THE POWER-LOOM.

In no department of human invention have such extraordinary vicissitudes been undergone, as in that which has had the most prodigious effect on the material prosperity of Great Britain. It is a fact familiar to all, that the ingenious mechanic who struck open the path of discovery in connection with the cotton manufacture, died in the workhouse at Nottingham; while the energetic and enterprising man who followed him died in possession of millions. These cases have attracted the world to gaze upon them; but there are others which lie in the more level places between, partaking as little of the shadow through which Hargrave, as of the shadow and sunshine through which Arkwright moved, yet suggestive of highly curious reflection, and appealing very strongly to the sympathies. For the difficulties which obstruct the way to knowledge are not incident to poverty alone, nor is it only those who force themselves upward through sordid impediments who demand attention and praise. I am about to sketch the career of a man of whom it would be less appropriate to say that he rose hardily by the help of knowledge, than that he descended willingly to testify his love of it; in whom the desire dwelt for its own sake, and not for any thought of ambition, or hope of gain, connected with it; who turned aside from a thousand temptations that might have repressed it, abandoned for it luxuries of taste in which his mind had long expatiated, and embraced an occupation the very opposite to that in which already he had lived forty quiet, leisurely, scholarly years. Nor in this regard is the poor barber's son of Preston, or even the illiterate carpenter of Blackburn, a more noteworthy subject of contemplation than the grave, gentle, middle-aged preacher and poet, who so suddenly found himself embarked in schemes that were to enrich millions and impoverish only himself, yet amid all the unquiet and misery that never cease to assail original invention remained exactly the same unsoured lover of books and verses as when his life knew no higher happiness or graver care.

Edmund Cartwright, elder brother of the well-known Major, came of a good Nottingham family which had suffered in its fortunes by siding with Charles the First. He was bred for the Church (in which he subsequently received the dignity of a Doctorate) not altogether by his own desire. He had wished to enter the navy; but an elder and a younger brother having been permitted to mount the blue coat, he was fain to resign himself to the black one, and at fourteen (he was born in 1743) he was duly sent up to Oxford, where, after taking his degree at University College, he got a fellowship at Magdalen. Langhorne, once thought a poet, and still deserving to be called an agreeable writer, was his college tutor in his undergraduate days; and a very early temptation to try his hand at verse was probably part of Langhorne's tuition. For his muse displayed no irregular or daring tendencies, either now or at any later time, but rather a docile and obedient than an original inspiration; and for the graceful turn thus given to a cultivated taste (since only thus we may characterise Cartwright's poetry), it will be no wrong to the memory of the good old translator of Plutarch if we hold him to some extent responsible. Before his pupil was nineteen his verses were before the world; though it was not till he was seven-and-twenty that he became talked about as the writer of a ballad-tale of the Edwin and Emma school, which not only passed through several editions at the time, but has since found its way into the collections. It has many really pleasing stanzas, and contains two lines which were great favorites with Walter Scott, who, in his youth, had often heard them instanced and repeated by Dugald Stewart "with much pathos" as a very beautiful picture of Resignation.

> And while his eye to heaven be raised,
> Its silent waters stole away.

The young poet meanwhile had married and received a presentation to the perpetual curacy of Brampton in Derbyshire, which, seven years later, he exchanged for a better living in Leicestershire. It soon became manifest, however, that he was not naturally formed for rising in the Church; for he held opinions, and took no pains to conceal them, which had ceased to be fashionable. He wrote a poem by way of indignant protest against impending hostilities with America, and took eager part in seconding the claims of Mr. William Jones, when that great scholar aspired to represent the University of Oxford, forgetting that he had disqualified himself by writing an *Ode to Liberty*. But happily for Cartwright he never sought or set his heart on the promotion he had such small chance of receiving, nor seemed in any respect dissatisfied with the life that lay before him. When only the little Derbyshire living was his, we find him absorbed in cares for his poor parishioners, and studying medicine to enable him to relieve any sudden ailments that afflicted them. When he changes it for the living in Leicestershire, he does not change his kindly contented nature; but, as he had learnt medicine for his poor parishioners' sake, he now studies farming for the sake of his not very rich little glebe, and becomes, after a brief space, like the good

Doctor Primrose, those three great characters in one, "a husbandman, a priest, and the father of a family."

In Arcadia Ego, said the inventor of the power-loom nearly half a century afterwards, when he looked back through a troubled memory on this first half of his life. Certainly a dream in Tempe itself, or one of the vales of Aready, could hardly have been more quiet. If one looks a little closely, it is true, one may see that there peeps forth now and then a glimpse of the spirit which was to give such excitement and interest to his latter years; but it is only when one of his parishioners has been cured by some simple remedy he has himself invented, or when one of his experiments in farming has had unexpected success. Never do we observe a discontented or uneasy looking forth *beyond* the limits of his parish or his glebe. He preaches sermons of the old practical school of divinity, writes verses in his intervals of doctoring and farming, and now and then reviews a book for the *Monthly*. For, being a man of good account in the world, a clergyman, a friend of Langhorne's, and moreover a Whig (an article now daily becoming much less plentiful, both in the Church and out of it, than it had formerly been), he was just the sort of writer to recommend himself to old Griffiths, who accordingly laid him under frequent contribution. As the reader may possibly remember, this was the editorial bibliopole, the seller of books at the sign of the DUNCIAD, who had no better words for poor Goldsmith in the depths of his early distresses than the lowest and worst in the dictionary; but in his correspondence with the well-to-do Leicestershire rector we find him a far more humanised being, who at least never breaks, as of old, into gross or unseemly expressions.

This Griffiths connection might yet have been not worth mentioning but for another to which it introduced the reviewer. Goldsmith and Chatterton had not been dead more than half-a-dozen years when another youth, also conscious of higher powers than could find outlet through the meanness of his fortune, was walking the flinty streets of London with a feeling bordering on despair. He was the son of a poor Norfolk schoolmaster and parish-clerk, and, like Goldsmith, had been an apothecary's apprentice. He had come up to London with three pounds in his pocket, which gradually dwindled down to fourpence halfpenny; and no care, no economy, no sacrifice, could delay any longer the terrible approach of Want. He had parted with all he could spare of his scanty wardrobe, had pawned a watch very dear to him, had let go even that copy of *Dryden* in which at the first flush of his little capital of three pounds he had ventured to invest no less than three shillings. And yet no answer was come from Lord North to a letter he had written that good-humoured prime minister; Lord Shelburne kept obdurate silence, notwithstanding a most complimentary copy of verses addressed to him; and from Lord Thurlow there was not a hint of encouragement for the poor confident youth, who had only asked his lordship to read and judge whether his poems might not deserve a patron. Darkness was on all sides closing around him, when happily he thought of Edmund Burke, perhaps fancied that the memory of the friend he loved might dispose him to a gentle hearing of the petition elsewhere so scornfully rejected, and finally resolved to write to him. It was early on a summer evening, in the year when Cartwright was so zealously engaged for Jones at Oxford, that this letter to Burke was delivered at his door by the writer of it, who afterwards, such was the agitation of hope and fear that possessed him, walked backwards and forwards over Westminster-bridge until long after daylight broke. Burke's generous answer sent back solid help as well as comfortable praise, and one of its many results was the life-long friendship which afterwards sprung up between George Crabbe and his first reviewer.

But while gloomy and anxious days thus passed for ever from the one, they were slowly beginning to open on the other. Within little more than three years after the time thus glanced at, Crabbe writes, in a laughing letter to his friend, of some odd invention he has heard about. The other remonstrates as if it were no laughing matter. "You shall not find me smiling at your loom," returns the good-hearted poet, "when you grow serious in it. I have the worst mechanical conception that any man can have, but you have my best wishes. May you weave your webs of gold!" Nor, amid the visions that were crowding then in the fancy of the sanguine projector, did it seem a mere poet's wish that golden webs *should* be woven.

But what had transformed into a sanguine projector the quiet and contented country clergyman? Nothing graver than the accident of a chance conversation. In the summer of 1784 Cartwright happened to be on a visit at Matlock in Derbyshire, when the talk at table turned on the extensive and ingenious manufactures lately established in that neighbourhood. Arkwright's mode of spinning cotton by machinery, just introduced, became the subject of particular controversy; one of the grumblers among the company having remarked that, if the method should be adopted generally, so much more yarn was sure to be manufactured than our own weavers could work up that it would have to be largely exported to the continent, and might there be woven into cloth so cheaply as greatly to injure the English trade. Cartwright reflected a moment, and observed that the remedy for such an evil did not seem very difficult;—why not apply the power of machinery to the art of weaving as

well as to that of spinning, and contrive looms to work up the yarn as fast as the spindle should produce it? The notion was laughed at. The thing was pronounced, from the minute intricacy of the movements required in weaving, to be ludicrously impossible; and "some gentlemen from Manchester" (presumed to be specially well-informed on such a subject because of their locality) carried the argument very decisively against Cartwright's view. Nevertheless, he was not convinced. He instanced the automaton chess-player for proof that there could be no real impossibility in applying power to any part of the most complicated machine; but the Manchester gentlemen, probably not being chess-players, could not the more be persuaded that even that highest attainable skill of mechanism could accomplish the extraordinary variety of movement required in a weaver's loom.

Cartwright went home after this conversation, brooding over it. His own simple remark had struck out for himself a truth which, as he turned it over in his mind, opened upon him more and more. For six or seven months he worked incessantly at models, at first rough and awkward even to ridicule, but steadily improving step by step; and at last, in April 1785, he took out a patent for the first of all the power-looms. It was a rude enough thing compared with the exquisite machinery used now, but it was the germ of all that followed; it received, in the three succeeding years, amendments from himself which were each the subject of a patent; and it cannot be doubted that Cartwright had here entitled himself, if ever man did, to the temporary rewards and lasting fame of a most important invention.

But the first he certainly did not get, and the last he hardly lived to see acknowledged. His principal satisfaction was the somewhat melancholy one of being treated after the manner of all inventors from the beginning of time. Poor Crabbe saw his friend's fortune made outright as soon as he had a clear comprehension of what his discovery was; and "God bless you in it!" he warmly wrote. "Only remember, when you grow very rich, that we were friends before; and do not look down on us as the summer birds that will then come and serenade you daily. . . Every new hope you give me of your success makes me happy; nor am I disinterested, since I expect to be maintained handsomely as a decayed poet." But, alas! the serenade of the summer birds was never heard in Cartwright's dwelling; and for "decayed poet" we are soon to read "decayed projector."

Cartwright's quiet, his peaceful studies, his happy contented ways, vanished completely with the dawning of the not inglorious hour in which he had reason to think himself a public benefactor. The public he would have served, rose against him straightway. His invention was to enrich all manufacturers, and of course manufacturers were its first and bitterest foes. There was nothing for it, if he would not be driven poorly back from the plough on which he had laid his hand, but to become manufacturer himself. His pleasant parsonage was abandoned; he sadly separated himself from his parishioners, endeared to him by many ties; and, impelled by the spirit which now wholly possessed him, he built weaving and spinning factories in Doncaster, flung into the venture whatever he possessed, and began the struggle which was only to close with his life.

As if he were entering a country to lay it waste, instead of carrying into it abundance and the means of countless increase, he had to dispute desperately every inch of ground. His cottons were wilfully damaged, his workmen were seduced, his patent rights invaded. Still he persevered, and from every fresh rebuff his inventive ardour received but new encouragement. In seven years from the time which changed the peaceful country clergyman into the active director of factories, workmen, and machines, he had taken out no fewer than nine patents. At a cost ruinous to his fortune, he had obtained them for weaving, for wool-combing (a most striking and valuable invention), for improvements in spinning, in callendering linens, in making ropes, in cutting of velvet pile, and for other matters of the like description; he had also largely added to his works in Doncaster, which he personally managed and superintended in all their details;—in short, he had laid broad and deep the foundations of enormous wealth, while he was himself getting poorer and poorer every day;—when suddenly the prospect seemed to brighten. A wealthy house in Manchester contracted for the use of four hundred of his looms. The mill was built to receive them, and had not been many days at work when it was burnt to the ground. Such were the warnings then administered to men who had intellect and courage to reason beyond the prejudices of their class. The struggle at last seemed hopeless. Poor Cartwright assigned his property at Doncaster in trust for his creditors, and betook himself to London.

He had one true friend in the midst of his misfortunes. He could write verses still. His muse might be homely, but she was faithful, and at all times ready with suit and service when invoked. Even while building his mills at Doncaster he was also building up a new edition of his poems; and on his way to London, a broken and discomfited but not a despairing or querulous man, he wrote a good, simple-minded, single-hearted sonnet, admitting his discomfiture, but refusing to stand helplessly wringing his hands over it.

With firm, unshaken mind that wreck I see,
Nor think the doom of man should be reversed for me

Let not the reader imagine that the hard struggle under which this captain of industry was thus for the moment beaten down, had been a fight fought with ignorance alone. No doubt there were many poor mistaken men then living who believed that machinery would grind them yet closer to the earth; but this class was only made use of at the time by another far above them, who dreaded machinery because of its very tendency to strengthen those whom, for their own purposes, they thus turned suicidally against themselves. These were men, neither needy nor uneducated, who regarded every fresh machine for diffusing the conveniences of life more widely, as but another revolutionary instrument for the levelling of distinctions which the due subordination of society required. It was not by the poor that Hargrave was driven from place to place, till the workhouse at Nottingham received him; for though mobs pelted him, and poor men broke his machines, they were but the tools of a more secret combination which had all the wealth and influence of Lancashire to second it. Under the same evil influence Arkwright must also have fallen, and closed perhaps for ever might have been those new and boundless fields of employment forced open by his genius, if he had not been a man picked out of ten thousand for indomitable perseverance and invincible hardihood. Against Cartwright's crowning improvement this foul combination of course revived again, and what it had lost of its power of agitation by Arkwright's success it easily recovered against the new inventor by practising on the sufferings of the hand-loom weavers, the power-loom having suddenly proclaimed a sentence of not distant extinction on those most helpless of all living workmen. For who should be called helpless among labourers if not that ever toiling ever ill-paid race, whose superlatively easy labour reduces necessarily to the very lowest point the strength and skill required to be displayed in it? A child's work can never in any circumstances be paid higher than by a child's wages, and it was not the least of the blessings conferred by the power-loom that it turned to worthier and more productive labour so many thousands upon thousands of wasted hands. It is a mistake to imagine, either, that the misery of the change was any great or new addition to the ordinary misery of the calling. When evidence was taken on the subject half a century ago, it was shown beyond question that for more than a year before Cartwright's invention the earnings of the great mass of these wretched men, when working even eighteen hours a day, had sunk very nearly to starvation point; so terrible had been the competition of numbers, principally Irish and their children, content with wages on which an English labourer could not live.

The testimony also supplied by that evidence to the inexpressible value of this discovery of the power-loom is most remarkable. As we read concerning it, we perceive that in the series of inventions which has made immortal the names of Hargrave, Arkwright, Crompton, and Cartwright, it may really stand as the crowning contrivance; and our wonder is unceasing that a mechanical power so original and beautiful should have been accomplished by one who started simply from the thought that it *was* to be accomplished, and, with a knowledge of mechanical principles only slight at first, was led in so short a time to so extensive a mastery over their application, by dint mainly of an honest and most single-minded zeal. Judge of the want it supplied by the effect it has produced. A quarter of a century ago (and the proportion of increase since then has been great beyond belief), there were nearly fifty thousand power-looms at work in England, weaving cotton alone. Take Manchester for example, the head-quarters of the violence and clamour which first assailed the discovery, and observe, within the brief but most interesting space of the last six years that Cartwright himself lived to see, its incredibly gigantic advances. In 1817 there were something less than two thousand power-looms at work in Manchester; in 1820 they had mounted to upwards of five thousand; and in 1823, the year of Cartwright's death, they were little short of twenty thousand. As many as ten years ago, in the island of Great Britain alone, more than a hundred thousand power-looms were in full employ! One wonders if any vision of such a result as this crossed the mind of the ruined projector, as he came journeying up to London in 1796, composing the pleasing sonnet to which I have referred, and prepared with a manly cheerfulness to begin life anew in the not very leisurely interval between his fiftieth and sixtieth year.

Begin life again as he might, however, he was in the grasp of a master passion which he could never again put aside. From the pursuit of scientific discovery, whatever hazard or danger it involved, he could not again draw back. The mere hope of gain had not inspired him to it, nor was he daunted by the presence of discouragement and loss. "It was now too late," says his daughter, "to return to that peaceful mode of life, and those literary pursuits, in which he had passed the best and happiest of his years." He rented a small house in Marylebone Fields, and lived the life of an inventor. Morning, noon, and night he was inventing. His little house became a very college of the sciences and arts. He improved his wool-combing machine in spite of the threats and abuse of the more than fifty thousand wool-combers whom it had fiercely arrayed against him. He made bread in his own kitchen by machinery. He had a plan for rendering houses fire-proof, and he invented geometrical bricks. He struck

out useful projects which others carried from him and applied. There was a machine for biscuit-baking which was his, and which a baker at Doncaster made a fortune by. None of his inventions did his open and guileless nature think of keeping secret; not a few of them, indeed, when once thrown off his thoughts by other fancies working there, he would afterwards even fail to recognise for his own.

"I remember him," says the son of his old friend Crabbe, alluding to the visits he would at this time occasionally make to the poet by way of holiday, to discuss spinning by looms and the spinning of verses. "Few persons could tell a story so well, no man make more of a trite one. I can just remember him; the portly, dignified old gentleman of the last generation, grave and polite, but full of humour and spirit." And pleasant it is, with that picture of him, to conjure up the portly polite figure side by side with his most frequent companion at this period of his life —a young, thin, eager, restless American, once student of art under Benjamin West, since more resolute student in civil-engineering, and daily debater with Cartwright of the all interesting question, *Whether practicable to move vessels by steam?* For daily, at Marylebone Fields, the famous Robert Fulton was now to be seen; and Cartwright's daughter long remembered the vivacity of spirit with which he would sit by her father's side, drawing perpetual plans of paddle-wheels, while Cartwright himself contrived modes as numberless of bringing steam to act upon them, these latter finally taking shape in "the model of a boat which, being wound up like a clock, moved on the water in a highly satisfactory manner." Poor Fulton died early, though not till he had launched the first steam-boat on the American waters; but before Cartwright died, steamers were regularly navigating every part of our English Channel, "and I must own," said the good old man, after watching the first Ramsgate boat, "I felt no little gratification in reflecting on the share I had in contributing to the exhibition."

Meanwhile his worldly troubles had become greatly more imminent and pressing; for, while his power-loom and wool-combing inventions had been silently forcing their way, his property in them had also been invaded, and continual thefts of his patents rendered it almost impossible to continue the working of his mills for the benefit of his creditors. After some anxious years, however, his indisputable and sole right to his own discoveries was affirmed, with much complimentary tribute to his inventive genius, in a celebrated judgment by Lord Eldon; and fortified by this authority he yielded to the importunity of his friends, and memorialized Parliament for such extension of the right, of which the exclusive exercise was thus at last assured to him, as might help to remunerate his hitherto unrewarded labours. He described himself in this memorial as the author of various mechanical inventions of great admitted utility to the manufactures of this country, but the labour of whose many anxious years, fruitful in benefit to the public, had brought himself no other reward than barren reputation accompanied by ruined fortunes.

Patiently waiting the result of his petition so far as it might affect his future, he yet could not bring himself to suspend his master-passion for experiment; but as though driven for a time from the manufacturing field, he now indulged it in that of agriculture. In 1801 he got a prize from the Agricultural Board for a practical essay, and soon after received from the Duke of Bedford an appointment to superintend an experimental farm at Woburn. In 1803, a new three-furrow plough got him the silver medal of the Society of Arts. Next year the Agricultural Board made him an honorary member; and in the two following years gave him their gold medal for experiments in manure, and their silver medal for an essay on the culture of potatoes. Walpole said of Chatham's popularity that it rained gold boxes, and we might as certainly say of Cartwright's inventive faculty that at least it rained gold and silver medals.

The engagement at Woburn, too, proved happily something more substantial. He found friends as well as patrons in that princely home. He became the Duke's domestic chaplain, as well as superintendent of the experimental farm; and from the early intelligence of the Duke's third son there flashed out at once upon the brave old man a quick and true feeling for all that was noble or true, to which his own nature warmly responded. Their friendship began in play, and ended in admiration as marked and full of sympathy as could possibly consist with such difference of years. "When I went to Woburn," the old man afterwards wrote, describing the steam-boat model he had constructed for Fulton, "I gave it to Lord John Russell, then about ten or eleven years old, as a plaything. It went by clockwork; and Lord John used frequently to amuse himself with setting it afloat on the stew-ponds in the garden." In the next year we find him publishing a volume of verses, of which Lord John receives the dedication; and up to the year of his death, it is touching to see the eager and trembling fervour with which he follows each successive step in the young statesman's public life.

From that happy interval at Woburn, indeed, may be traced such brighter fortune as gilded the old man's declining years. Parliament soon granted him the further protection to his patent which his memorial prayed for, and this protection brought other, more substantial justice with it. Forced at last to acknowledge and respect his rights,

the manufacturers now began to discover the mistake they formerly made, and fifty of the greatest Manchester houses took the lead in memorializing Parliament for "compensation to Doctor Cartwright." A committee was appointed, much evidence was heard, and the application was successful. In other words, it was proved that by his inventions he had lost between thirty and forty thousand pounds; and Parliament, in consideration of the public advantages they had so widely, and at such a sacrifice diffused, voted him ten thousand pounds. But he was nearly seventy years old when he received it, and there was therefore little doubt of its giving him competence for the brief remainder of his life.

It did so, and to the last he went on inventing. When he was seventy-nine he wrote a poem, in which this manly triplet,

> With mind unwearied, still will I engage,
> In spite of failing vigour and of age,
> Nor quit the conflict till I quit the stage,

expresses what was soberly the fact to within a few hours of the close of his existence. When sent in his eightieth year to Dover for warm sea-bathing, he saved the bath-man the work of two men by solving his difficulties in pumping up the water; a few weeks later he designed the model of a new Centaur carriage; and a day or two before he died he wrote a quite elaborate argument to a friend on what he believed to be a new method of working the steam-engine. He went to his very grave inventing; and never had the grave received a better or more ingenious man. Whenever we celebrate our English Worthies, therefore, let not the name of EDMUND CARTWRIGHT be forgotten.