

one remark ever was: "C'est un fait, c'est singulier!" At the time referred to in this extract, life looked gloomy to him in every sense. Rome had fallen. The French were entering Rome:

"Mr. Cass, the American Minister, knowing the state of affairs, sent word on the 2d of July, 1849, that he wished to speak to me. Going to his house, I met him in the street. He, in the kindest manner, placed an American man-of-war, lying off Civitavecchia, at my disposal, giving me leave to go on board with such of my comrades as might run risks by remaining. I thanked the generous representative of the great republic, telling him, however, that I meant to leave Rome with all those who chose to accompany me, and try yet to achieve something for our country, whose fortunes did not seem to me even then altogether desperate."

There follows the harrowing description of that attempt—France and Austria joining hands to seize the dreaded "red devil," and to disperse his followers, the Tuscans shutting their gates at his approach, the inhabitants of the Romagna turning a deaf ear to his appeal. He is heart-sick at the state of Anita, who, though already ill, had shorn her hair and dressed as a soldier to follow her beloved, and to all his remonstrances (she was on the eve of becoming a mother for the sixth time) making answer: "You wish to abandon me." His men desert, he reaches the republic of San Marino, where, he says: "On the steps of a church outside the city I wrote the following proclamation: 'Soldiers! I absolve you from your pledge to accompany me. Return to your homes, but remember that Italy ought not to be left to the shame of servitude.'" But for him and his few faithful ones surely Venice is left to die in? Not so. Just as he sights the lagoons, the Austrian men-of-war discover and attack his tiny fleet of fishing boats. Anita is dying, he carries her in his arms to a peasant's hut, receives her dying kiss; and, before the corpse lying in his arms is cold, he is compelled to abandon it: the Austrians are on his track. Another month of hiding, of danger, of hair-breadth escapes: every man's hand is against him whose hand is only raised against the foes of Italy. Finally, a fisherman volunteers to go for his boat and convey them in safety to the Ligurian shores, if meanwhile they can lie in hiding in the woods along the shore between the sea and the Maremma. They succeed, and the fisherman comes with his boat.

"There, in the harbor of S. Sterbino, the little craft awaited us, and we embarked, touched by the proofs of affection lavished on us by our generous liberators. How proud I am to have been born in Italy, where, despite the rule of priests and thieves, our youths are growing up to despise dangers, torture, peril, and death, to march calmly to the fulfilment of their duty, the emancipation of their country from her chains.

"In the Genoese fishing boat we sailed for the isle of Elba, to take in provisions and fishing gear, and passed a night and part of a day at Porto Longone. Thence, coasting along the Tuscan shore without stopping at Leghorn, we continued our course westwards. I did not deceive myself as to the unfavorable reception which awaited me on the part of the Government in the Sardinian States, and I was half inclined to ask for a berth on board an English vessel anchored in the port of Leghorn; but the longing to see my children before leaving Italy, where I knew I should not be allowed to remain, prevailed.

"In September we landed safely at Porto Venere. There and at Chiavari nothing new; in this latter city I was received in the house of my cousin, Bartolomeo Pucci, of cherished memory, and we were welcomed by his kindly family, by the population of Chiavari, and by the numerous Lombards who had taken refuge there after the battle of Novara. But as soon as General La Marmora, then royal commissary at Genoa, learnt of my arrival, he gave orders that I should be transferred to that city, escorted by a captain of carabinieri in plain clothes. General La Marmora's proceedings

did not surprise me; he was but the willing instrument of the policy that then prevailed in our country, besides being on his own account a natural enemy to all who, like myself, were stained with the republican bar sinister. So I was shut up in a secret cell of the Ducal palace in Genoa, thence transported by night on board the war frigate *S. Michele*, treated, notwithstanding, with deference in Genoa by La Marmora and on board by the chivalrous commander, Persano. All I asked was for twenty-four hours to go to Nice and take leave of my children, promising to return to my temporary prison, and La Marmora gave me leave on parole. I don't know whether policemen in disguise were on board the *S. Michele*, but certainly news had been sent to Nice, and the carabinieri were on the alert. As usual, the authorities detained me on board for several hours, so that I had barely time to reach Cavas, where my children were, pass the night there, and return at once.

"The sight of my children, whom I was obliged to abandon, grieved me deeply. It is true that they were left in friendly hands; the two boys (Menotti and Ricciotti) with my cousin Augustus Garibaldi, and my Teresita with Mr. and Mrs. Deideri, who were like parents to her. But I had to quit them for an indefinite space of time—this was made clear to me when I was summoned to choose my place of exile.

"And here I cannot pass over in silence the manly defence of my cause assumed by the liberal members of the Piedmontese Parliament, Baralis, Borella, Valerio, Brofferio, who made such a powerful appeal in my favor that if they did not succeed in getting the sentence of banishment revoked, assuredly they saved me from a still harsher fate. The insatiable bloodthirstiness of the Austro-clerical party, victorious throughout the peninsula, was rife even in Piedmont. The hopes I still cherished that brighter destinies were in store for my country, suggested my choice of Tunis as a near abode in exile, especially as I knew I should find there Castelli of Nice, a friend of my childhood, and Pedriani, also a friend and fellow-exile of 1834. But, embarked for Tunis on board the war steamer *Tripoli*, I found that the Government, subservient to French orders, would none of me, so I was carried back and deposited on the island of La Maddalena, where I remained twenty days.

"There, ludicrous to relate, were not wanting those who insinuated in the ear of the Sardinian Government (or it may be that they feigned the belief) that I was bent on revolutionizing the islanders, half of whom in those days were pensioners or servants of the Crown. A kindly population they were, though, and they treated me right well! So from the island of La Maddalena I was escorted to Gibraltar by the war brig *Colomba*. The English Governor gave me six days to take myself off. The gratitude and affection which I have ever cherished for the generous English nation made this discourteous, futile, and unworthy proceeding doubly hard to bear.

"Still clear out I must, even if nothing but jumping into the sea was left; and, following the advice of friends, I decided to cross the straits and seek a refuge in Africa, where G. B. Carpeneto, the Sardinian Consul at Tangiers, welcomed me to his house, and, with my two companions and officers, Leggiore and Coccelli, we were hospitably entertained for six months. At Modigliana I found a beneficent priest,* and at Tangiers an honest and generous royal consul, and to both I owe a debt of gratitude. True is the old proverb: 'The frock does not make the monk.'

"At Tangiers, with my generous host Carpeneto, I passed my time as tranquilly and happily as an Italian exile far from his country and his dear ones could expect to do. At least twice a week we went shooting, and game was abundant. A friend lent me a little boat, so we made up fishing parties, and fish also was plentiful. The courteous hospitality with which Mr. Murray, the English Vice-Consul, welcomed me to his house, lured me at times from my solitary and rustic habits.

"Nor did all my Italian friends forget me in absence. Francesco Carpeneto, who had been most kind to me from the time of my return to Italy, in 1848, bethought himself of a plan to enable me to earn my living, and tried to collect sufficient money among his own friends and mine for the purchase of a vessel of which I was to have the command. This scheme pleased me; unable to do aught towards the

fulfilment of my political mission, I caught at the chance of being able to work, hoping as a merchant-trader to become independent and no longer remain at the charge of my generous and hospitable friends. So I at once acceded to Francesco's plan, and made arrangements to start for the United States, where a vessel might be purchased. In June, 1850, I embarked for Gibraltar, thence for Liverpool and New York. Crossing the Atlantic, I was seized with rheumatic pains, and on landing was unable to stir, was set on shore like a bale of goods, on Staten Island, and, still suffering from my illness, passed a month, partly on that island and partly in the house of my dear and good friend, Michele Pastacaldi, where I enjoyed the friendly companionship of Foresti, one of the illustrious martyrs of the Spielberg. Carpeneto's plan came to nothing; he had only been able to place three shares of \$2,000 each with the Camozzi brothers of Bergamo and one Piazzoni, and what vessel in America could be purchased for \$6,000? A small coasting vessel, perhaps, but, not being an American subject, I should have been obliged to take an American captain, which would not have paid.

"But something I must do! A kind, sterling Florentine friend, Antonio Meucci, had decided on setting up a candle factory, and offered me work in his establishment. Said and done! Without capital I could not take shares in his speculation, as the \$6,000, proving insufficient for the purchase of a vessel, remained in Italy; so I made up my mind to work on whatever conditions should be offered. And for several months I worked with Meucci, who did not treat me like a common workman, but with the utmost kindness as one of the family.

"One day, however, tired of tallow-boiling, and very likely impelled by my natural and habitual restlessness, I left the house, resolved to seek a different employment. I remembered my seafaring life, knew a little English, and so went down to the shore, where coasting vessels were loading and unloading their cargoes. I asked the first to take me as a sailor; those on board the vessel went on with their work, scarcely giving heed to my request. I tried the second, with the same result. Then I passed on to a third, asked some men who were unloading to let me help; the answer was that they wanted no help. But I persisted: 'I don't want pay; let me work to warm myself'—it was actually snowing; no answer whatever. I felt mortified. I lived again in memory the days when I was honored with the command of the fleet of Montevideo and her gallant and immortal army! What did all that avail? I was not wanted now! However, I swallowed my mortification and returned to my tallow-boiling. Most fortunate was it that I had not acquainted Meucci, excellent man, with my resolution; so the vexation, known only to myself, was lessened. And here let me state that nothing in the conduct of my kind master had prompted my untimely resolve; he and his wife, Mrs. Hester, were lavish in their benevolence and friendliness."

How strangely reads this episode now—with the hero of countless victories, the liberator of Italy, lying there on lone Caprera beneath the granite slab, while his countrymen erect monuments in every city to his memory, identifying his name with independence from the foreigner in the past, and hopes for freedom from moral thralldom in the future!

MCMASTER'S FRANKLIN.

Benjamin Franklin as a Man of Letters.
[American Men of Letters.] By John Bach McMaster. Boston: Houghton, Mifflin & Co. 1887. ix., 293 pp. 16mo.

It is almost a century since Franklin died, yet during that time his reputation has had few hard shocks, and he is to-day, as he was when living, a very popular hero. Image-breakers have not of course wholly neglected him, but they have not shattered the aggregate of excellences which make up his fame. The hero of the Autobiography—or what has passed for it so many years—is still cherished, while the warnings of the historically cautious are not listened to. For one unhappy infant who is christened John Adams or Alex-

* Don Giovanni Veritas, a patriot priest who saved the fugitives after Anita's death.

ander Hamilton, there are a hundred who press on to manhood under the burden of the name of Benjamin Franklin. But the ambition of parents has had in mind the statesman, the politician, the diligent printer, or the thrifty tradesman; probably Franklin the man of literature never had a namesake. It is with the clear advantage of a fresh topic that Professor McMaster approaches a subject about which no author until now has seriously troubled himself. To be sure, Franklin holds, by common consent, at home and abroad, a high position in American letters, which has been accorded him in a generous but uncritical and unconcerned spirit. Mr. McMaster's genius for making entertainment out of all he writes does not now desert him; he could, we think, if he would, make even the authenticity of Shakspeare's works a readable matter, and he would have been forgiven had he swollen this one small volume into two. It is plain, however, that he has felt a restraint in passing from the life history of a nation to the closer consideration of one individuality. The unkindest thing one would wish to say of this book is that its author is too fond of a literary coach and six not to find a monograph somewhat slow-paced. The same modesty and the same freshness which were so charming in his larger 'History,' are both here to maintain a growing reputation already enviable.

In no marked degree do the documents lately acquired by the State Department seem to have aided in strengthening previous knowledge about Franklin, or in more sharply defining his place in literature. Valuable as it no doubt is, it appears to be admitted that the "Stevens Collection" is to be chiefly useful for purposes of correction or verification, and that Mr. Bigelow's new edition of Franklin's works, so far as it has been reinforced by these papers, is sufficiently exhaustive and definitive. Mr. McMaster has fallen back upon his usual method of throwing the most brilliant side-lights possible upon his subject. His facile skill in exploring old newspapers and other contemporary sources has enabled him profitably to use materials not commonly yielding rich results to investigators as painstaking though not as dexterous as he. The "accessories" in Professor McMaster's style are often so dramatic or lively as to lend a sort of fictitious interest even to the character of the practical and hard-headed author of the 'Poor Richard Maxims.'

Everything which Franklin wrote or did had some clear purpose in view. There was in his nature no waste of force, and, what is more, no inner life, no intellectual retreat where he should abide apart for a season. His were not the usual habits of literary men, and hence it is, in literary annals, that his cannot be said to be an especially attractive or picturesque figure. He knew little of the horror of garrets, of hunger, or the rebuffs of the powerful. After the first few boyish, though always clever, successes in his brother's paper and elsewhere, he soon grew to know his own powers, and his shrewdness told him when to spread his pinions and when not to attempt vain flights. Success came surely to him after he had outwitted Bradford in Philadelphia, and in his newspaper and his pamphlets and in the Junto he had readers and listeners with whom he could do as he pleased, and therein he had arrived at the Utopia of editors and publishers. The literary Franklin can only be known by close attention to the details of his busy life, and therefore Prof. McMaster has not erred in making a biographical study in which the writings come in for no more than their due and proportional recognition. So large a share of Franklin's literary remains consists of scientific papers of a

long out-dated value and of correspondence of quite unequal interest, that nothing could be stupider than a critique of his works apart from a consideration of his vivid personality.

Franklin plainly revealed himself in all he wrote, and this has given an air of sincerity which has much to do with the unbounded admiration still held for him in America, and, it may almost be said, yet more firmly held in Europe. It is not at all to the purpose to ask what manner of man Franklin in reality was; this book, with the wonted courtesy of its author, waives the decision of that question. Franklin laid himself bare to the world almost as unreservedly as did Cellini or Rousseau, and the lesson of his life, down to the final date in the Autobiography, is explicit enough, nor is there the slightest reason to suppose that the Ethiopian afterwards changed his skin, or even wished to perform that miracle. A confession with Franklin was both repentance and absolution. Though not a few refuse homage to the personal character of this most brilliant man of affairs of American history, the evil that he did seems not to have lived after him, at least it is not commonly remembered against him. Nor was the good interred with his bones, for his memory to most people is still of sweet savor.

Prof. McMaster has not, then, set himself the ungracious task of undoing a reputation—such is not the cast of his disposition. He is, however, characteristically frank. To some extent he appears to share in the opinion, openly expressed to this day in Philadelphia, that Franklin was a consummate master of the art of success, financial and political. The subject is not altogether pleasant, yet if any one cares to see how Franklin stands in the eyes of many now living in the city of his adoption, let him turn to Mr. Horace W. Smith's 'Life and Correspondence of the Rev. William Smith, D.D.' (vol. i, pp. 344, 587, and elsewhere). It is noteworthy that in Massachusetts, where ethical judgments passed on public men are surely as severe as they are anywhere, Franklin's popular fame cannot be said to be tarnished. Had anything seriously affecting Franklin's reputation for better or worse turned up in the so-called "Stevens Collection," it is certain that it would have been made good use of in this book, but no such historical "find" has disclosed itself. The one literary performance which might tell us more of the hinted-at Gallic tendency of Franklin's later ethics, will, in all likelihood, never see the light in any common edition of his works, unless Mr. Bigelow decides or is permitted to print it. We do not forget that the late Henry Stevens once announced the publication of this bagatelle, but if it ever was printed, it is now rare with a rarity which that eminent bibliographer could so well effect.

The Franklin whom Mr. McMaster has constructed, of materials which he has been at much labor to collect, is very real, though perhaps there is not quite enough of him, for at times he becomes indistinct in the maze of contemporary life in the midst of which he moved—always the central figure. Vivid indeed are the pages given to the great election of 1764, when Franklin and Galloway ran for the Assembly—an event which is still a live topic in the city where it was held. A remarkable event it was, not only on account of the modernness of its conduct, but because it settled the reputation of Franklin among men of his day, and to some extent for all time. He was so much a man of the nineteenth century that his "methods" in business and politics were those of to-day; the quality of his wit, too, was essentially modern. He always knew a "good thing," and he never

neglected the main chance. Now he was recasting and improving adages borrowed from almanacs forty years old when he was born, now making practical use of electrical theories which he found revolving in the mind of the more retiring Ebenezer Kinnersley. One sowed and another watered, his genius gave the increase; the world was the wiser for it, and Franklin waxed fat with success.

There is a fine opportunity, which Professor McMaster neglected to "improve," for moralizing on the impossibility of any man, however great, repeating the successes of Benjamin Franklin. It is simply out of the question that he could, in this age, have been preëminent in so many directions, great as his success might have been in one or a few. A money-making man of to-day, conducting a successful newspaper like the *Pennsylvania Gazette*, which had run off all competitors, and carrying on at the same time a lucrative retail business, could not afford to go into politics. Franklin went on his European errands because he was patriotic and ambitious as well to go, and because, too, he had made enough money to keep him comfortable in any event. Nowadays such a political mission would be ostentatiously made at a "great personal sacrifice." In literature, as in business and statecraft, it should always be remembered that he never had a rival worthy of the name. His mechanical genius was of a direct but not transcendent sort, so that, did he lay sticks for a fire, or hang a door, no one ever seems before to have done the thing at all well. How much of guile or sordidness there was in his nature is not to the point; he certainly was one of the few men of his time to discover that simplicity, like honesty, is a good policy. This unpretentiousness, assumed or not, of speech, garb, and literary style explains much of his success in France. While Lee chafed, and Adams was "respectable" and distant, Franklin was delighting everybody, from Court to populace, by eccentrically minding his own business, meanwhile in reality looking after the fate of a new nation, with his own *bonhomie*, of course. That he walked in the counsel of the ungodly is plainly shown in the flippant but clever pages of Bachaumont, but calumny did not seem to touch his skirts. There is reason to think that he held, as Disraeli did, later, that women's aid is an absolute necessity to political as well as social success. The French Court did not lack, at that time, those who were only too ready to be flattered into usefulness. To the last he was a French wit and man of the world, yet we choose to remember him as making pious and edifying suggestions, in his serene old age, before the Federal Convention, which we forget were dictated by policy as well as by conscience. Results achieved are what his countrymen have been wont to admire in Franklin. Their forbearance towards the manner of his successes and his moral insouciance has been of that easy, tolerant kind, of which Franklin so highly approved in several of his smaller writings.

What he wrote was after all but an outward expression of what he was. Even his *jeux d'esprit*, of which he was so vain, had practical ends. A perfect understanding of his whole life seems unavoidable if we would know his force as a man of letters. Such breadth of treatment may at times have lost sight of the primary object, but it shows a fairness due a great man by placing him on a large stage. More minuteness occasionally would not have injured the general plan. Considering the space given to the subject of piracy, which is suggested by Franklin's juvenile ballad-making on that always fascinating topic, it might be just to complain that further on Mr. McMaster has devoted too

little attention to the vastly more important political meetings. Of some of the most interesting of those papers which best illustrate Franklin's purely literary style, no account is taken, beyond a bare mention of their titles. Some attention certainly should have been paid to Franklin's theories of a revised orthography on a phonetic basis, and of his relations with Webster in this matter—a subject on which little of a satisfactory nature has as yet been written. The memorial to Congress from the Pennsylvania Society for the Abolition of Slavery is unhesitatingly ascribed to the pen of Franklin. This, we had supposed, was not a certainty, although he signed the document. On page 271 it is stated that "Mr. Parton and Mr. Bigelow alone have reprinted Polly Baker's speech." It is worthy of remark that it was reprinted in *Hall's Law Journal* in 1813; in connection with which fact, two interesting notes are to be seen in the *Nation* for November 7 and December 26, 1878 (vol. 27, pp. 285, 398), in the first of which is given a summary of the famous speech.

Professor McMaster calls for a better edition of selections from Franklin's best literary productions. No one could do this more skilfully than himself. It might make Franklin's writings better known than in fact they are. Even the immortal Autobiography is in danger of being more talked about than read. Mr. Bigelow has, it is a pleasure to see, put Franklin's conjectural contributions to the *Pennsylvania Gazette* into his latest edition; it now remains for some one to reprint the "Dogood" papers, Franklin's earliest efforts, to which Mr. Parton first called attention, and quotations from which Professor McMaster freely cites, having apparently no doubt as to the author. Mr. Bigelow thus far ignores these early attempts, although he prints Franklin's "Skeleton sketch of the topics for the Autobiography," in which he admits the authorship of them.

STEWART AND GEE'S PHYSICS.

Lessons in Elementary Practical Physics. By Balfour Stewart, M.A., etc., and W. W. Haldane Gee. Vol. I. General Physical Processes. 8vo, pp. xvi, 291. Vol. II. Electricity and Magnetism. 8vo, pp. xx, 497. Macmillan & Co. 1885, 1887.

In 1870 the late Prof. Stewart published an elementary treatise on physics (3d ed., 1886) to which he gave the title 'Lessons in Elementary Physics.' We cannot regard the title as well chosen. It is true the chapters were divided into "lessons," presumably to render the work more convenient for use as a text-book; but this fact did not render the word a fitting one to go upon the title-page. In that position, so far as it conveyed any impression at all, it was one which was misleading, and calculated to hide the real merits of the work. When we take up a book entitled 'Lessons' in any science, we can hardly avoid the impression that it is somewhat fragmentary and disconnected; that it treats of special points which the author considered interesting or important, but that it does not pretend to be a systematic text-book or treatise on the subject to which it relates. But Prof. Stewart's book was by no means one of this kind. It began at the beginning, covered the whole ground, and, so far as regards fundamental principles, was a well-digested, well-developed, and very complete work. It was, in fact, an elementary treatise on physics, designed for use as a text-book in schools and for private study, and this, or something equivalent to this, should have been its title.

The work before us is of an entirely different character. When completed by the publication

of the third volume on 'Heat, Light, and Sound,' supposing that volume to be constructed on the same plan as those which have already appeared, and considering the size of the volumes, it will be at least four times as large as the elementary work to which we have referred. Its title differs from the title of that work only by the insertion of the word "practical." But the work is not practical as opposed to theoretical. A large portion of the experiments are inserted for the sole reason that they serve to illustrate physical theories and are the foundations on which those theories are based. Neither is the work practical in the sense that its main object is to teach the application of physics to the business affairs of life. Of course very much is contained in the volume on electricity and magnetism the knowledge of which is of the greatest utility, even indispensable, to the electrical engineer, to the manufacturers of electrical machines, to the managers of telegraphs and telephones, and various others; but the object of the book is not to teach these gentlemen their business. The telegraph and the telephone are treated not as a means—at which we have not yet ceased to wonder—of communication between widely separated persons, but as the means nearest at hand to illustrate and explain some of the most important phenomena of that mysterious agent which promises so much and of which we still know so little. The work is, in fact, a treatise on experimental physics, and is practical in the sense of giving minute directions for the actual performance of those experiments upon which the science is based.

In what sense it is called an elementary work it would be hard to say. It is true that it gives detailed directions for the performance of the simpler as well as the more complicated experiments—for those that require only such simple apparatus as most students can prepare for themselves, as well as those which require the intervention of complicated and costly machines. But no one should be misled by the use of the word elementary on the title-page into the supposition that the work is suited for beginners. A large portion of the work would be of little or no use to those who had not previously studied some elementary treatise on physics, and for this preparatory study the elementary treatise first mentioned will on the whole be found the best, especially because it was written by the best-known author of the present work. But, whatever introductory treatise may be used, we can safely say of the students in high-schools and colleges, that the more they already know of the science of physics, and the more ample the means of performing experiments to which they have access, the more useful they will find this work.

A considerable knowledge of the science, or rather sciences, of physics, is not the only qualification which the authors of this work assume that the student possesses. The number of mathematical formulæ is very great. This was unavoidable. The mathematical method is the only clear and satisfactory method in which a large part of the science can be treated. The authors seem to have made special efforts to render everything as clear and simple as possible; but if any one will look at "Lesson xix. General Theory of the Balance" (vol. i, p. 63), or "Chapter v. The Tangent Galvanometer" (vol. ii, pp. 225-274), he will see that they will be of very little use to him unless he is "well up" in his algebra, geometry, and trigonometry, and that in the former an acquaintance with the principles of the lever is also necessary. The processes of the differential and integral calculus are sometimes introduced, for example, in the chapter on Elasticity

(vol. i, ch. vi), but not to such an extent as to render an ignorance of that branch of mathematics a serious impediment to the use of the work.

The chapters into which the work is divided commence usually with a short general introduction, giving such definitions and explanations as are necessary to the understanding of the lessons which follow. This general introduction is, however, sometimes omitted, and, as in the first chapter of the volume on Electricity and Magnetism, we are immediately set to work. The lessons are constructed throughout on one invariable and consistent plan; the metrical system, in the form known as the C. G. S. (Centimètre, Gramme, Second) system of measurements being, in almost all places employed, though ample tables and directions for converting the metrical into English measures are given. The opening lesson of vol. ii, which plunges at once *in medias res*, will serve as a specimen of all. It is entitled "Electrification by Friction and Conduction." First we have a minute statement, under eleven distinct heads, of the necessary "Apparatus." In order to show the minuteness and detailed accuracy and clearness with which this statement is made out, we will quote some of the divisions; we have not room for the whole:

"(1.) Two pieces of glass tubing about 350 mm. long by 15 mm. in diameter. Each must be closed at one end by the blow-pipe. The tubes must be thoroughly clean and dry. The open end should be closed by a cork to keep out dust. (2.) Several ebonite penholders. . . . (6.) A piece of catskin or other fur. . . . (11.) Several metres of silk thread."

Then follows: "Experiment I. Electrification by Friction." And first we have a clear and precise statement of what the experimenter must do, and lastly a statement of the results, the inferences to which they necessarily lead, and the principles they appear to establish. Next comes "Experiment II. Electrification by Conduction," on the same general plan. This experiment is followed by a table containing "a list of substances in their approximate order of conductivity." Finally, we have: "Experiment III. All substances of a different nature may be electrified by being rubbed together." With a model example of the course to be pursued in order to establish this principle, the lesson ends. Two engravings of parts of the apparatus employed in these experiments are inserted in the text. The whole work is abundantly supplied with engravings made from drawings or photographs taken directly from the apparatus itself.

In the preface to the first volume the authors express the hope that their work may prove of use to three classes of students: "in the first place, those who are attending an elementary course in a well-furnished laboratory; secondly, those who have access to a laboratory containing only a few instruments; and thirdly, those who are desirous of acquiring a knowledge of the processes of physics while they have not the opportunity of working in any laboratory. This last class will value the engravings we have given." To the first class of students this work will be simply invaluable. By keeping it near at hand when working in the laboratory, they will save a vast amount of time and trouble to themselves in asking, to their teachers in answering, a multitude of questions. To the second class, so far as the apparatus to which they have access extends, the same remarks will apply as to the first; so far as they are obliged to do without apparatus they belong to the third class. The third class, who depend upon books alone, will, for the most part, be made up of those who have previously studied some elementary text-book of