

did not forget the tyranny of the marriage laws. Freedom of separation, in consequence of the replacement of an old affection by a stronger one of later growth, became one of their leading tenets. Hence Tolstoy (who, by the way, as a thorough-going individualist, had never joined the ranks of the "advanced" party or of any other) with his 'Anna Karénina,' which bears the menacing Biblical epigraph: "Vengeance is mine; I will repay," was denounced as a renegade. By a stern insistence on the moral law, quite comparable to Hawthorne's, Tolstoy had betrayed the cause of civil and religious freedom! Tolstoy is later restored to Kropotkin's good graces. By his interpretation of the Gospel teaching, he developed a doctrine of the simple life—simple to a degree unthought of by Wagner—that has much in common with the movement "towards the people" in which Kropotkin took part. Hence of Tolstoy's later works our author gives a sympathetic criticism that should bring them many new readers.

Making allowances for his peculiar bias, Kropotkin's analysis of Tolstoy's genius seems to us the most adequate of any we have read. Thus he makes clear (p. 115) the almost morbid love of self-analysis, combined with absolute sincerity, which lies at the bottom of the novelist's work from the very start. And in the following passage he lays his finger on the greatest artistic excellence of Tolstoy's writings, the capacity for all-embracing, impartial, objective observation, which runs parallel with an immense moral earnestness, but is never colored, except in some of his latest works, by the author's social and philosophic theories:

"Tolstoy's artistic power carries him beyond and above his theories. . . . His appreciation of this or that action, of this or that of his heroes, may be wrong; his own 'philosophy' may be open to objection; but the force of his descriptive talent and his literary honesty are always so great that he will often make the feelings and actions of his heroes speak against their creator, and prove something very different from what he intended to prove. This is probably why Turgéneff, and apparently other literary friends, too, told him: 'Don't put your "philosophy" into your art.' Trust to your artistic feeling, and you will create great things." In fact, notwithstanding Tolstoy's distrust of science, I must say that I always feel, in reading his works, that he is possessed of the most scientific insight I know of among artists. He may be wrong in his conclusions, but never is he wrong in his statement of data. True science and true art are not hostile to each other, but always work in harmony" (p. 117).

Of Turgéneff, also, Kropotkin gives an excellent æsthetic appreciation. And while, like other critics, he lays stress on the simple beauty of this writer's style and the perfection of his narrative art, he makes especially clear the value of his novels, as representing successive periods of thought and successive types of character in Russian society. Thus our critic should be of real service to American readers who, judging Turgéneff's world by their own Anglo-Saxon ethics, become disgusted with his weak and flabby heroes.

For the reactionist and religious zealot, Dostoyévski, Kropotkin has a hearty dislike, and hence, it seems to us, decidedly underrated his literary genius. It is true that in his masterpiece, 'Crime and Punishment,' Dostoyévski attacks materialistic philosophy absurdly enough,

making it lead his poor, demented hero to a crime that he must afterwards expiate by the severest mental torture, which ends only with a return to the trusting faith of his childhood. But the social propaganda of this novel is really a matter of minor importance, which would, indeed, be overlooked by most English readers; Ras-kólnikoff commits murder rather because of his own morbid temperament than in consequence of philosophic heresies. The narrative of his later agony is told with a power unsurpassed in fiction. Kropotkin, with his healthy common sense, performs a service by emphasizing the faults of Dostoyévski's work, and showing the absurdity of calling him the most representative of Russian authors, but he goes much too far in placing him below the commonplace and bourgeois Gontcharoff.

Sympathy for the toiling masses, and admiration for the men who give utterance to their hopes and their sorrows, lead Prince Kropotkin to devote much space to the "folk-novelists," Ryeshétnikoff, Levstov, Uspénski, and others—writers who are scarcely known to the Western public even by name, and for whom even our author can claim no high rank as literary artists. They did their work in quickening the sympathies of educated Russians for their less fortunate fellow-countrymen, in preparing for the time when Russia shall be truly a nation. So even Gorky seems to attract Kropotkin less by his literary talent than by his passionate humanitarian aspirations.

Finally, we must note the buoyant, hopeful spirit which pervades this book, and which contrasts so strongly with the bitter, pessimistic tone of the novelists who have made Russian life familiar to Western readers.

James Watt. By Andrew Carnegie. Doubleday, Page & Co. 1905. 8vo, pp. 241.

Its lively, not to say jerky, style would hardly be a sufficient inducement to read this book. It contains, beyond a scrap or two, no new information about Watt. A particular interest, however, must attach to Mr. Carnegie's commentary on Watt's life, as one sees as soon as one recalls what that life was. Not the testimony of eulogists, but systematic critical comparison, warrants us in placing Watt among the world's great intellects, narrow though the field was to which he confined himself. Even when he was a child, his genius produced its impression, and was recognized by a few perspicacious men for what it was. At the grammar school he was backward in his recitations. He was not good at answering such questions as boys are expected to answer. Yet he must have been making good use of his time, since the early records of his thinking astonish us by bearing the marks of a trained mind—his stores of knowledge seem so well ordered, he strikes the nail so squarely on the head with unfaltering promptness, he is so sure to carry his most attentive scrutiny to the points where logical leakiness was most to be apprehended. The specifications of his patent, drawn up by this almost unschooled young man at an early stage of the invention, continued during near a generation to furnish lawyers with new surprises at their completeness.

When, at twenty years of age, he went

to set up his little shop in Glasgow, explicit testimony and unmistakable actions show us that the extraordinary minds then clustered in the University began from their first interviews with the young instrument-maker to entertain a very thorough respect for his acquirements and intellect. John Robison, the well-known astronomer and physicist (afterwards called to a professorship in Russia), happening, when himself not quite twenty (Watt being then twenty-two), to drop into the shop, confesses, "I had the vanity to think myself a pretty good proficient in my favorite study, and was rather mortified at finding Mr. Watt so much my superior."

When, at the age of twenty-three, he took up his great problem, the judiciously contrived pumping-engine of Newcomen (which Mr. Carnegie does not understand, and misdescribes; but then Newcomen was born in the south of England) was beginning to be inadequate for the deepening mines of Cornwall, although its general principle is that of a modern pumping-engine, and though it had unquestionably been better adapted to pumping out coal mines than any more complicated contrivance, especially if requiring a considerable pressure of steam, would have been. It had a boiler and a separate piston-cylinder. Steam, being admitted to the vertical cylinder below the piston, raised this, and was first cut off and then chilled in the cylinder; whereupon atmospheric pressure, aided by the weight of the piston, restored the latter to its first position. The power was transmitted to the pump by means of a beam oscillating about its centre. Watt began by making an experimental study, sufficiently thorough and accurate for all the practical purposes of his generation, of the thermal phenomena of the boiling of water. He discovered for himself the heat of vaporization, though he at once found that Black, who was professor in Glasgow, but who printed hardly anything, had taught the whole doctrine of "latent heat" for two years. He also discovered that the same amount of heat was required to convert water from a fixed temperature into steam, no matter under what pressure it was boiled, as nearly as he was able to measure this heat. Being thus sufficiently equipped with theoretical data, he proceeded to the work of invention; and within a few months after his rediscovery of the heat of vaporization he had hit upon the idea of his essential improvement of the steam-engine, that of the condenser. That is, instead of chilling the steam in the cylinder, which chilled the metal of the cylinder and thus the new steam sent into it, he opened a passage into an exhausted cold chamber where a jet of water cooled the steam. He did not stop here, however, but perfected the engine in its principal features and in its minutest accessories considerably beyond what could advantageously be put into practice in his day.

Although these inventions were not all made before he began actual work, they were mostly made within four years. For thirty-five years Watt's life was a struggle to get the engines made and running. There was no machinery to make them with, nor any good tools. There were no even barely tolerable journeymen machinists. There were no men fit to be trusted to run the engines; and the best there were were liable

at any time to smash things in their drunkenness. For twenty-five of these years, Watt was the second partner in what was for those times a vast concern—the greatest mechanical establishment in the world. He was not naturally a man of business. He detested it. Financial affairs terrified him; and he always dwelt too much on adverse contingencies. He had the Celtic passion, pride, imagination, glow, social sympathies; and it needed another Celt to interpret him to us. The publishers well understood what was wanted in asking Mr. Carnegie to undertake this biography. It is very satisfactory to find that his judgment of the conduct of the firm is distinctly commendatory. Many sagacious observations of general application to the direction of large works are scattered through the volume, which its author evidently endeavors to render practically useful; so that it becomes not only a study of Watt, but an elucidation of Carnegie. In this connection, one will remark how full and clear an idea of the entire contents of the book he carries away from the reading of it. We note that here is one business man more added to the list of admirers of Samuel Smiles.

Happily, no literary person has been permitted to tamper with the text, as several passages convincingly prove. The preface names two highly competent engineers as having revised the technical passages, but here and there a sentence may be found to which they can hardly have lent their deliberate approval. Thus, on page 74, we read that the Newcomen engine "was an atmospheric engine, and in no sense a steam engine." In no sense? On page 49, and in a paragraph devoted to explaining what is meant by the phrase "latent heat," we read: "Heat . . . lies also in water. . . . The heat lies latent and dead until we raise the temperature of the water to 212 degrees, and it is turned into vapor. Then the powerful force is instantly imbued with life." But, in fact, the living force is not derived from the water, but from the coal; and more heat is "latent" in the steam than in the water.

Mr. Carnegie is quite mistaken, too, in attributing the first discovery of the composition of water to Watt. It having been already known that water was produced when hydrogen was burnt, Cavendish in 1781 ascertained that pure water was the sole product, and that it equaled in weight the sum of the oxygen and hydrogen consumed. He told Priestley of this, who, with a rather amusing notion of his own competence as compared with that of Cavendish, undertook to repeat the experiment with greater precision. In 1783 Priestley communicated the result to Watt, but stating it in terms of the phlogiston theory to which he was wedded. All that Watt did was to set Priestley's logic right by stating the matter as everybody now states it, and as Cavendish had originally conceived it. Mr. Carnegie can find the whole story, as all critics now concede that it should be told, in Thorpe's "Essays in Historical Chemistry" (Macmillan, 1902).

On page 15 it is said that, "at fifteen, Watt had read twice carefully 'The Elements of Philosophy' (Gravesend)." This was not, however, Gravesend's great 'Introductio ad Philosophiam,' of 1736, which may be said to have given birth to the Scotch philosophy of common sense, but was only (doubtless in translation) his 'Physicae Elementa Mathematica, Experimentis Con-

firmita, sive Introductio ad Philosophiam Newtonianam,' of 1720.

The reader would have been placed in a better situation to appreciate Watt's intellect if his lesser inventions could have been more fully explained, such as the indicator diagram, and especially that approximate parallel motion which he himself considered his *chef-d'œuvre* of ingenuity, for which see Kempe's 'How to Draw a Straight Line' (Macmillan, 1877).

Although Watt's statement that the total heat of saturated steam is the same at all pressures is so far from being true that no less than three-tenths of the sensible heat of the water must be subtracted from the total heat in order to get a substantially constant remainder, yet it does not follow that Watt's observations were in error. He could not do otherwise than assume that the heat imparted to the water, up to its boiling point, was measured by its temperature, which he naturally would ascertain by a mercurial thermometer, doubtless reading it only to the nearest Fahrenheit degree. If, then, he determined the heat of vaporization by passing the steam into water not very much cooler, it might very well happen that, although every figure he recorded was correct, these figures should have indicated an exact constancy of the total heat at all pressures.

Our readers will be interested in knowing that Watt not only read French and Italian, but, at a time when any knowledge of German was rare, took pleasure in discussing German poetry, and that he seems also to have had some acquaintance with Kant.

American Bibliography. By Charles Evans. Vols. 1, 2. Privately Printed for the Author. Chicago. 1903-1904.

For some twenty years, Mr. Charles Evans of Chicago, at one time librarian of the Chicago Historical Society, has been engaged in an undertaking of great magnitude, namely, to make a record of "all books, pamphlets, and periodical publications printed in the United States from the genesis of printing in 1639 down to and including the year 1820." The manuscript is now completed, and the first two volumes have been issued. The first volume, covering the years 1639 to 1729 inclusive, was published in 1903. It contained 3,244 titles, 968 of which fall in the seventeenth century. The second volume, with the imprint of 1904, has just been issued; it carries the record down through the year 1750, and the titles to number 6,623. The third volume is promised for the fall of this year, and the remaining five or six at yearly intervals.

The work is in many ways unique. Its typographical appearance is striking, the body of the titles being printed in capitals and small capitals, with lower-case letters for imprints and notes only. But the most important feature of this bibliography is the chronological arrangement of the titles. By choosing a chronological rather than an alphabetical or systematic arrangement, Mr. Evans has performed a real service, directly to students of American literature and civilization, and indirectly by the example he has set for future compilers of national bibliographies. Each volume has an alphabetical index of authors (and of titles of anonymous books), a classed index of sub-

jects, and a list of printers (the last-mentioned, however, with no clue to the books printed by them). The titles have been copied "with scrupulous care from the works themselves, or from comparison of existing authorities." Unfortunately, Mr. Evans does not tell what authorities he has used, nor does he indicate the titles which have not been copied from the books themselves. A bibliography like the present work, which is intended to be final, should, in all cases where the record has not been made from personal inspection, state the fact, and also give explicit reference to the source or sources of information. The neglect of this first principle in bibliography, and the absence of all critical apparatus, must be regarded as a serious defect.

"The use of line-titles," Mr. Evans remarks, "so dear to the heart of the young bibliographer, has been purposely avoided from what is believed to be a well-considered belief that they should have no place in modern bibliography. Their use belongs, and rightly, to the incunabula of printing, or to books without title-pages, and to these two classes their use should be restricted."

We are inclined to differ. The object of line-titles is to indicate, as far as possible, the typographical appearance of the title-pages, particularly in the case of older books with longwinded titles like most of those catalogued in the present volumes; they are also of value where punctuation has not been used, in obviating the necessity of adding it. The liability "to create editions which do not exist" is not greater if line-titles are used than otherwise, while in certain cases their employment will enable the student to discriminate between issues which cannot be distinguished in any other way. However, while this matter is not quite as unimportant as Mr. Evans would have us believe, we are willing to admit that it is a minor detail.

Mr. Evans's 'American Bibliography' is certainly one of the most important contributions to bibliographical literature of recent date, and, when completed, will rank among the most useful tools of librarians, bibliographers, and students of literature.

The Fair Land Tyrol. By W. D. McCrackan. Boston: L. C. Page & Co. 1905.

Untrodden Peaks and Unfrequented Valleys: A Midsummer Ramble in the Dolomites. By Amelia B. Edwards. Third edition. London: George Routledge & Sons; New York: Dutton.

Books in English upon the Tyrol are still so few that any addition to the number is in itself welcome. Considering the billow of Americans which dashes against the Alps of Switzerland and flows down the passes into Italy, it is amazing how few penetrate the Tyrol, and how much fewer are those who really come to know it. Yet railway carriages from Paris to Vienna without a change thread the whole length of the land from Bregenz to Zell; and the Brenner Road carries thousands of tourists through the beautiful little city of Innsbruck, without stopping. For noble, high Alpine scenery, for magnificent mountain roads, for superb cliff and chasm, for sweeping forests, and for beautiful upland valleys, the Tyrol equals, and in some respects surpasses, most parts of Switzerland.

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