curiously learned in many branches of antiquity, metaphysics, medicine, and etymology, and perfectly at home in all the details of architecture, music, and law. He was well acquainted, too, with most of the modern languages, and familiar with their most recent literature. Nor was it at all extraordinary to hear the great mechanician and engineer detailing and expounding, for hours together, the metaphysical theories of the German logicians, or criticizing the measures or the matter of the German poetry.

"His astonishing memory was aided, no doubt, in a great measure, by a still higher and rarer faculty—by his power of digesting and arranging in its proper place all the information he received, and of casting aside and rejecting, as it were instinctively, whatever was worthless or immaterial. Every conception that was suggested to his mind seemed instantly to take its place among its other rich furniture, and to be condensed into the smallest and most convenient form. He never appeared, therefore, to be at all encumbered or perplexed with the *verbiage* of the dull books he perused, or the idle talk to which he listened; but to have at once extracted, by a kind of intellectual alchemy, all that was worthy of attention, and to have reduced it for his own use to its true value and to its simplest form. And thus it often happened, that a great deal more was learned from his brief and vigorous account of the theories and arguments of tedious writers, than an ordinary student could have

derived from the most faithful study of the originals, and that errors and absurdities became manifest from the mere clearness and plainness of his statement of them, which might have deluded and perplexed most of his hearers without that invaluable assistance."

CHAPTER XXXVIII.

SIR RICHARD ARKWRIGHT.—THE COTTON MANUFACTURE.

THE history of the steam-engine, and of him whose inventive genius has made it what it is, may be appropriately followed by some account of an individual, whose rise from a very humble origin to affluence and distinction was the result of his persevering attention to the improvement of the machinery employed in one of the most important branches of our manufactures, and whose name is intimately connected with the recent history of the commercial greatness of this country; we mean the celebrated SIR RICHARD ARKWRIGHT. Arkwright was born on the 23rd of December, 1732, at Preston, in Lancashire. His parents were very poor, and he was the youngest of a family of thirteen children; so that we may suppose the school education he received, if he ever was at school at all, was extremely limited. Indeed, but little learning would probably be deemed necessary for the profession to which he was bred, that of a barber. This business he continued to follow till he was nearly thirty years of age; and this first period of his history is of course obscure enough. About the year 1760, however, or soon after, he gave up shaving, and commenced business as an itinerant dealer in hair, collecting the commodity by travelling up and down the country, and then, after he had dressed it, selling it again to the wig-makers, with whom he very soon acquired the character of keeping a better article than any of his rivals in the same trade. He had obtained possession, too, we are told, of a secret method of dyeing the hair, by which he doubtless contrived to augment his profits; and perhaps, in his accidental acquaintance with this little piece of chemistry, we may find the germ of that sensibility he soon began to manifest to the value of new and unpublished inventions in the arts, and of his passion for patent rights and the pleasures of monopoly.

It would appear that his first effort in mechanics, as has happened in the case of many other ingenious men, was an attempt to discover the perpetual motion. It was in inquiring after a person to make him some wheels for a project of this kind, that in the latter part of the year 1767, he got acquainted with a clockmaker of the name of Kay, then residing



Painted by Wright, of Derby

Engraved by TWright

SIR RICHARD ARKWRIGHT.



at Warrington, with whom it is certain that he remained for a considerable time after closely connected. From this moment we may date his entrance upon a new career.

The manufacture of cotton cloths was introduced into this country only towards the end of the seventeenth century; although stuffs improperly called Manchester cottons had been fabricated nearly three centuries before, which, however, were made entirely of wool. It is generally thought that the first attempt at the manufacture of cotton goods in Europe did not take place till the end of the fifteenth century, when the art was introduced into Italy. Before this, the only cottons known had been imported from the East Indies. The manufacture seems to have thriven well even on its first establishment in this country; we are told by a writer whose work appeared in 1641, that the cottons wrought at Manchester were even then "not seldom sent into foreign parts," to be exchanged there, as he intimates, for the raw material.*

The English cottons, for many years after the introduction of the manufacture, had only the weft of cotton; the warp, or longitudinal threads of the cloth, being of linen. It was conceived to be impracticable to spin the cotton with a sufficiently hard twist to make it serviceable for this latter purpose. Although occasionally exported, too, in small quantities, the manufactured goods were chiefly consumed at home. It was not till about the year 1760 that any considerable demand for them arose abroad.

But about this time the exportation of cottons, both to the continent and to America, began to be carried on on a larger scale, and the manufacture of course received a corresponding impulse. The thread had hitherto been spun entirely, as it still continues to be in India, by the tedious process of the distaff and spindle, the spinner drawing out only a single thread at a time. But, as the demand for the manufactured article continued to increase, a greater and greater scarcity of weft was experienced, till at last, although there were 50,000 spindles constantly at work in Lancashire alone, each occupying an individual spinner, they were found quite insufficient to supply the quantity of thread required. The weavers generally, in those days, had the weft they used spun for them by the females of their family; and now "those weavers," says Mr. Guest, in his *History of the Cotton Manufacture*, "whose families could not furnish the necessary supply of weft, had their spinning done by their neighbours, and were obliged to pay more for the spinning than the price allowed by their masters; and, even with this disadvantage, very few could procure weft enough to keep themselves constantly employed. It was no uncommon thing for a weaver to walk three or four miles in a morning, and call on five or six spinners, before he could

* See "Treasures of Traffic," by Lewis Roberts, as quoted in Supplement to "Encyclopædia Britannica," art. Cotton Manufacture.

collect weft to serve him the remainder of the day; and when he wished to weave a piece in a shorter time than usual, a new riband or gown was necessary to quicken the exertions of the spinner."

It was natural, in this state of things, that attempts should be made to contrive some method of spinning more effective than that which had hitherto been in use; and, in fact, several ingenious individuals seem to have turned their attention to the subject. Long before this time, indeed, spinning by machinery had been thought of by more than one speculator. A Mr. Wyatt, of Lichfield, is stated to have actually invented an apparatus for that purpose so early as the year 1733, and to have had factories built and filled with his machines, both at Birmingham and Northampton. These undertakings, however, not being successful, the machines were allowed to perish, and no model or description of them was preserved.* There was also a Mr. Laurence Earnshaw, of Mottram, in Cheshire, of whom "it is recorded," says Mr. Baines, in his "History of Lancashire," vol. i. p. 115, "that in the year 1753, he invented a machine to spin and reel cotton at one operation, which he showed to his neighbours, and then destroyed it, through the generous apprehension that he might deprive the poor of bread;"—a mistake, but a benevolent one.

It was in the year 1767, as we have mentioned, that Arkwright became acquainted with Kay. In 1768 the two friends appeared together at Preston, and immediately began to occupy themselves busily in the erection of a machine for the spinning of cotton-thread, of which they had brought a model with them. They had prevailed upon a Mr. Smalley, who is described to have been a liquor-merchant and painter of that place, to join them in their speculation; and the room in which the machine was fixed was the parlour of a dwelling-house attached to the free grammar-school, the use of which Smalley had obtained from his friend the schoolmaster. At this time Arkwright was so poor, that, an election contest having taken place in the town, of which he was a burgess, it is asserted that his friends or party were obliged to subscribe to get him a decent suit of clothes before they could bring him into the poll-room (*See Baines's "History of Lancashire,"* vol. ii. p. 484). As soon as the election was over, he and Kay left Preston, and, carrying with them their model, betook themselves to Nottingham, the apprehension of the hostility of the people of Lancashire to the attempt he was making to introduce spinning by machinery having, as Arkwright himself afterwards stated (*See his Case, 1781*), induced him to take this step. On arriving at Nottingham, he first made arrangements with Messrs. Wright, the bankers, for obtaining the necessary supply of capital; but they, after a short time, having declined to continue their

* *See "Essay on the Cotton Trade,"* by Mr. Kennedy, "*Manchester Memoirs,"* second series, vol. iii.

advances, he took his model to Messrs. Need and Strutt, stocking-weavers of that place, the latter of whom was a particularly ingenious man, and well qualified, from his scientific acquirements, of which he had possessed himself under many disadvantages, to judge of the adaptation of the new machinery to its proposed object. An inspection of it perfectly satisfied him of its great value; and he and Mr. Need immediately agreed to enter into partnership with Arkwright, who accordingly, in 1769, took out a patent for the machine as its inventor. A spinning-mill, driven by horse-power, was at the same time erected and filled with the frames; being, unless we include those erected many years before by Mr. Wyatt, the first work of the kind that had been known in this country. In 1771, Arkwright and his partners established another mill at Cromford, in the parish of Wirksworth, in Derbyshire, the machinery in which was set in motion by a water-wheel; and in 1775 he took out a second patent, including some additions which he had made to his original apparatus.

In what we have hitherto related we have carefully confined ourselves to facts which are universally acknowledged; but there are other points of the story that have been stated in very opposite ways, and have given rise to much doubt and dispute.

The machinery for which Arkwright took out his patents consisted of various parts, his second specification enumerating no fewer than ten different contrivances; but of these the one that was by far of greatest importance was a device for drawing out the cotton from a coarse to a finer and harder-twisted thread, and so rendering it fit to be used for warp as well as weft.* This was most ingeniously managed by the application of a principle which had not yet been introduced in any other mechanical operation. The cotton was in the first place drawn off from the skewers on which it was fixed by one pair of rollers, which were made to move at a comparatively slow rate, and which formed it into threads of the first and coarser quality;† but at a little distance behind the first was placed a second pair of rollers, revolving three, four, or five times as fast, which took it up when it had passed through the others, the effect of which would be to reduce the thread to a degree of fineness so many times greater than that which it originally had. The first pair of rollers might be regarded as the feeders of the second, which could receive no more than the others sent to them; and that, again, could be no more than these others themselves took up from the skewers. As the second pair of rollers, therefore, revolved, we will say, five times for every one revolution of the first pair, or, which is the same thing,

* This was, in truth, the principal subject of Arkwright's first patent; and, accordingly, on the great trial (afterwards mentioned) which took place in June, 1785, his opponents accused him of endeavouring unfairly to prolong his first patent by means of his second.

† In Arkwright's apparatus, which was a

combination of the carding and spinning machinery, this first part of the process was somewhat modified; but the principle of the two pairs of rollers, the one revolving faster than the other, which forms the peculiarity of the machine, was employed as here described.

required for their consumption in a given time five times the length of thread that the first did, they could obviously only obtain so much length by drawing out the common portion of cotton into thread of five times the original fineness. Nothing could be more beautiful or more effective than this contrivance; which, with an additional provision for giving the proper twist to the thread, constitutes the water-frame or throstle, which is so called from its having been originally moved by *water power*.

Of this part of his machinery Arkwright particularly claimed the invention as his own. He admitted, with regard to some of the other machines included in his patent, that he was rather their improver than their inventor; and the original spinning-machine for coarse thread, commonly called the spinning-jenny, he frankly attributed in its first conception to a person of the name of Hargrave, who resided at Blackburn, and who, he said, having been driven out of Lancashire in consequence of his invention, had taken refuge in Nottingham, but, unable to bear up against a conspiracy formed to ruin him, had been at last obliged to relinquish the further prosecution of his object, and died in obscurity and distress.

There were, however, other parties who had an interest as well as Arkwright in these new machines, and who would not allow that any of them were of his invention. As to the principal of them, the water-frame, they alleged that it was in reality the invention of a poor reed-maker, of the name of Higs or Hayes, and that Arkwright had obtained the knowledge of it from his old associate Kay, who had been employed by Higs to assist him in constructing a model of it a short time before Arkwright had sought his acquaintance. Many cotton-spinners, professing to believe this to be the true state of the case, actually used Arkwright's machinery in their factories, notwithstanding the patent by which he had attempted to protect it; and this invasion of his monopoly was carried to such an extent, that at last he found himself obliged to bring actions against no fewer than nine different parties.*

The first of these, in which a Colonel Mordaunt was defendant, was tried in the Court of King's Bench in July, 1781. Upon this occasion, however, the question as to the originality of the inventions was not mooted, the position taken for the defence being the insufficiency of the

* It is asserted, in the article on the Cotton Manufacture, in the Supplement to the sixth edition of the "Encyclopædia Britannica," and repeated in a paper on the same subject in the 91st number of the "Edinburgh Review," that a trial took place upon the subject of Arkwright's first patent in the year 1772, on which occasion he obtained a verdict establishing its validity. This statement, however, for which no authority is given, appears to be a mistake. No such trial is alluded to in the course of the proceedings in

the Court of King's Bench in June and November, 1785, although both that of July, 1781, and that of February, 1785, are repeatedly mentioned; nor is it noticed, we believe, in any of the earlier accounts of Arkwright's machinery. Mr. Guest (who has written a history of the cotton manufacture, which is marked by a somewhat strong dislike to Arkwright) searched the records of the courts of King's Bench, Common Pleas, and Exchequer, for the year 1772, without finding any trace of it.

specification on which the patent had been obtained; and upon that ground a verdict was given in favour of the defendant. On this result Arkwright abandoned the other eight actions he had raised; and, instead of attempting any longer to maintain his patent in a court of law, published a pamphlet, containing what he called his "Case," with a view of inducing the legislature to interfere for his protection. It is proper we should here mention, that, although the first of these actions in 1781, which decided the fate of the others, thus went off without the real merits of the case having been gone into, yet several of the defendants were prepared to dispute the claim of the patentee to the invention of the machines, and that both Higs and Kay had been summoned to give their evidence upon that point, and were actually in court during the trial of the action against Colonel Mordaunt, the former having been brought over from Ireland, where he was then residing, expressly for the occasion.

Arkwright submitted to the verdict that had been given against him for nearly four years; but at last, in February, 1785, he raised a second action, which was tried in the Court of Common Pleas; and having brought forward several engineers who declared that they could make the machines from the descriptions which he had given in his specification, he obtained a verdict which reinstated him in the enjoyment of his monopoly. Upon this, as on the former occasion, the only question submitted to the jury was that regarding the sufficiency of the specification; although it soon appeared that several of the parties interested were determined not to rest satisfied with a decision of the matter upon that ground alone.

Accordingly, in the month of June, in the same year, a *scire-facias*, an action which is nominally at the suit of the Crown, was brought against Arkwright in the Court of King's Bench to repeal the patent, in the trial of which the whole of the question was at last gone into. The principal evidence on which it was attempted to be shown that the water-frame was not invented by Arkwright was that of Higs, of Kay, and of Kay's wife, the substance of which was, that the double rollers had been originally contrived by Higs in the early part of the year 1767, while he was residing in the town of Leigh; that he had employed his neighbour and acquaintance Kay to make a model of a machine for him upon that principle; and that Kay, upon meeting with Arkwright a short time after, at Warrington, had been persuaded by him to communicate to him the secret of Higs's invention, on the understanding, as it would appear, that the two should make what they could of it, and share the advantages between them. The evidence of each of the witnesses corroborated, so far as the case admitted, that of the others; Higs stating that he had been first informed of the manner in which Arkwright had got possession of his invention by Kay's wife, who, on her part, swore that she recollected her husband making models, first for Higs, and

afterwards for Arkwright, although she could not speak with any distinctness to the nature of the machine; while Kay himself acknowledged the treachery of which he had been guilty, and gave a particular account of the manner in which, as he said, Arkwright had contrived to obtain from him the secret of Highs's invention. Highs also stated that, upon meeting with Arkwright in Manchester, some years after he had taken out his patent, he charged him with the source from which he had derived the machine; to which Arkwright said nothing at first, but afterwards remarked that, if any person, having made a discovery, declined to prosecute it, he conceived any other had a right, after a certain time, to take it up and obtain a patent for it, if he chose.

This famous trial lasted from nine o'clock in the morning till half-past twelve at night, and excited the greatest interest, both among those more immediately concerned, and among the public generally. Among the witnesses examined were Mr. Cumming, the well-known watchmaker, Mr. Harrison, the son of the inventor of the marine chronometer, Mr. Darwin, and the since celebrated James Watt. The result was a verdict again invalidating the patent; which, on a motion being made for a new trial, the court refused to disturb. Arkwright after this never took any further steps to vindicate his patent rights. This has led some writers to argue that in all probability he had really obtained the inventions in the manner that Highs and Kay alleged. It is, however, to be remembered that it has been a common fate with those, who have been fortunate enough to enrich themselves by their happy inventions, to have attempts made to take from them the honour of those discoveries, of the profits of which it is found impossible to deprive them; and that it has seldom, in such cases, been difficult to find some hitherto unheard-of genius to set up his claim to the prior discovery of what, nevertheless, it would appear he scarcely knew the value of, after he had discovered it. In this particular case the other party had a strong interest in setting aside Arkwright's pretensions if they could, and the circumstance of Kay having been connected with Highs before he was employed by him, afforded them a tempting foundation on which to erect what they, no doubt, considered a very convenient theory. Then again, as for so much of their allegation as rested upon the evidence of this Kay, it was not entitled to command much attention, since it appeared both that he had some time before quarrelled with Arkwright, and that he must, even by his own account, have acted so perfidious a part in regard to his first friend, Highs, as to deprive him of all claim to be believed in anything he might now choose to assert. Highs's own evidence is undoubtedly what seems to bear strongest against Arkwright; but he, from very natural causes, might have been mistaken as to various points. He appears to have told his story in a very confused and ineffective way—much as if he either did not feel his ground to be very sure, or was not at all aware of the im-

portance of the facts to which he was brought to speak. It is not impossible that, if he actually did invent the machine in question, Arkwright may have also hit upon the same idea about the same time; or may, at least, have been led to it merely by some vague rumour that had got abroad as to what Higs was about—not an unnatural supposition, when we reflect that his operations seem to have been a good deal talked of in the neighbourhood, and that the slightest hint of the principle of the water-frame would have sufficed to put an ingenious man like Arkwright in possession of the whole machine. And this after all gives us, perhaps, the most natural explanation of his conversation with Higs at Manchester. If he knew that he had really stolen his invention from that person in the manner stated in Kay's evidence, it is not likely that he would have been much disposed to meet him at all; whereas the interview appears to have been arranged by the intervention of a mutual acquaintance, who no doubt had obtained the consent of both parties to his bringing them together. His silence, when Higs charged him with having got possession of his invention, or rather merely noticed the circumstance (for the whole seems to have passed in quite an amicable manner), will depend for its interpretation very much upon the exact words used by Higs, which it is very possible he did not recollect perfectly when he gave his evidence in the Court of King's Bench twelve or thirteen years afterwards. Perhaps he said nothing about Kay at all; but merely remarked in general terms that he had been beforehand with Mr. Arkwright in thinking of the two pairs of rollers which formed so valuable a part of his patent machinery. This was an averment which for anything that Arkwright knew might be true, and which if incorrect he had at any rate no means of refuting; so that nothing could be more natural than his remaining silent—although he would scarcely, one would think, have taken the thing quite so passively if he had been flatly charged with the base conduct afterwards imputed to him. The observation, again, he is said to have made a little while after is perfectly consistent with this view of the case. He waives the question as to which of the two might have been first in possession of the idea; and contents himself with simply remarking that, however that might be, he conceived any one who had made a discovery which he thought might be turned to advantage, was quite entitled to take it up and prosecute it by himself, even though another might also be in possession of it, if that other showed no intention of stirring in the business. And to this remark Higs, by his own account, quietly assented, although it certainly would have been natural for him to have hinted, if he really had previously advanced the charge which on the trial he said he had, that, whatever a man might do with regard to an invention that was really his own, he could hardly have a right in any circumstances to steal those of other people, and take out a patent for them.

Whatever conclusion may be come to on the subject of Arkwright's claim to the invention of the machinery introduced by him into his spinning factories, it is incontestable that to him alone belongs the merit both of having combined its different parts with admirable ingenuity and judgment, and of having by his unwearied and invincible perseverance first brought it into actual use on anything like an extensive scale, and demonstrated its power and value. The several inventions which his patent embraced, whether they were his own or not, would probably but for him have perished with their authors; none of whom, except himself, had the determination and courage to face the multiplied fatigues and dangers that lay in the way of achieving a practical exemplification of what they had conceived in their minds, or to encounter any part of that opposition, incredulity, and ridicule, of those disappointments, repulses, losses, and other discouragements, over all of which he at last so completely triumphed. When he set out on this career he was poor, friendless, and utterly unknown. We have already stated that, on his coming with Kay to Preston, he was almost in rags; and it may be added that, when he and Kay made application immediately before this to a Mr. Atherton for some pecuniary assistance to enable them to prosecute their plans, Arkwright's appearance alone was enough to determine that gentleman to have nothing to do with the adventure. Can we have a more exciting example, then, of what a resolute heart may do in apparently the most hopeless circumstances?—of what ingenuity and perseverance together may overcome in the pursuit of what they are determined to attain? And this is the grand lesson which the history of Arkwright is fitted to teach us—to give ourselves wholly to our object, and never to despair of reaching it. Even after he had succeeded in forming his partnership with Messrs. Need and Strutt, his success was far from being secured. For a long time the speculation was a hazardous and unprofitable one, and no little outlay of capital was required to carry it on. He tells us himself in his "Case" that it did not begin to pay till it had been persevered in for five years, and had swallowed up a capital of more than twelve thousand pounds. We cannot doubt that it required all Arkwright's dexterity and firmness to induce his partners to persevere with the experiment under this large expenditure and protracted disappointment. But it was the character of the man to devote his whole heart and faculties to whatever he engaged in. Even to the close of his life the management of his different factories was his only occupation, and even amusement. Although he had been from his early years afflicted with severe asthma, he took scarcely any recreation—employing all his time either in superintending the daily concerns of these establishments, which were regulated upon a plan that itself indicated in its contriver no little

ingenuity and reach of mind;* or in adding such improvements to his machinery from time to time as his experience and observation suggested. And thus it was, that from a poor barber he raised himself, not merely to rank and great affluence, but to be the founder of a new branch of national industry, destined in a wonderfully short space of time to assume the very first place among the manufactures of his country. A very short review of what the cotton trade has since become, as compared with its previous state, will show what it owes to Sir Richard Arkwright.

England may be said to have been a manufacturing country for five hundred years, from the time, namely, when the clothiers of Flanders came over in great numbers, and settled themselves in different parts of the kingdom, on the marriage of our Edward III. to Philippa of Hainault. The manufacture of cotton cloth, however, as we have already noticed, was not introduced among us till about the middle of the seventeenth century, and made no extraordinary progress for a hundred years afterwards. As an evidence of the comparatively slight degree of interest which it excited, and of the little ingenuity which was consequently exerted in its improvement, it may be stated that the valuable invention of the fly-shuttle, which was introduced into the woollen manufacture about the year 1738, was not employed in the weaving of cottons till more than twenty years afterwards; up to which period, whenever the web was more than three feet wide, two men were constantly stationed at the loom in which it was wrought, the one to throw the shuttle from right to left, and the other to throw it back from left to right. It was not till the year 1769 that an attempt was made upon any considerable scale to spin cotton thread by machinery; for, whatever may have been done before this time by individuals of mechanical ingenuity in inventing contrivances for that purpose, it is certain that the invaluable improvement in question was really introduced into the manufacture by Arkwright when he took out his patent and built his first mill.

The consequence has been a revolution in the entire system, not only of our manufactures but of our commerce, such as never had taken place in so short a space of time in any country. About the beginning of the last century, the quantity of cotton wool annually imported into Great Britain did not amount to 1,200,000 lbs.; and by the year 1720 it had not increased to much beyond 2,000,000 lbs. There are no returns from 1720 to 1771, but the importation had probably gone on increasing

* "The originality and comprehension of Sir Richard Arkwright's mind," says the writer of the article on the Cotton Manufacture, in the Supplement to the "Encyclopædia Britannica," "were perhaps marked by nothing more strongly than the judgment with which, although new to business, he conducted the great concerns his discoveries gave rise to, and the systematic order and arrange-

ment which he introduced into every department of his extensive works. His plans of management, which must have been entirely his own, since no establishment of a similar nature then existed, were universally adopted by others; and after long experience they have not yet in any material point been altered or improved."

during that interval, although at a slow rate. Nor did it make a very rapid progress even for several years after spinning by machinery was introduced, having from 1771 to 1775 averaged only 4,764,589 lbs., and for the next five years only 6,706,013 lbs. In 1784, the year immediately preceding the final repeal of Arkwright's patent, it amounted to 11,482,083 lbs. That event gave a great impulse to the manufacture, the average importation for the next five years having grown to 25,443,270 lbs. annually. In 1799 it had risen to 43,379,278 lbs., and in 1800 to 56,010,732 lbs. In 1817 it was 124,912,968 lbs., and in 1843 it actually amounted to the immense quantity of 673,193,116 lbs. The average importation of cotton wool into Great Britain may now (1858) be stated as amounting to about 600 millions of pounds per annum, or fully three hundred times what it was a century ago, and to more than a hundred and fifty times what it was when Arkwright began to spin.

The whole of this raw material, with the exception of about a fifth or sixth part, is spun into thread, and mostly wrought into cloth, in this country. The Reverend Dr. Cartwright invented his power-loom in 1784; but it is only since the commencement of the present century that weaving by machinery has become general. Steam was first applied as the moving power for the spinning machinery in 1785; in which year Messrs. Boulton and Watt erected one of their rotative engines for a factory belonging to the Messrs. Robinson, at Papplewick, in Nottinghamshire. In the present day the cotton is carded, spun, and woven into cloth in the same manufactory; these different operations being performed by machinery the several parts of which are all set in motion by a single steam-engine.

In 1787 the number of spinning factories in the county of Lancaster amounted only to 42, of comparatively inconsiderable magnitude; in August 1825, there were, according to Mr. Baines,* no fewer than 104 such factories in Manchester alone, which were worked by 110 steam-engines, of the aggregate power of 3,598 horses. The total number of steam-looms at work in the kingdom in 1835 was 109,626.† In 1824, it has been stated,‡ the number of spindles constantly in motion was about six millions, and the power by which they were moved equal to that of 10,572 horses. In another statement, however, drawn up by Mr. Kennedy,§ it is calculated that in 1817 (when the importation of cotton wool was not nearly so great as in 1824) the number of spindles was 6,645,833, and the moving power equal to that of 20,768 horses. It must be four or five times as great now as it was then. Some idea may be formed of the growth of this manufacture since the year 1769, by contrasting the astonishing number of threads, which it would thus

* "History of Lancashire," vol. ii. p. 134.

† Returns by Inspectors of Factories, as quoted in Porter's "Progress of the Nation," iii. 163.

‡ Supplement to "Encyclopædia Britannica," art. Cotton Manufacture.

§ "Manchester Memoirs," Second Series, vol. iii.

appear are now spun every day, with the 50,000 which were all that were then produced.

The produce of all this machinery is, as may be supposed, immense. "In the present improved state of this (the weaving) process," says the writer of the article already referred to in the "Encyclopædia Britannica," "one person, generally a girl, attends to two looms, the weekly produce of which is from seven to nine pieces of cloth, of seven-eighths wide, and twenty-eight yards long." "A single factory in Manchester," says Mr. Guest, writing in 1828, "and that not of first-rate magnitude, receives the raw cotton, and turns out a web of cloth, varying in width from three quarters of a yard to a yard and a quarter, of forty miles in length every week." In 1750, it has been calculated, the whole amount of the cotton manufacture of the kingdom did not exceed the annual value of 200,000*l.*: it now probably amounts, even after an immense reduction of prices, to between thirty and forty millions of pounds sterling per annum. Sir Richard Arkwright states in his "Case" published in 1781, that the capital then invested in buildings and machinery by those engaged in this trade amounted to 200,000*l.*; even in 1827 it was calculated to amount, in Lancashire alone, which possesses about four-fifths of the trade, to 8,000,000*l.** In the year ending on the 1st of May 1818, 105 millions of yards of cotton cloth of all sorts were manufactured in Glasgow and the neighbourhood, of which the value was about 5,200,000*l.*† Of this about one-half was exported. The declared, or real, value of the cotton cloths, twist, and yarn, exported from Great Britain in 1843 exceeded 23,000,000*l.* The export trade in cotton is now more than three times that in woollens, the manufacture of which used to be the great staple of the kingdom.

The extraordinary perfection to which every part of the cotton manufacture has now been carried is another result for which we are entirely indebted to the introduction of machinery. Especially since the invention of the mule, a compound of the jenny and the water-frame, about the year 1790, the muslins manufactured in England have been every year attaining a greater fineness of fabric, and are now rapidly approaching to a rivalry even in this respect with the most exquisite productions of the East. As an illustration of the state of advancement to which the spinning process has been brought, it may be mentioned, that "Mr. John Pollard, of Manchester, spun, in 1792, on the mule, no fewer than 278 hanks of yarn, forming a thread of 233,520 yards, or upwards of 132 miles in length, from a single pound of raw cotton."‡ The diminution in the price of the manufactured article which has been produced by the successive improvements in the cotton machinery is equally extraordinary. Yarn of what is called No. 100, which even in 1786,

* Baines's "Lancashire," vol. ii. p. 134, vol. iii. p. 404.

† "Encyclopædia Britannica," Supplement.

‡ "Edinburgh Review," No. 91, p. 15.

after its price had been greatly reduced by the cancelling of Arkwright's patent, sold for thirty-eight shillings, was in 1832 to be had for less than three shillings. The raw material is now indeed brought from India, and manufactured into cloths in England, which, after being re-exported to that country, are actually sold there cheaper than the produce of the native looms. There can hardly be a more striking proof than this of the triumph of machinery.

Finally, it appears that, while the number of persons employed in the cotton manufacture in 1767 did not probably amount to 30,000, the number of those now engaged in its different departments can hardly be less than half a million. Even many years ago, indeed, it was calculated by some authorities to be twice as great.* Yet, "in some branches of the business," it has been stated, "the spinning in particular, such is the economy of labour introduced by the use of machinery, that one man and four children will spin as much yarn as was spun by six hundred women and girls fifty years ago."†

CHAPTER XXXIX.

INVENTION OF THE POWER-LOOM:—DR. CARTWRIGHT; W. EDWARDS;
R. WALKER.



DR. CARTWRIGHT.

MACHINERY, in addition to being used in the spinning, is also, as we have stated, extensively applied to the weaving of cotton; and we shall now

* "Edinburgh Review," No. 91.

† Baines's "Lancashire," vol. i. p. 119

give a short account of the Reverend Dr. CARTWRIGHT, to whose ingenuity our great national manufacture is indebted for the introduction of this crowning improvement. The story, besides its connection with what has gone immediately before, and its own interest, will be found not to be wanting in appropriateness with reference to our general subject; and we have been supplied with the materials of our sketch from a quarter which enables us to add some original and authentic particulars to what has been elsewhere published.

Edmund Cartwright was born in the year 1743, and was the fourth son of William Cartwright, Esq., of Marnham, in Nottinghamshire. One of his elder brothers was the late Major John Cartwright, so well known for his steady devotion through a long life to what he believed to be the cause of truth and patriotism, and for many public and private virtues which commanded the respect even of those who differed most widely from him in politics. Being intended for the Church, Edmund at the usual age was entered of University College, Oxford, from whence he was subsequently elected a Fellow of Magdalen College. He early distinguished himself by his literary attainments, an evidence of which he gave to the world while yet a young man, by the publication of a small volume of Poems, which was very favourably received. About the year 1774, also, he became a contributor to the "Monthly Review;" and he continued to be a frequent writer in that publication during the following ten years.

For the first forty years of his life he had never given any attention to the subject of mechanics; although, as was recollected long afterwards, his genius for invention in that department had once displayed itself, while at his father's house during one of his college vacations, in some improvements which he made on an agricultural machine which happened to attract his notice. But this exercise of his ingenuity, being out of the line of his pursuits at that time, led to no other attempts of the kind, nor to any further application of his thoughts to such matters.

The circumstances which many years after this led him to the invention of his weaving-machine, or power-loom, as it is commonly called, cannot be better described than they have been by himself in the following statement, first printed (in 1815) in the Supplement to the "Encyclopædia Britannica:—" "Happening," he says, "to be at Matlock in the summer of 1784, I fell in company with some gentlemen of Manchester, when the conversation turned on Arkwright's spinning machinery. One of the company observed that as soon as Arkwright's patent expired, so many mills would be erected, and so much cotton spun, that hands would never be found to weave it. To this observation I replied, that Arkwright must then set his wits to work to invent a weaving-mill. This brought on a conversation upon the subject, in which the Manchester gentlemen unanimously agreed that the thing was impracticable; and in defence of

their opinion they adduced arguments which I was certainly incompetent to answer, or even to comprehend, being totally ignorant of the subject, having never at the time seen a person weave. I controverted, however, the impracticability of the thing by remarking that there had been lately exhibited in London an automaton figure which played at chess. Now, you will not assert, gentlemen, said I, that it is more difficult to construct a machine that shall weave, than one that shall make all the variety of moves that are required in that complicated game. Some time afterwards a particular circumstance recalling this conversation to my mind, it struck me that, as in plain weaving, according to the conception I then had of the business, there could be only three movements, which were to follow each other in succession, there could be little difficulty in producing and repeating them. Full of these ideas, I immediately employed a carpenter and smith to carry them into effect. As soon as the machine was finished I got a weaver to put in the warp, which was of such materials as sail-cloth is usually made of. To my great delight, a piece of cloth, such as it was, was the produce. As I had never before turned my thoughts to mechanism, either in theory or practice, nor had seen a loom at work, nor knew anything of its construction, you will readily suppose that my first loom must have been a most rude piece of machinery. The warp was laid perpendicularly, the reed fell with a force of at least half a hundred weight, and the springs which threw the shuttle were strong enough to have thrown a Congreve rocket. In short it required the strength of two powerful men to work the machine, at a slow rate, and only for a short time. Conceiving in my simplicity that I had accomplished all that was required, I then secured what I thought a most valuable property by a patent, 4th of April, 1785. This being done, I then condescended to see how other people wove; and you will guess my astonishment when I compared their easy modes of operation with mine. Availing myself, however, of what I then saw, I made a loom in its general principles nearly as they are now made. But it was not till the year 1787 that I completed my invention, when I took out my last weaving patent, August the 1st of that year."

Dr. Cartwright's children still remember often seeing their father about this time walking to and fro apparently in deep meditation, and occasionally throwing his arms from side to side; on which they used to be told that he was thinking of weaving and throwing the shuttle. From the moment, indeed, when his attention was first turned to the invention of the power-loom, mechanical contrivance became the grand occupying subject of his thoughts. With that sanguineness of disposition which seems to be almost a necessary part of the character of an inventor, he looked upon difficulties, when he met with them in any of his attempts, as only affording his genius an occasion for a more distinguished triumph; nor did he allow even repeated failures for a moment to dishearten him.

Some time after he had brought his first loom to perfection, a manufacturer, who had called upon him to see it at work, after expressing his admiration of the ingenuity displayed in it, remarked that, wonderful as was Mr. Cartwright's mechanical skill, there was one thing that would effectually baffle him, namely, the weaving of patterns in checks, or, in other words, the combining, in the same web, of a pattern, or fancy figure, with the crossing colours which constitute the check. Mr. Cartwright made no reply to this observation at the time; but some weeks after, on receiving a second visit from the same person, he had the pleasure of showing him a piece of muslin, of the description mentioned, beautifully executed by machinery. The man is said to have been so much astonished, that he roundly declared his conviction that some agency more than human must have been called in to assist on the occasion.

After this, Dr. Cartwright exercised his ingenuity in a variety of other contrivances; and introduced valuable improvements in the combing of wool by machinery, in rope-making, and in several other departments of agriculture and manufactures. For some of these inventions he took out patents, and for others premiums were bestowed upon him by the Society for the Encouragement of Arts, and the Board of Agriculture. Even the steam-engine engaged his attention; and an account of some improvements which he proposed in its mechanism may be found in "Rees's Cyclopaedia." Indeed, several years before the close of the last century, while resident at Eltham, in Lincolnshire, he used frequently to tell his son that, if he lived to be a man, he would see both ships and land-carriages impelled by steam. At that early period he had constructed a model of a steam-engine attached to a barge, which he explained about the year 1793, in the presence of his family, to Robert Fulton, then a student of painting under his countryman West, and whose zeal and activity afterwards, as is well known, brought the project of steam-navigation to such perfection in America, from whence it has extended all over the civilized world. Even so late as the year 1822, Dr. Cartwright, notwithstanding his very advanced age, and although his attention was much occupied by other philosophical speculations, was actively engaged in endeavouring to contrive a plan for propelling land-carriages by steam.

His death, however, at Hastings, in October, 1823, prevented the completion of this, as well as of many other designs in the prosecution of which he had been employed. His enthusiasm for mechanical invention continued unabated to the last; and indeed his general energy both of mind and body was very little impaired up to within a short period of his death. In a letter to his brother, Major Cartwright, dated 24th April, 1819, he says: "I this day entered into my 77th year in as good health and spirits, thank God, as I have done on any one birth-day for the last half century. I am moving about my farm from eight o'clock

in the morning till four in the afternoon without suffering the least fatigue. I sent in my claim to the Board of Agriculture for their premium for a cure of the mildew on wheat, but have not yet heard that it was admitted. I don't know whether I ever mentioned to you a machine for dibbling or planting wheat, which I have brought to great perfection. I have also a very material improvement on the stocks respecting ploughs and wheel-carriages: but of this I shall say nothing till I have brought it to the proof, which I hope to do very shortly; when you shall be immediately informed of the result, whether favourable or not." The following verses, also, which he sent to a friend not long before his death, will show at once the undiminished ardour and activity of his mind, and the generous and philanthropic motives by which his enthusiasm was sustained and directed:—

“Since even Newton owns that all he wrought
Was due to industry and patient thought,
What shall restrain the impulse which I feel
To forward, as I may, the public weal?
By his example fired, to break away,
In search of truth, through darkness into day?
He tried on venturous wing, the loftiest flight,
An eagle soaring to the fount of light!
I cling to earth, to earth-born arts confined,
A worm of science of the humblest kind.
Our powers, though wide apart as earth and heaven,
For different purposes alike were given:
Though mine the arena of inglorious fame,
Where pride and folly would the strife disdain,
With mind unwearied still will I engage
In spite of failing vigour and of age.
Nor quit the combat till I quit the stage,
Or, if in idleness my life shall close,
Let well-earned victory justify repose!”

The disposition of this excellent man, indeed, naturally carried him throughout his life to promote, by every means in his power, the benefit of his fellow-creatures; and the following fact is perhaps worthy of being recorded, as illustrating how this tendency used to display itself in other parts of his conduct, as well as in his zeal for mechanical improvements. While he held the living of Goadby-Marwood, in Leicestershire, he applied himself so assiduously to the study of medicine that he acquired extensive knowledge and eminent skill in that science, and was in the habit of prescribing to his poorer parishioners with great success. On one occasion, having made a visit of charity to a poor family, one of the members of which, a boy, lay apparently expiring of putrid fever, he observed that the process of brewing was going on in another apartment of the cottage. On this the antiseptic qualities of yeast instantly occurred to his recollection; and, in his anxiety to save the boy's life, he desired his mother to give him as much yeast as could be forced down his throat. This was scarcely done, when he became somewhat alarmed at

his own precipitancy ; but he said nothing, and left the cottage. He was immediately after this obliged to go from home for a few days on business, and during his absence he was continually haunted with the thought of the poor boy ; but on his return he found, to his inexpressible delight, that he was both alive and getting better, and that his mother dated the commencement of his recovery from the moment the yeast had been administered to him. This anecdote, however, it must be confessed, is certainly more illustrative of the worthy philanthropist's zeal than of his discretion.

Actuated by such feelings as those we have described, Dr. Cartwright was as free as any man who ever lived from jealousy or illiberality towards other inventors. In fact, it may be safely asserted, that, had he not carried his frankness and want of suspicion, as well as his indifference to pecuniary gains, beyond the limits of worldly prudence, his ingenious contrivances would, in all probability, have been productive of much greater benefit to himself than they ever actually were. So careless was he in regard to retaining in his own possession the valuable ideas with which his mind was continually teeming, that he has been frequently



ROBERT FULTON.

known to have given the most important assistance, by his suggestions, to other persons engaged like himself in mechanical pursuits, and afterwards to have forgotten the circumstance as entirely as if it had never happened. Nay, so completely did what he was engaged about at the moment occupy his mind, that he sometimes forgot his own inventions, and other productions, of an older date, even when his attention was particularly called to them. One day one of his daughters having chanced to repeat in his presence some lines from a poem entitled the "Prince of

Peace," which appeared in his volume already mentioned, he exclaimed, to her surprise and amusement, "Those are beautiful lines, child; where did you meet with them?" On another occasion, being shown the model of a machine, he examined it with great attention, and at last observed, that the inventor must have been a man of great ingenuity, and that he himself should feel very proud if he had been the author of the contrivance; nor could he be immediately convinced of what was proved to be the case, namely, that it was a machine of his own.

Dr. Cartwright was defrauded of the pecuniary profits which he might reasonably have expected from his great invention of the power-loom by various accidents, and especially by the burning of a manufactory, containing five hundred of his machines, almost immediately after it was built. It may also be added, that, after he had demonstrated the practicability of weaving by machinery, other inventors applied themselves to the devising of contrivances for that purpose slightly different from his—a comparatively easy task, even where the new invention was not merely a disguised infringement of his patent, while in those cases in which it was in reality nothing more than such an infringement, it was yet so protected that it could hardly be reached and put down as such. On these and other accounts, and in no small degree owing to Dr. Cartwright's carelessness about his own interests, the power-loom only began, in point of fact, to be extensively introduced about the year 1801, the very year in which his patent expired. So generally, however, was it felt among those best entitled to express an opinion on the subject that to him really belonged the merit of the invention, that in the year 1808 several merchants and manufacturers of Manchester and its neighbourhood, to none of whom he was personally known, held a meeting to consider the propriety of presenting to the Lords of the Treasury a memorial of his eminent services, and of the losses he had sustained through the piracies and other unfortunate circumstances to which we have alluded. In consequence of this and other applications in his favour, the sum of 10,000*l.* was soon after granted to him by Parliament. This national recognition of his claims may be taken as a sufficient answer to some attempts that have been occasionally made to rob Dr. Cartwright of the credit of having been the author of one of the most valuable presents ever made to the manufacturing industry of his country. The number of power-looms existing in Great Britain (they had scarcely been introduced into Ireland) before the inventor died was probably not much under a hundred thousand.

But as a man of education and literary habits, the inventor of the power-loom, notwithstanding his deviation from his original track of thought and study when he began to give his attention to mechanics, may yet be said to have come even to that new line of pursuit with certain acquired advantages. He brought with him at least a mind

awakened to some knowledge of its own powers by the general cultivation it had received, and not undisciplined by its accustomed exercises to habits of speculation and inquiry. The individual we are now to mention, who also rose to eminence in what may be called a department of mechanics, was in these respects very differently circumstanced.

WILLIAM EDWARDS, the celebrated Welsh engineer, was born in 1719, in the parish of Eglwysilan, in Glamorganshire. He lost his father, who was a small farmer, when he was only two years old; but his mother continued to hold the farm, and was in this manner enabled to bring up her family, consisting of two other sons and a daughter, beside William, who was the youngest. Her other sons, indeed, were soon old enough to take the chief part of her charge off her hands. William, in the meantime, was taught, as he grew up, to read and write Welsh; and this was all the education he seems to have received. When about the age of fifteen he first began to employ himself in repairing the stone fences on the farm; and in this humble species of masonry he soon acquired uncommon expertness. The excellent work he made, and the despatch with which he got through it, at last attracted the notice of the neighbouring farmers; and they advised his brothers to keep him at this business, and to let him employ his skill, when wanted, on other farms as well as their own. After this he was for some time constantly engaged; and he regularly added his earnings to the common stock of the family.

Hitherto the only sort of building he had practised, or, indeed, had seen practised, was merely with stones without mortar. But at length it happened that some masons came to the parish to erect a shed for shoeing horses near a smith's shop. The operations of these architects were contemplated by William with the liveliest interest, and he used to stand by them for hours while they were at work, taking note of every movement they made. A circumstance that at once struck him was, that they used a different description of hammer from what he had been accustomed to employ; and, perceiving its superiority, he immediately got one of the same kind made for himself. With this he found he could build his walls both a good deal faster and more neatly than he had been wont to do. But it was not long after he had, for the first time in his life, had an opportunity of seeing how houses were erected that he undertook to build one himself. It was a workshop for a neighbour; and he performed his task in such a manner as obtained him great applause. Very soon after this he was employed to erect a mill, by which he still further increased his reputation as an able and ingenious workman. Mr. Malkin, to whose work on the Scenery, &c., of South Wales, we are indebted for these particulars of Edwards's early life, as well as for the materials of the sequel of our sketch, states that it was while building this mill, that the self-taught architect acquired his first knowledge of the principle of the arch.

After this achievement Edwards was accounted the best workman in that part of the country; and, being highly esteemed for his integrity and fidelity to his engagements, as well as for his skill, he had as much employment in his line of a common builder as he could undertake. In his twenty-seventh year, however, he was induced to engage in an enterprise of a much more difficult and important character than anything he had hitherto attempted.

Through his native parish, in which he still continued to reside, flowed the river called the Taff, which, following a southward course, falls at last into the estuary of the Severn. It was proposed to throw a bridge over this river at a particular spot in the parish of Eglwysilan, where it crossed the line of an intended road; but in the way of this design difficulties of a somewhat formidable nature presented themselves, owing both to the great breadth of the water, and the frequent swellings to which it was subject. Mountains covered with wood rose to a considerable height from both its banks, which first attracted and detained every approaching cloud, and then sent down its collected discharge in torrents into the river. Edwards, however, undertook the task of constructing the proposed bridge, though it was the first work of the kind in which he ever had engaged. Accordingly, in the year 1746, he set to work; and in due time completed a very light and elegant bridge of three arches, which, notwithstanding that it was the work of both an entirely self-taught and an equally untravelled artist, was acknowledged to be superior to anything of the kind in Wales. So far his success had been as perfect as could have been desired. But his undertaking was far from being yet finished. He had in conjunction with some friends given security that the work should stand for seven years; and for two years and a half all went on well. There then occurred a flood of extraordinary magnitude; not only the torrents came down from the mountains in their accustomed channels, but they brought along with them trees of the largest size, which they had torn up by the roots; and these, detained as they floated along by the middle piers of the new bridge, formed a dam there, the waters accumulated behind which, at length burst from their confinement and swept away the whole structure. This was no light misfortune in every way to poor Edwards; but he did not suffer himself to be disheartened by it, and immediately proceeded, as his contract bound him to do, to the erection of another bridge, in the room of the one that had been destroyed. He now determined, however, to adopt a very magnificent idea—to span the whole width of the river by a single arch, of the unexampled magnitude of one hundred and forty feet from pier to pier. He finished the erection of this stupendous arch in 1751, and had only to add the parapets, when he was doomed once more to behold his bridge sink into the water over which he had raised it, the extraordinary weight of the masonry having forced up the keystones,

and, of course, at once deprived the arch of what sustained its equipoise. Heavy as was this second disappointment to the hopes of the young architect, it did not shake his courage any more than the former had done. The reconstruction of his bridge for the third time was immediately begun with unabated spirit and confidence. Still determined to adhere to his last plan of a single arch, he had now thought of an ingenious contrivance for diminishing the enormous weight which had formerly forced the keystone out of its place. In each of the large masses of masonry called the haunches of the bridge, being the parts immediately above the two extremities of the arch, he opened three cylindrical holes, which not only relieved the central part of the structure from all over-pressure, but greatly improved its general appearance in point of lightness and elegance. The bridge with this improvement was finished in 1755, having occupied the architect about nine years in all; and it has stood ever since.

This bridge over the Taff—commonly called the New Bridge, and by the Welsh *Pont y Pridd*—was, at the time of its erection, the largest stone arch known to exist in the world. Before its erection the Rialto at Venice, the span of which was only ninety-eight feet, was entitled, as Mr. Malkin remarks, to this distinction among bridges; unless, indeed, we are to include the famous aqueduct-bridge at Alcantara, near Lisbon, consisting in all of thirty-five arches, the eighth of which is rather more than a hundred and eight feet in width, and two hundred and twenty-seven in height. The bridge at Alcantara was finished in 1732. Since the erection of the bridge over the Taff several other stone arches of extraordinary dimensions have been built both in our own country and in France—such, for instance, as the five composing the splendid *Pont de Neuilly* over the Seine near Paris, the span of each of which is a hundred and twenty-eight feet; the central arch of the bridge over the same river at Mantes, which is of the same dimensions; the *Island Bridge*, as it is called, over the Liffey near Dublin, which is a single arch of a hundred and six feet in width; the bridge over the Tees at Winston, in Yorkshire, which is also a single arch of a hundred and eight feet nine inches wide, and which was built in 1762 by John Johnson, a common mason, at a cost of only five hundred pounds; and the nine elliptical arches, each of a hundred and twenty feet span, forming the magnificent *Waterloo Bridge* over the Thames at London. But no one of these great works rivals in respect of dimensions the arch constructed by Edwards. The bridge over the Taff, we may add, rises to the height of thirty-five feet above the water, and is the segment of a circle of a hundred and seventy feet in diameter. Buttressed as it is at each extremity by lofty mountains, while the water flows in full tide beneath it, its aspect, as it is seen rising into the air, may well be conceived to be particularly striking and grand.

This bridge, which is looked upon as a wonder to this day, spread the fame of Edwards over all the country. He afterwards built many other bridges in South Wales, several of which consisted also of single arches of considerable width, although in no case approaching to that of the arch over the Taff. One which he erected over the Tawy near Swansea, had a span of eighty feet; another at Llandovery in Carmarthenshire was eighty-four feet wide; and a third, Wychbree Bridge, over the Tawy, was of the width of ninety-five feet. All the bridges which Edwards built after his first attempt have their arches formed of segments of much larger circles than he ventured to try in that case; and the roads over them are consequently much flatter, a convenience which amply compensates for their inferiority in point of imposing appearance. He found his way to this improvement entirely by his own experience and sagacity; as indeed he may be said to have done to all the knowledge he possessed in his art. Even his principles of common masonry, he used himself to declare, he had learned chiefly from his studies among the ruins of an old Gothic castle in his native parish. In bridge-building the three objects which he always strove to attain in the highest possible degree were, first, durability; secondly, freedom for the passage of the water under the bridge; and lastly, ease of traffic over it.

In commencing architect Edwards did not abandon the business of his forefathers. He was likewise a farmer to the end of his life. Nay, such was his unwearied activity that, not satisfied with his week-day labours in these two capacities, he also officiated on Sundays as pastor to an Independent congregation, having been regularly ordained to that office when he was about thirty years of age, and holding it till his death. He accepted the usual salary from his congregation, considering it right that they should support their minister; but, instead of putting the money into his own pocket, he returned it all, and often much more, in charity to the poor. He always preached in Welsh, although early in life he had also made himself acquainted with the English language, having embraced the opportunity of acquiring it under the tuition of a blind old schoolmaster, in whose house he once lodged for a short time while doing some work at the county town of Cardiff. He is said to have shown all his characteristic assiduity of application in this effort, and to have made a correspondingly rapid progress.

This ingenious and worthy man died in 1789, in the seventieth year of his age, leaving a family of six children, of whom his eldest son David became also an eminent architect and bridge-builder, although he had had no other instruction in his profession than what his father had given him. David's eldest son is also said to have inherited the genius of his father and his grandfather.

We will take advantage of the mention of Edwards's clerical occupation

to subjoin a few words respecting another clergyman, the *Wonderful* ROBERT WALKER, as he is still called in the district of the country where he resided, who was curate of Seathwaite, in Cumberland, during the greater part of last century. The fullest account that has appeared of Mr. Walker is that given in the notes to his series of sonnets entitled "The River Duddon," by Mr. Wordsworth, in whose poem of "The Excursion" the worthy clergyman is also noticed with the commendation due to his singular virtues. From this memoir we learn that Walker was born in the parish of Seathwaite, in 1709; that, being of delicate constitution, it was determined by his parents, whose youngest child he was, to breed him a scholar; and that accordingly he was taught the elements of reading, writing, and arithmetic by the clergyman of the parish, who also officiated as schoolmaster. He afterwards contrived to acquire some knowledge of the classics; and, becoming in this manner qualified for taking Holy Orders, was ordained and appointed to the curacy of his native parish, which was at this time (about the year 1735) of the value of five pounds per annum. On obtaining possession of this living, Walker married, his wife bringing him what he calls himself, in one of his letters, a "fortune" of forty pounds. We must refer to Mr. Wordsworth's pages, and the documents which will be found printed there, for a detail of all that the industry and economy of the curate and his wife contrived to accomplish upon these scanty resources. Suffice it to say that about twenty years after Walker's entrance upon his living, we find its value, according to his own statement, increased only to the amount in all of seventeen pounds ten shillings. At a subsequent period it received a further augmentation, to what amount is not stated; but it was not considerable. Before this Mr. Walker had declined to accept the adjoining curacy of Ulpha, to be held, as proposed by the bishop, in conjunction with that of Seathwaite, considering, as he says himself, that the annexation "would be apt to cause a general discontent among the inhabitants of both places, by either thinking themselves slighted, being only served alternately, or neglected in the duty, or attributing it to covetousness in me; all which occasions of murmuring I would willingly avoid." Yet at this time he had a family of eight or nine children. One of his sons he afterwards maintained at Trinity College, Dublin, till he was ready for taking Holy Orders. He was, like his predecessors in the same cure, schoolmaster as well as clergyman of his parish; but "he made no charge," says his biographer, "for teaching school; such as could afford to pay gave him what they pleased." His hospitality to his parishioners every Sunday was literally without limitation; he kept a plentiful table for all who chose to come. Economical as he was, no act of his life was chargeable with anything in the least degree savouring of avarice; on the contrary, many parts of his conduct displayed what in any station would have been deemed extraordinary disinterestedness and

generosity. Finally, at his death, in 1802, he actually left behind him no less a sum than two thousand pounds.

There is in all this, as Mr. Wordsworth remarks, something so extraordinary as to make some explanatory details necessary. "And to begin," he says, "with his industry; eight hours in each day, during five days in the week, and half of Saturday, except when the labours of husbandry were urgent, he was occupied in teaching. His seat was within the rails of the altar; the communion-table was his desk; and, like Shenstone's schoolmistress, the master employed himself at the spinning-wheel, while the children were repeating their lessons by his side. Every evening, after school-hours, if not more profitably engaged, he continued the same kind of labour, exchanging, for the benefit of exercise, the small wheel, at which he had sat, for the large one on which wool is spun, the spinner stepping to and fro. Thus was the wheel constantly in readiness to prevent the waste of a moment's time. Nor was his industry with the pen, when occasion called for it, less eager. Entrusted with extensive management of public and private affairs, he acted in his rustic neighbourhood as scrivener, writing out petitions, deeds of conveyance, wills, covenants, &c., with pecuniary gain to himself, and to the great benefit of his employers. These labours, at all times considerable, at one period of the year, viz., between Christmas and Candlemas, when money transactions are settled in this part of the country, were often so intense, that he passed great part of the night, and sometimes whole nights, at his desk. His garden, also, was tilled by his own hand; he had a right of pasturage upon the mountains for a few sheep and a couple of cows, which required his attendance; with this pastoral occupation he joined the labours of husbandry upon a small scale, renting two or three acres in addition to his own less than one acre of glebe; and the humblest drudgery which the cultivation of these fields required was performed by himself. He also assisted his neighbours in haymaking and shearing their flocks, and in the performance of this latter service he was eminently dexterous. They in their turn, complimented him with the present of a haycock, or a fleece; less as a recompense for this particular service than as a general acknowledgment. The Sabbath was in a strict sense kept holy; the Sunday evenings being devoted to reading the Scripture and family prayer. The principal festivals appointed by the Church were also duly observed; but through every other day in the week, through every week in the year, he was incessantly occupied in works of hand or mind; not allowing a moment for recreation, except upon a Saturday afternoon, when he indulged himself with a newspaper, or sometimes with a magazine. The frugality and temperance established in his house were as admirable as the industry. Nothing to which the name of luxury could be given was there known; in the latter part of his life, indeed, when tea had been brought into almost general

use, it was provided for visitors, and for such of his own family as returned occasionally to his roof, and had been accustomed to this refreshment elsewhere; but neither he nor his wife ever partook of it. The raiment worn by his family was comely and decent, but as simple as their diet; the homespun materials were made up into apparel by their own hands. At the time of the decease of this thrifty pair, their cottage contained a large store of webs of woollen and linen cloth, woven from thread of their own spinning. And it is remarkable that the pew in the chapel in which the family used to sit remained a few years ago neatly lined with woollen cloth, spun by the pastor's own hand. It is the only pew in the chapel so distinguished; and I know of no other instance of his conformity to the delicate accommodations of modern times. The fuel of the house, like that of their neighbours, consisted of peat, procured from the mosses by their own labour. The lights by which, in the winter evenings, their work was performed were of their own manufacture, such as still continue to be used in these cottages; they are made of the pith of rushes dipped in fat. *White* candles, as tallow candles are here called, were reserved to honour the Christmas festivals, and were perhaps produced upon no other occasions. Once a month, during the proper season, a sheep was drawn from their small mountain flock, and killed for the use of the family; and a cow, towards the close of the year, was salted and dried for winter provision; the hide was tanned to furnish them with shoes. By these various resources this venerable clergyman reared a numerous family; not only preserving them, as he affectingly says, "from wanting the necessaries of life," but affording them an "unstinted education, and the means of raising themselves in society."

All this, if not a lesson in the pursuit of knowledge, is at least a striking example of what assiduity and perseverance will do in any pursuit, as well as highly instructive with regard to one of the most important subjects that can engage the attention of literary or scientific students, the art, namely, of husbanding time and employing it to the best advantage. But with all his industry of another description, Mr. Walker did not find it impossible to nourish and exercise also his mental powers. "It might have been concluded," his biographer proceeds, "that no one could thus, as it were, have converted his body into a machine of industry for the humblest uses, and kept his thoughts so frequently bent upon secular concerns, without grievous injury to the more precious parts of his nature. How could the powers of intellect thrive, or its graces be displayed, in the midst of circumstances apparently so unfavourable, and when to the direct cultivation of the mind so small a portion of time was allotted? But, in this extraordinary man, things in their nature adverse were reconciled; his conversation was remarkable, not only for being chaste and pure, but for the degree in

which it was fervent and eloquent; his written style was correct, simple, and animated. Nor did his *affections* suffer more than his intellect; he was tenderly alive to all the duties of his pastoral office; the poor and needy he never 'sent empty away;' the stranger was fed and refreshed in passing that unfrequented vale; the sick were visited; and the feelings of humanity found further exercise among the distresses and embarrassments in the worldly estate of his neighbours, with which his talents for business made him acquainted; and the disinterestedness, impartiality, and uprightness which he maintained in the management of all affairs confided to him were virtues seldom separated in his own conscience from religious obligations. Nor could such conduct fail to remind those who witnessed it of a spirit nobler than law or custom; they felt convictions which, but for such intercourse, could not have been afforded, that, as in the practice of their pastor there was no guile, so in his faith there was nothing hollow; and we are warranted in believing that, upon these occasions, selfishness, obstinacy, and discord, would often give way before the breathings of his goodwill and saintly integrity. It may be presumed, also, while his humble congregation were listening to the moral precepts which he delivered from the pulpit, and to the Christian exhortations, that they should love their neighbour as themselves, and do as they would be done unto, that peculiar efficacy was given to the preacher's labours by recollections in the minds of his congregation, that they were called upon to do no more than his own actions were daily setting before their eyes."

What may be deemed out of character, we may merely add, in some of the occupations in which this excellent clergyman was wont to employ himself, ought to be judged of with a reference both to the times in which he was born and grew up, and to the simple and sequestered population among whom it was his lot to pass his life. "Had he lived," says Mr. Wordsworth justly, "at a later period, the principle of duty would have produced application as unremitting: the same energy of character would have been displayed, though in many instances with widely different effects."

CHAPTER XL.

PURSUIT OF KNOWLEDGE BY TRAVELLERS:—LITHGOW; WALKING STEWART; ATHENIAN STUART; LEDYARD; BELZONI.—CONCLUSION.

WE have already adverted to the practice which prevailed among the earlier Greek philosophers of seeking knowledge by travelling into foreign parts, and have mentioned Solon, Pythagoras, Democritus, and others, as

having resorted to this method of storing their minds with information and enlarging their capacities of thought. Homer himself was traditionally reported to have acquired his various knowledge of mankind and of nature, by having actually perambulated the different lands of which he sung. Plato did not open his Academy till he had visited both Italy and Egypt, and come back to his native Athens fraught with all the learning both of the East and the West. Herodotus, the Father of History, spent the greater part of his life in travelling over Egypt, Libya, Assyria, Scythia, Thrace, Macedonia, and the different states and isles of Greece, by way of preparation for his great work, which is filled with descriptions of what its author had seen with his own eyes in these journeyings, and with accounts of transactions and events, the circumstances of which he had collected in the places where they happened. In those days foreign travel offered to a liberal curiosity almost its only opportunity of learning much, either of other countries, or even of some of the most interesting and important branches of scientific knowledge. Now all learning is recorded in books, and books are in the hands of everybody. Whatever new light breaks forth in one country spreads itself in this way over every other, almost as instantaneously as the light of the risen sun over the hemisphere. Books even bring other countries themselves, as it were, home to us, and enable us to make ourselves to a certain extent familiar with them and their inhabitants without crossing our thresholds. But in the days of Plato and Herodotus, this fireside travelling; as it has been quaintly called, was, like many of our other modern luxuries, comparatively unknown. The books that existed were few, and to the generality of people almost as if they did not exist at all. Nor had more than a very small portion even of the philosophic knowledge of which mankind were already in possession been as yet collected into these convenient depositories. It mostly floated still upon the breath of men's lips, and was to be sought for in distant countries where the living sages dwelt. Thither, therefore, the student repaired as to his university. Nor was the necessity which was thus imposed upon him, of becoming a traveller at the same time that he became a student, without some peculiar advantages, unfavourable as such a condition of things was upon the whole to the rapid and general diffusion of knowledge. It might be a question whether the fabric of philosophy, which arose in Greece between the age of Pythagoras and that of Plato, may not have been indebted for something of its imposing mould and lineaments of finer beauty, to the more extended and varied views of the world and of mankind, which were acquired by its founders and constructors in their extensive wanderings. The abundant supply we now have of the reflected light of books, and its commodiousness for ordinary purposes, have well nigh turned away the eyes of ordinary students from the use and the desire of any other, and abolished altogether from the

customary methods of education, both that direct communication of mind with mind, and that intercourse with things themselves instead of the mere words by which they are dimly shadowed forth, whereby the great thinkers of earliest antiquity were chiefly nurtured. May not the effect be somewhat analogous to what would be produced on the bodily organ of vision by withdrawing it altogether from the natural light of day, and confining it to artificial light?

Books, immense as their value really is, are overrated when it is supposed that they may be made to teach us everything. Many of the items which constitute the mass of human knowledge have not yet found their way into books, but remain still loose and ungathered among the habits and daily transactions of society, or of some particular portion of it, from intercourse with which they are much more easily and perfectly learned than they could be from books, were they actually to be there recorded. But much of what meets us in our direct intercourse with the world, and supplies us with the richest sources of reflection and speculation, does not admit of being transferred to books at all. Indeed what should any one of us know of that country, or portion of society, with which we happen to be most familiar, if all our knowledge of it consisted merely either of what has been, or of what could be, set down about it in books? What mere description, even the most minute and faithful, ever placed before any man an exact representation even of a scene in the world of inanimate nature? The copy, it is true, simply by virtue of its being a copy, may have charms which the reality wants; but that is not the question. The one is something entirely *different* from the other, and produces a different impression upon the mind. Much more must this be the case when the subject of the description is something that, from the more various, complicated, and shifting nature of its relations and lineaments, and from much of its character not showing itself to the eye at all, still less admits of being thrown into the shape of a picture. The moral condition, indeed, of a country and its inhabitants is constituted by so multifarious a concourse of circumstances, that their number and diversity alone would preclude them from being adequately represented in their working and effect by any description. To be felt and understood in their real power and combined agency, they must be seen and experienced. A general judgment with regard to the matter may undoubtedly be formed from the reports of others; and from such reports also, filled up and coloured by the mind of the reader or hearer, a sufficiently vivid picture of something having a certain resemblance to the original may be drawn; but the real features of that original are nevertheless sure to be in a thousand respects misconceived. Hence with regard to certain subjects, and these neither the least interesting nor the least important to be known, travelling becomes a means of acquiring knowledge, for which in fact there is no substitute.

Crowded, too, as is this path of enterprise with so many both of the hazards and the opportunities most alluring to a warm imagination, it is not to be wondered at that it should always have had a peculiar charm for active and adventurous spirits, and that in no other pursuit whatever should greater toils, privations, and dangers, have been encountered and overcome.

In the small space that now remains to us we cannot attempt to enumerate many names from the long catalogue of celebrated travellers; but our work would be incomplete without a reference to a few of the most distinguished of those examples which recent times have afforded of this species of devotion in the pursuit of knowledge. There is no other, as we have just remarked, which has sustained men in the endurance of more severe and prolonged suffering, or more frequently tempted them to peril everything, even life itself, in the effort to attain their object.

Some have performed journeys of wonderful extent and difficulty on foot. Of this class is WILLIAM LITHGOW, who was born in Scotland about the end of the sixteenth century. This person, in a history of his adventures, which he published in 1614, and which has been more than once reprinted, computes the extent of his pedestrian wanderings over various countries in Europe, Asia, and Africa, at no less than thirty-six thousand miles. He underwent many hardships in the course of his peregrinations; but the worst misfortune which befel him was what he suffered in his return home, when he was seized at Malaga, in Spain, by the Inquisition, and subjected both to the ordinary and the extraordinary torture. So dreadfully was he disabled by the injuries he received on this occasion, that after he reached England, and it was proposed that he should make his appearance at Court to present his book to James I., he had to be carried thither on a litter, his worn and emaciated frame exciting the astonishment of all who saw him. Lithgow, who afterwards recovered his health, died in 1640. The late MR. JOHN STEWART, commonly called Walking Stewart, affords us another instance which deserves to be commemorated under this head. Mr. Stewart had only recently gone out to Madras as a writer in the service of the East India Company, when, in the year 1765, he formed the extraordinary resolution of leaving the Presidency, and setting out to travel on foot over the world. The first thing which he did, in pursuance of this determination, was to write a letter to the Directors, in which he told them that he "was born for higher pursuits than to be a copier of invoices and bills of lading to a company of grocers, haberdashers, and cheesemongers." This heroic epistle, which doubtless not a little amused the persons to whom it was addressed, is said to be still preserved among the records of the Company. Its spirited author lost very little time, after despatching it, in proceeding to execute his project. He first directed his course to Delhi; and he subsequently visited in the same manner almost every other part of the

Indian peninsula, and even extended his excursions to Persia, and, crossing the Red Sea, traversed a considerable portion of the opposite continent of Africa. Finally, he determined to make out the journey to Europe on foot, which he actually accomplished, arriving at length in safety at Marseilles, after surmounting a long succession of difficulties by the most unconquerable perseverance. He then made a tour through Spain, and afterwards walked across France to his native country. But he had not come home, even after all this exertion, to repose from his toils. He soon after set out on a pedestrian perambulation over England, Scotland, and Ireland; and, that finished, he proceeded to the New World, and walked over the greater part of the United States. Such performances will be acknowledged to have amply earned for their author the epithet by which he was distinguished.

Walking Stewart must not be confounded with his contemporary, Mr. JAMES STUART, commonly called Athenian Stuart, from his splendid work entitled "The Antiquities of Athens," who, it so happens, is also famous for his travels, a considerable part of which was performed on foot. Indeed, Stuart's life is altogether a fine instance of devotion to the pursuit of knowledge. He was born in London in 1713, and by the early death of his father was left, while yet a boy, to support his mother and her three younger children by the exercise of his almost uninstructed talents in the humble occupation of painting fans. While sustaining this heavy charge, he found time to study, almost without assistance, not only the higher departments of the art of drawing, but anatomy, geometry, and other branches of science, the knowledge of which he deemed essential to his professional progress as a draftsman and painter. He even taught himself Latin, excited by a desire to understand the inscriptions in that language which he used to see under engravings; and he afterwards proceeded to the study of Greek. But the knowledge he found in books was insufficient to satisfy him; he could take no rest until he had seen with his own eyes those lands of Italy and Greece of which he had read so much. He therefore made preparations for travel; and let it be recorded to his honour that the first thing he did was to exert himself to obtain situations for his sister and his two younger brothers, which, although humble, might enable them to support themselves and their mother during his absence. An anecdote is also told of him which places in a striking point of view the resolute enthusiasm with which he set out on his enterprise. He had a dangerous wen on his face, which a surgeon whom he consulted advised him to endeavour to get removed before commencing his travels. As the least hazardous mode of treatment, it was at the same time proposed to submit it to a course of medical applications which would occupy a considerable time. Stuart himself, however, immediately asked if an operation could not be attempted. On being informed, in reply, that it

certainly might, but that it would be attended with some danger, he reflected a moment, and then, placing himself on a chair, requested the surgeon to proceed immediately to apply the knife; "I," said he, "shall not stir." The operation, fortunately, was performed with perfect success. Stuart then set out on foot, and in this manner accomplished the journey to Rome. He had little or no money in his pocket; but he supported himself on his way by the paintings which he executed and sold. While at Rome he became acquainted with Mr. Revett, the architect, with whom he afterwards proceeded to Greece. It was during a residence of some years in that country that he collected the materials for his great work, already mentioned, which was published in 1762, and immediately introduced its author both to fame and to abundant and lucrative employment in the new profession of an architect, which he had resolved to embrace. He was afterwards appointed surveyor of Greenwich Hospital, and became a Fellow of the Royal and of the Antiquarian Societies. Mr. Stuart died in 1788.

If our object were to enumerate the important accessions which have been made both to geography and the other sciences by persons who have devoted their lives to travelling, there are many other names of greater eminence which would claim our attention; but, for our particular purpose, we must select our notices with reference, not so much to the positive discoveries which the traveller may have made, as to the spirit of enterprise he has displayed, and the extraordinary sacrifices to which he has submitted for the sake of his object; and, estimated by that criterion, there is, perhaps, no name that ought in this department of exertion to be placed before that of JOHN LEDYARD. Ledyard was born in the year 1751, in Connecticut, in North America. His father, who was the captain of a vessel employed in the West India trade, died at the early age of thirty-five, leaving his widow, with John and three younger children, almost destitute of any means of support. Some time after this Mrs. Ledyard married again, on which the subject of our notice went to live with his grandfather, who took upon himself the charge of educating and providing for him. The strange and shifting history of his youth we can only sketch very rapidly. After having been kept for some time at a grammar-school in the town of Hartford, where he acquired some acquaintance with the classical tongues, he was sent to a lawyer's office. Here he remained only a few months, when, finding law not at all to his taste, he abandoned the study. He was now nineteen; and he seems to have passed a year or two more of his life in doing nothing. At last, in the beginning of the year 1772, he determined to enter himself a student at a college which had been recently established at Hanover, in New Hampshire, for the education of missionaries to be employed in converting the Indians. In entering upon this new pursuit, the principal part of his equipment consisted of

a collection of dresses and scenery, which he took with him to the college for the purpose of indulging his taste for theatrical amusements, of which he had some time before become passionately fond. After persevering in his studies for four months, he one day, tired of the quiet life he had been leading, left the college, without leave or notice of his intention, and bent his steps to the woods, where he wandered about with the Indians for about three months and a half. He then returned to college; but after a residence of three or four months longer, he again made his escape, this time embarking in a canoe which, with the assistance of some of his fellow-students, he had hollowed out of a large tree, with the intention of descending the Connecticut to Hartford. The distance was not less than a hundred and forty miles, and there were dangerous falls and rapids in many parts of the river; but the intrepid navigator accomplished his voyage without any accident, although, on one occasion, while he lay at his length in his bark, wrapped up in his bear-skin, and absorbed in the perusal, it is uncertain whether of his Greek Testament or his Ovid, the only two books he had taken with him, he very narrowly escaped being sucked down a formidable precipice. His missionary zeal having completely evaporated, his views were now turned to the regular ministry; but, although he began the prescribed preliminary studies, his impatience to be actually engaged in preaching would not allow him to proceed in this course, and he exerted himself, with his characteristic spirit and energy, to carve out, if possible, a shorter road to his object. But we must refer the reader to the very interesting memoirs of his life and travels, published by his countryman, Mr. Sparks, for a detail of his various adventures in this pursuit. Suffice it to say that, after many ridings to and fro, he could not prevail upon the reverend gentleman to whom he applied for immediate ordination to accede to his request. This determined him to bid a final adieu to theology; and, in a few weeks after, he entered himself as a common sailor on board a trading vessel bound to the Mediterranean. He was now for the first time in a line of life suited to his restless and daring character of mind; still, not quite satisfied, he took an opportunity, while the ship was lying at Gibraltar, of leaving it, and enlisting as a soldier. But by the exertions of the captain, who was his friend, his release was obtained from this new engagement; and he returned to the vessel, and completed his voyage back to America. He had no intention, however, of remaining at home. In a letter which he wrote to one of his friends from Gibraltar he had said, "I allot to myself a seven years' ramble more, although the past has long since wasted the means I possessed;" and, in conformity with this resolution, he next set out on a voyage to England, entering himself again as a common sailor on board a vessel bound for Plymouth. From Plymouth he begged his way to London, where he expected to find some relations; but, being unsuc-

successful in a short search he made after them, he addressed himself to Captain Cook, who was then (in 1776) setting out on his third and last voyage, and was by him engaged to accompany the expedition in the capacity of a corporal of marines. He was now at last embarked in good earnest on such a *ramble* as he had long been desirous of, and had a chance of seeing something of the world.

In the course of his voyage, Ledyard distinguished himself on various occasions by his activity, courage, and spirit of adventure. At the island of Onalaska, on the north-west coast of America, he was selected by Cook to go alone on an expedition into the interior, in quest of a European settlement which there was reason to believe existed there; and this hazardous commission he executed with great ability and perfect success, having, after a journey of two days, arrived among a small colony of Russians, three of whom he brought back with him to the ship. At Owhyhee his enterprising disposition prompted him, accompanied by two other persons belonging to the expedition, to attempt the ascent of the celebrated volcanic mountain called *Monna Roa*, which has been computed to be about eighteen thousand feet high. After persevering, however, for two days, the party found themselves obliged to return without having reached the summit. The mountain has since been ascended by Lord Byron and several of his officers, when he carried home the bodies of the king and queen of the Sandwich Islands in his majesty's ship *Blonde*, in 1824-5.* Ledyard also headed the party of marines who were with Captain Cook when he was killed at this island. He continued for two years longer in the navy after returning from his voyage round the world; and then, having found himself in December, 1782, in a man-of-war stationed near New York, he considered it his duty to embrace the opportunity of leaving the service of a country with which his own was now engaged in hostilities. He made his escape, accordingly, from the ship, and returned for a short time to his native village, from which he afterwards transferred himself to Hartford. During four months which he spent here, he employed himself in writing an account of his adventures while on board Cook's ship, which was published. Like everything that Ledyard wrote, this work, without much polish of diction, abounds in the traces of a vigorous mind accustomed to suffer no opportunity to pass unimproved of storing itself with materials for reflection. After seeing his book through the press, his old desire of roaming, only made more restless and impatient by the partial gratification it had already enjoyed, roused him again to new schemes and new labours.

His first project was a trading voyage to the north-west coast of his native continent; and he expended much time and exertion in vain endeavours to induce some of his mercantile countrymen to entrust him

* See his *Voyage*, pp. 169—191.

with the conduct of such an enterprise. He then resolved to repair to Europe, in hopes of better success in that quarter; and, taking ship accordingly, he arrived at Cadiz in August, 1784. From hence he soon after sailed for Brest, and proceeded afterwards to L'Orient, where he intended to announce his plan. At first the persons to whom he had brought letters seemed to enter into his views as warmly as he could desire; and a negotiation was nearly concluded for securing his services to conduct the proposed adventure. After being amused, however, for nearly a year by the expectations thus excited, he was doomed to be again disappointed: some obstacles, of a nature not well ascertained, suddenly presented themselves, and the scheme was abandoned. On this Ledyard proceeded to Paris, where he made himself known to the American minister, Mr. Jefferson, who gave him a very encouraging reception, and exerted himself to promote his object. Here he also met with the celebrated Paul Jones; and that enterprising commander, on being informed by him of his scheme for an expedition to the north-west coast of America, at once agreed to join him in it, and to advance the funds necessary for undertaking it on a large scale; but, after four or five months, this plan also fell to the ground. Hitherto Ledyard had been supported, according to stipulation, by the parties with whom he had successively entered into these fruitless negotiations; but now he was entirely without resources. In this condition he was reduced to the necessity of becoming a pensioner upon the bounty of various distinguished persons whose regard he had acquired, among whom Mr. Jefferson and the Marquis de la Fayette are particularly mentioned. Meanwhile he made still another attempt to induce a mercantile company to enter into his favourite project; but, after keeping him for several months in suspense, it failed like the others.

Hopeless as he had now become of succeeding in his original plan, he still clung to his determination to find his way, if possible, by some means or other, to the north-west part of the American continent, with the view of exploring that vast and as yet almost unknown region. He resolved, therefore, to attempt the attainment of his object in a new way: namely, by travelling overland to the north-eastern extremity of Asia, through Russia and Siberia, and then crossing Behring's Strait to the quarter he was desirous of reaching. But, while he was making preparations for setting out on this adventure, he was induced suddenly to start for London by a letter from a friend in that city, offering him a free passage in a vessel which was about to sail for the Pacific Ocean, and which would set him ashore at any part of the American coast he might choose. On arriving in the English metropolis he was introduced to Sir Joseph Banks and other eminent scientific characters. His plan of operations was very soon arranged. He determined to land at Nootka Sound, and from thence, penetrating at once into the interior, to make

his way across the wilderness to Virginia; but this daring design, like his former attempts, was destined to be frustrated long before he had encountered any of its dangers. The vessel in which he had embarked had sailed down the river and put out to sea, when, just as they were losing sight of the land, she was seized and brought back by order of government, in consequence of some irregularity in clearing at the custom-house, and eventually adjudged to be forfeited. On this occasion Ledyard lost all the property he had in the world, which did not, however, amount to much, the principal part of it consisting of two great dogs, an Indian knife, and a hatchet, which he had purchased with some money given him by the gentleman (Sir James Hall) at whose invitation he had come to London.

On this disappointment he immediately turned his thoughts again to his plan of travelling across Europe and Asia by land; and accordingly, in December, 1786, he set out for Hamburgh, where he arrived with only ten guineas in his pocket, part of the produce of a subscription which had been made for him in London, the remainder of which appears to have been expended in providing himself a second time with a couple of great dogs, and other articles which constituted his simple equipment for a journey across the American continent. Here he heard of a countryman of his own, a Major Langhorn, who was reported to him as having as great a passion for travelling as himself, and who was now at Copenhagen in the course of a perambulation he had been making over the North of Europe. Having reason to suspect that Langhorn was in want of money, the generous Ledyard immediately determined to render him all the succour his own scanty resources would permit. "I will fly to him," says he, in a letter to a friend, "with my little all, and some clothes, and lay them at his feet. 'At this moment I may be useful to him: he is my countryman, a gentleman, a traveller. He may go with me on my journey: if he does, I am blessed; if not, I shall merit his attention, and shall not be much out of my way to Petersburg.'" Full of these visions he set out for Copenhagen, where on his arrival he found the person of whom he was in quest, in the predicament he had anticipated, and in so complete a state of destitution, indeed, that he could not leave his room for want of decent clothes. Ledyard's ten guineas soon remedied this inconvenience; and even enabled the two to enjoy a very pleasant fortnight in each other's society. But when Ledyard at last proposed to his friend to accompany him to Petersburg, Langhorn's reply was abundantly frank and decisive: "No," said he; "I esteem you, but I can travel in the way I do with no man on earth."

Ledyard therefore, having contrived to recruit his finances by drawing a bill for a few pounds on the secretary to the American embassy in London, which he was fortunate enough to find a person willing to discount, proceeded on his journey alone. When he came to the usual

place for crossing the Gulf of Bothnia, he found that his deviation from the direct line of his route in pursuit of Langhorn had lost him his only opportunity of passing over that season; for the winter had turned out what is called an open one, that is to say, the water had not, as it commonly does, frozen all over, so as to form a road for sledges, while at the same time the masses of floating ice made sailing through it impracticable. This was a disappointment which for a moment disconcerted and struck down even Ledyard's courage; but it was only for a moment. To turn back was out of the question; to remain for several months where he was, in inactivity, as little suited his inclination; he therefore resolved to travel round by the northern extremity of the gulf, and so to reach its opposite coast by a journey of above twelve hundred miles through the most desolate regions of the inhabited globe; and all this labour was only to reach a point to which the distance directly across the gulf was not more than fifty miles. He actually accomplished his formidable undertaking in an extraordinarily short space of time, considering the nature of the country through which he had to make his way, having reached Petersburg within seven weeks after leaving Stockholm, which was travelling at the rate of about two hundred miles a week.

On arriving at Petersburg his money, as might be supposed, was quite exhausted, and even his clothes were torn to pieces. He was again fortunate enough, however, to obtain twenty guineas by drawing a bill on Sir Joseph Banks, for the payment of which the discounteer was willing to depend on that gentleman's generosity. Thus provided he set out for Siberia in company with a Dr. Brown, a Scotch physician, who was going thither on a commission from the government. The travellers proceeded together to Tobolsk, and from thence to Barnaoul, the capital of the province of Kolyvan, where they parted. "How I have come thus far," writes Ledyard from this place to Mr. Jefferson, on the 29th of July, "and how I am to go still farther, is an enigma that I must disclose to you on some happier occasion. My health is perfectly good; but, notwithstanding the vigour of my body, my mind keeps the start of me, and I anticipate my future fate with the most lively ardour. Pity it is, that in such a career one should be subjected, like a horse, to the beggarly impediments of sleep and hunger." After spending a week at Barnaoul, he set out for Irkutsk with the courier who had charge of the mail. Here he remained about ten days, during which time he visited the lake of Baikal, and the other scenery in the neighbourhood. He then proceeded in a boat down the river Lena, and arrived at Yakutsk after a voyage of twenty-two days. This, however, was destined to be the termination of his journey. The Russian government, which at the solicitation of some of his friends in Paris had professed to grant him its protection, and had hitherto forwarded him on his way, is supposed to have been all along determined, nevertheless, that he should not reach

the coast of America, where a fur company had been recently established, the concerns of which the national jealousy was unwilling to expose to the inspection of the subject of another state. The commandant at Yakutsk, accordingly, contrived in the first instance to persuade him to remain there during the winter, contrary to his own earnest wishes to proceed, and on representations which he afterwards found to be quite false. "What, alas! shall I do?" he says in his journal, on finding himself all but detained by force, and not without reason to apprehend that even that might be employed, if necessary, to prevent him from pursuing his journey. "What shall I do, for I am miserably prepared for this unlooked-for delay? By remaining here through the winter, I cannot expect to resume my march until May, which will be eight months. My funds! I have but two long frozen stages more, and I shall be beyond the want or aid of money, until, emerging from the deep deserts, I gain the American Atlantic States; and then, thy glowing climates, Africa, explored, I will lay me down, and claim my little portion of the globe I have viewed: may it not be before." He goes on to lament his poverty as forming, after all, the chief entanglement which had induced him to yield to the commandant's importunities. With regard to his proposed journey, which had been represented to him as impracticable, he says, in a letter to Colonel Smith. "I do not believe it is so, *nor hardly anything else.*" But he adds that he was somewhat reconciled to his detention by one consideration among others, namely, that he was *without clothes, and with only a guinea and one-fourth in his purse.* While at Yakutsk he employed himself diligently in studying the peculiarities of the country and its inhabitants, and keeping all the while a regular journal of his observations. It was here that he wrote his celebrated eulogy on woman, which has been so often quoted. But, after he had been a few months at Yakutsk, he was induced to embrace an opportunity which offered of returning up the river in a sledge over the ice to Irkutsk. This journey of fifteen hundred miles, he accomplished in seventeen days. In four or five weeks after his arrival at Irkutsk he was seized by an order of the Russian government, and immediately despatched in custody to Moscow, from whence he was sent forward in the same condition to Poland, and there set at liberty, with an intimation that he might now go wherever he pleased, but that, if he ever again set foot in the Russian dominions, he would certainly be hanged. We will leave him to tell the remainder of his story in his own words. "I had penetrated," says he, in his journal, "through Europe and Asia, almost to the Pacific Ocean; but, in the midst of my career, was arrested a prisoner to the Empress of Russia, by an express sent after me for that purpose. I passed under a guard part of last winter and spring; was banished the empire, and conveyed to the frontiers of Poland, six thousand versts from the place where I was arrested, and the journey was performed in six weeks. Cruelties

and hardships are tales I leave untold. I was disappointed in the pursuit of an object on which my future fortune entirely depended. I know not how I passed through the kingdoms of Poland and Prussia, or from thence to London, where I arrived in the beginning of May, disappointed, ragged, penniless; and yet so accustomed am I to such things that I declare my heart was whole." His health, he acknowledges, had suffered for the first time from his confinement, and the rapidity with which he had been hurried through Tartary and Russia; but a few days rest, he adds, in Poland had re-established it, "and I am now," he says, "in as full bloom and vigour as thirty-seven years will afford any man."

When Ledyard found himself in London, one of the first persons on whom he called was his friend Sir Joseph Banks. This gentleman, after hearing from him the story of his disasters, and learning that he had now no particular object in view, told him of the Association which had just been formed, and of which he was himself one of the leading members, for prosecuting discoveries in the interior of Africa. This was news which made Ledyard's heart leap with joy; and having received a letter of introduction from Sir Joseph, he went with it directly to Mr. Beaufoy, the secretary of the Association. "Before I had learned from the note the name and business of my visitor," said Mr. Beaufoy, "I was struck with the manliness of his person, the breadth of his chest, the openness of his countenance, and the inquietude of his eye. I spread the map of Africa before him, and tracing a line from Cairo to Sennaar, and from thence westward in the latitude and supposed direction of the Niger, I told him that was the route by which I was anxious that Africa might, if possible, be explored. He said he should think himself singularly fortunate to be trusted with the adventure. *I asked him when he would set out.* 'To-morrow morning,' was his answer."

It was not possible to get his instructions and letters ready with all the expedition that would have satisfied the wishes of the eager and heroic adventurer. But he at last left London. "Truly it is written," he exclaims in the exultation of his heart, in a letter addressed immediately before his departure to his mother, "that the ways of God are past finding out, and His decrees unsearchable. Is the Lord thus great? So also is He good. I am an instance of it. I have trampled the world under my feet, laughed at fear, and derided danger. Through millions of fierce savages, over parching deserts, the freezing North, the everlasting ice, and stormy seas, have I passed without harm. How good is my God! What rich subjects have I for praise, love, and adoration!" To Mr. Beaufoy, the last time they were together, on the morning of his departure, he said, with perhaps a somewhat sadder, but not a less resolute spirit, "I am accustomed to hardships. I have known both hunger and nakedness to the utmost extremity of human suffering. I have known what it is to have food given me as charity to a madman;

and I have at times been obliged to shelter myself under the miseries of that character, to avoid a heavier calamity. My distresses have been greater than I have ever owned, or ever will own to any man. Such evils are terrible to bear; but they never yet had power to turn me from my purpose. If I live, I will faithfully perform, in its utmost extent, my engagement to the Society; and if I perish in the attempt, my honour will still be safe, for death cancels all bonds."

We have little more to relate of poor Ledyard. From London he proceeded to Paris, and from thence to Marseilles, where he took ship for Alexandria. From Alexandria he pursued his journey up the Nile to Cairo, where he arrived on the 19th of August. His intention was to set out at the proper season with the caravan from this city to Sennaar; and in the meantime he occupied himself in studying the character and manners of the people among whom he was, and gaining as much as he could of the information most likely to be useful to him in his future progress. He kept, as usual, a journal of his observations, copious extracts from which have been printed in the "Proceedings of the Association." But towards the end of November, when the caravan which he intended to accompany was just on the point of setting out, he was attacked by a bilious complaint; and, after all his hopes, this long looked for opportunity of prosecuting his journey seemed on the point of being lost. In his extreme anxiety in these circumstances to get rid of his indisposition as speedily as possible, he took so large a dose of the common remedy, vitriolic acid, as to produce the most violent pains, which the best medical skill in Cairo was exerted in vain to remove or alleviate; and he perished a victim to his zeal and precipitancy.

There never beat a heart animated by a warmer or more disinterested love of the path of public duty which it had chosen, than that which death had now laid low. Mr. Sparks's memoir, to which we have been indebted for the materials of our rapid sketch, contains many other anecdotes of his generous self-devotion which our space does not permit us to notice. The following passage, however, from a letter addressed to his employers, one of the last he ever wrote, presents so fine a picture of a mind elevated by some of the noblest feelings of which our nature is susceptible, that we quote it as a fit conclusion to the account we have given of the writer. "Money!" he exclaims, "it is a vile slave! I have at present an economy of a more exalted kind to observe. I have the eyes of some of the first men of the first kingdom on earth turned upon me. I am engaged by those very men in the most important object that any private individual can be engaged in. I have their approbation to acquire or to lose; and their esteem, also, which I prize above everything, except the independent idea of serving mankind. Should rashness or desperation carry me through, whatever fame the vain and injudicious might bestow, I should not accept of it; it is the good and great I look

to; fame bestowed by them is altogether different, and is closely allied to a 'Well done' from God; but rashness will not be likely to carry me through, any more than timid caution. To find the necessary medium of conduct, to vary and apply it to contingencies, is the economy I allude to; and, if I succeed by such means, men of sense in any succeeding epoch will not blush to follow me, and perfect those discoveries which I have only abilities to trace out roughly, or a disposition to attempt. A Turkish sofa has no charms for me: if it had, I could soon obtain one here. Believe me, a single 'Well done' from your Association has more worth in it to me than all the trappings of the East; and what is still more precious is, the pleasure I have in the justification of my own conduct at the tribunal of my own heart."

Ledyard, as is well known, was the first of too long a list of courageous adventurers who have one after another sacrificed their lives in the cause of African discovery; and, did our limits permit, the names of Houghton, Hornemann, Park, Laing, Clapperton, and many others, might each furnish us with an example, not unworthy to be compared with his, of fearless resolution, and perseverance which only death could overcome. But all that we can attempt now is to sketch very briefly the career of one who, although he also perished in that enterprise, fatal to so many of his forerunners, the attempt to penetrate into central Africa, is and will continue to be chiefly remembered for his researches and discoveries in another quarter of the same great continent; we mean the lamented Belzoni. GIOVANNI BATTISTA BELZONI was born in 1778 at Padua, where his father was a barber. The family, however, had belonged originally to Rome; and it is related that Belzoni, when only thirteen years of age, betrayed his disposition for travelling by setting out one day along with his younger brother to make his way to that city, which he had long been haunted by a passionate desire to see, from hearing his parents so often speak of it. The failing strength and courage of his brother, however, forced him to relinquish this expedition, after they had proceeded as far as the Apennines; and he returned once more to assist his father in his shop, as he had already for some time been doing. But when he was three years older, nothing could detain him any longer in his native place; and he again took the road to Rome, which this time he actually reached. On his first arrival he is said to have applied himself to the acquirement of a knowledge of the art of constructing machines for the conveyance and raising of water, with the view probably of obtaining a livelihood by the exhibition of curious or amusing experiments in that department of physics. It appears, however, that he eventually adopted the profession of a monk, as offering an easier or surer way of gaining his bread.

The conquest of northern Italy by the French in 1800 brought him the opportunity, which he embraced, of throwing off his monastic habit,

heartily tired as he was by this time of the idleness and obscurity to which it consigned him. He led now for some years a wandering life, returning in the first instance to his native town, and then proceeding to Holland, from whence, in about a year afterwards, he came back to Italy. Meanwhile he had attained so uncommon a height, with strength proportioned to it, that he was an object of wonder wherever he was seen. It was probably with the expectation of being able to turn these personal advantages to account that he determined, in 1803, to come over to England. On arriving here, accordingly, he first attempted to gain a maintenance by perambulating the country, exhibiting hydraulic experiments and feats of muscular strength; and, accompanied by his wife, an Englishwoman, whom he had married soon after his arrival, he visited with this object all the principal towns both of Great Britain and Ireland. He was afterwards engaged for some time at Astley's amphitheatre; and altogether he continued for about nine years in England.

At last, seeing no prospect of improving his circumstances in this country, in 1812 he sailed with his wife for Lisbon. Here he soon obtained an engagement from the director of the San Carlos theatre; at the expiration of which he proceeded to Madrid, where for a time he also attracted considerable attention by his performances. From Madrid he went to Malta; and here, it is supposed, the first idea suggested itself to him of passing over to Egypt, as others of his countrymen had already done, and offering his services to the Pacha, the famous Mahomet Ali, himself a model of energy and activity, and the liberal patron of resolution and enterprise. Accordingly, carrying with him a recommendation from a Maltese agent of the Pacha, he proceeded, still accompanied by his wife, to Cairo. On presenting himself to Ali, he was immediately engaged, on the strength of his professed skill in hydraulics, to construct a machine for watering some pleasure-gardens at Soubra, on the Nile. This undertaking, it is said, he accomplished to the Pacha's satisfaction; but an accident having occurred to one of the persons looking on, on the first trial of the machine, the Turkish superstition, under the notion that what had happened was a bad omen, would not suffer the use of it to be continued. This misfortune, at the same time, put an end to all Belzoni's hopes of further employment from the Pacha; and he was once more probably as much at a loss what to betake himself to as he had ever before been in his life.

The state of destitution, however, in which he found himself, led to his entering upon a new career, in which he was destined to acquire great distinction. The late Mr. Salt was at this time the English consul in Egypt, and, embracing the opportunity which his situation afforded him, was actively employed in investigating and making collections of the precious remains of antiquity in which that country abounded. For this purpose he kept several agents in his pay, whose employment it was to

make researches in all directions after interesting objects of this description. To Mr. Salt Belzoni now offered his services in this capacity; and he was immediately employed by that gentleman in an affair of considerable difficulty, namely, the removing and transporting to Alexandria of the colossal granite bust of Memnon, which lay buried in the sands near Thebes. The manner in which Belzoni accomplished this his first enterprise in his new line of pursuit at once established his character for energy and intelligence. Dressing himself as a Turk, he proceeded to the spot, and there half persuaded and half terrified the peasantry into giving him the requisite assistance in excavating and embarking the statue, till he had the satisfaction at last of seeing it stowed into the boat intended for its conveyance, without having received any injury, and fairly afloat on the Nile. Having arrived at Alexandria, it was afterwards sent to England, and it is now in the British Museum.

Belzoni had now found his proper sphere, and henceforth his whole soul was given to the work of exploring the wonderful country in which he was, in search of the monuments of its ancient arts and greatness. Sometimes he was employed in the service of Mr. Salt, sometimes on his own account. The next affair which Mr. Salt committed to him was the excavation of the Temple of Ipsamboul, in Upper Egypt, which was so enveloped in sand that only its summit was visible. Belzoni, however, in despite of innumerable obstacles, partly of a physical nature, partly created by the opposition of the natives, at last succeeded in penetrating into its interior. On returning from this expedition, he next undertook a journey to the valley of Beban-el-Malouk, beyond Thebes, where, from a slight inspection on a former occasion of the rocky sides of the hills, he had been led to suspect that many tombs of the old inhabitants would be found concealed within them. For some time he searched in vain in all directions for any indication of what he had expected to find, till at last his attention was suddenly attracted by a small fissure in the rock, which presented to his experienced eye something like the traces of human labour. He put forward his hand to examine it, when the stones, on his touching them, came tumbling down, and discovered to him the entrance to a long passage, having its sides ornamented with sculpture and paintings. He at once entered the cavern—proceeded forward—and, after overleaping several obstacles which opposed his progress, found himself in a sepulchral chamber, in the centre of which stood an alabaster sarcophagus, covered with sculptures. He afterwards removed this sarcophagus, and with infinite labour took exact copies of the drawings, consisting of nearly a thousand figures, and the hieroglyphic inscriptions, amounting to more than five hundred, which he found on the walls of the tomb. It was from these copies that Belzoni formed the representation or model of this tomb, which he afterwards exhibited in London and Paris.

On returning to Cairo from this great discovery, he immediately engaged in a new investigation, which conducted him to another perhaps still more interesting. He determined to make an attempt to penetrate into one of the pyramids; and was at last fortunate enough to discover in that called the pyramid of Cephrenes the entrance to a passage, which led him into the centre of the structure. Here he found a sepulchral chamber, with a sarcophagus in the middle of it, containing the bones of a bull—a discovery which was considered to prove that these immense edifices were in reality erected by the superstition of the old Egyptians, for no other purpose than to serve each as a sepulchre for one of their brute divinities. After this, encouraged by the splendid success that had hitherto attended his efforts, which had now made him famous over Europe, Belzoni engaged in various other enterprises of a similar character, which we have not room to enumerate. He made also several journeys both to the remoter parts of Egypt, and beyond the bounds of that country into the adjoining regions of Africa. At last he determined to revisit Europe; and, accordingly, he set sail for that purpose in September, 1819.

The first place which he visited was his native city, from which he had now been absent nearly twenty years. When he left it last he was an unknown wanderer, without employment or the means of existence, and ready almost to accept the humblest that might be anywhere offered him; he returned to it now with a name familiar over the civilized world, and the glory of many discoveries which had long made him the pride of his fellow-citizens. He presented on this occasion to the town of Padua two lion-headed granite statues, which were placed by the magistracy in a conspicuous situation in the Palace of Justice; a medal being at the same time struck in honour of the giver, on which were inscribed his name and a recital of his exploits. A copy of this medal, in gold, was presented to Belzoni, accompanied with a letter expressive of the admiration felt by the Paduans for their distinguished townsman. From Italy he hastened to England, where the rumour of his discoveries had already excited a greater interest than in any other country. Here he met with the welcome due to one whose services had contributed to extend the scientific glory of the nation; and, both in the world of letters and in the world of fashion, the celebrated traveller became a chief object of attraction. He now employed himself in preparing an account of his travels and discoveries for the press; and the work appeared about the end of the year 1820, in a quarto volume, accompanied with another volume of plates in folio. It excited great interest, and soon passed through three editions; while translations of it into French and Italian had also appeared at Paris and Milan. It was after the publication of his book that Belzoni prepared his representation of the tomb he had discovered at Beban-el-Malouk which was exhibited in London and Paris.

Tired, however, of leading an inactive life, he soon began to project other schemes of foreign travel. He visited successively France, Russia, Sweden, and Denmark; after which, returning to England, he undertook, under the auspices of the government, to prosecute the perilous attempt of penetrating into central Africa. His plan was to endeavour, in the first instance, to reach Timbuctoo, thence to direct his course eastward towards Sennaar, and then to return through Nubia and Egypt. But even his experience, skill, and extraordinary personal strength and prowess, did not save him from falling a victim in the cause in which so many gallant men had already perished. He left England towards the end of the year 1822 for Gibraltar, on reaching which he immediately embarked for Tangiers. From this he proceeded to Fez, where he was well received by the Emperor of Morocco, and obtained permission to join a caravan for Timbuctoo, which was to set out in a few days. Unexpected difficulties, however, arose when he was on the point of departure; and after a residence at Fez of five months, he was obliged to give up all hope of commencing his journey by the route he had originally fixed upon. On this disappointment he sailed for Madeira, and from thence, in October, 1823, he set out for the mouth of the river Benin on the west coast of Africa, with the intention of making his way to the interior from that point. He entered upon this journey accompanied by an English merchant, who was to conduct him as far as the town of Benin, and to introduce him there to the king of the country; but by the time he had arrived at this place a malady, which had attacked him almost as soon as he had set his foot on shore, had reached such a height, that he was unable to proceed any farther; and he begged his companion to have him taken back to Gato. He arrived here on the 2nd of December in a dreadfully exhausted state, and, being immediately attacked with delirium, expired on the following day. His remains were interred under a plane-tree on the shore, while the English vessels on the station honoured his memory by discharges of their cannon during the ceremonial. An inscription in English was afterwards placed over his grave, recording his melancholy fate, and expressing a hope that every European who might visit the spot would, if necessary, cause the ground to be cleared, and the fence repaired, around the resting-place of the enterprising and intrepid traveller.

Many other names of persons of both sexes remain in the records of literature, science, and art, and the other departments of intellectual exertion, which might be referred to as illustrating the Pursuit of Knowledge under Difficulties. But the selection of examples we have made,

regulated as it has been with a view to give as much diversity of interest as possible to our work, will probably be thought sufficiently extensive for that purpose. The lesson we would teach is, that in no situation of life, be it what it may, is the work of mental cultivation impossible to him who in good earnest sets about it. What is chiefly wanted to invigorate the mind to the encounter and conquest of the most formidable difficulties which any circumstances can oppose to it, is simply a clear conception and abiding conviction of that truth.

We will make only one additional remark. In other pursuits, the most unremitting endeavours often fail to secure the object sought, which, being usually something which only one individual can appropriate, is equally within the grasp of other competitors, some one of whom may snatch it away before it can be reached by him who best deserves it; but in the pursuit of knowledge it matters not how many may be the competitors: no one stands in the way of another, or can deprive him of any part of his chance, we should rather say of his certainty, of success; on the contrary, they are all fellow-workers, and may materially help each other forward. The wealth which each seeks to acquire has, as it were, the property of multiplying itself to meet the wants of all.

But it is not merely as a direction for the student that we ought to account the lesson valuable which teaches how much every man has it in his power to do for himself, if he will but set resolutely about the doing of it; it is still more valuable as a moral lesson. Indeed, if knowledge were not itself one of the supports of morality, it would not be worthy of the commendations which have universally been bestowed upon it; nor would its diffusion deserve the warm encouragement it has uniformly received from an enlightened philanthropy. But, though it is not true that the man who has accomplished himself in science or literature is always a more virtuous character than he who is without any intellectual culture, there can be no doubt of the generally humanizing and elevating tendency of a devotion to such pursuits; and, more especially, must the best effects be experienced from this dedication of his faculties by him whom it compels to learn and practice, to an extraordinary extent, the duties of steadiness, diligence, husbanding of time, concentration of attention, perseverance, courage, endurance of hardships, and every other habit and quality which depends upon the exercise of self-command or self-denial. In acquiring these virtues he acquires what is more precious than any knowledge, and will go farther to render him a useful and even influential member of society, than if he were to make himself master of all the learning that ever was stored up in libraries.



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