

the extent of his reading as a schoolboy and a young man he was far from being a cloistered student, absorbed in his books. In spite of his lameness and his serious illnesses in youth, his constitution was naturally robust, his disposition genial, his spirits high: he was always well to the front in the fights and frolics of the High School, and a boon companion in the "high jinks" of the junior bar. The future novelist's experience of life was singularly rich and varied. While he lived the life of imagination and scholarship in sympathy with a few choice friends, he was brought into intimate daily contact with many varieties of real life. At home he had to behave as became a member of a Puritanic, somewhat ascetic, well-ordered Scottish household, subduing his own inclinations towards a more graceful and comfortable scheme of living into outward conformity with his father's strict rule. Through his mother's family he obtained access to the literary society of Edinburgh, at that time electrified by the advent of Burns, full of vigour and ambition, rejoicing in the possession of not a few widely known men of letters, philosophers, historians, novelists, and critics, from racy and eccentric Monboddo to refined and scholarly Mackenzie. In that society also he may have found the materials for the manners and characters of *St Ronan's Well*. From any tendency to the pedantry of over-culture he was effectually saved by the rougher and manlier spirit of his professional comrades, who, though they respected *belles lettres*, would not tolerate anything in the shape of affectation or sentimentalism. The atmosphere of the Parliament House (the Westminster Hall of Edinburgh) had considerable influence on the tone of Scott's novels. His peculiar humour as a story-teller and painter of character was first developed among the young men of his own standing at the bar. They were the first mature audience on which he experimented, and seem often to have been in his mind's eye when he enlarged his public. From their mirthful companionship by the stove, where the briefless congregated to discuss knotty points in law and help one another to enjoy the humours of judges and litigants, "Duns Scotus" often stole away to pore over old books and manuscripts in the library beneath; but as long as he was with them he was first among his peers in the art of providing entertainment. It was to this market that Scott brought the harvest of the vacation rambles which it was his custom to make every autumn for seven years after his call to the bar and before his marriage. He scoured the country in search of ballads and other relics of antiquity; but he found also and treasured many traits of living manners, many a lively sketch and story with which to amuse the brothers of "the mountain" on his return. His staid father did not much like these escapades, and told him bitterly that he seemed fit for nothing but to be a "gangrel scrape-gut." But, as the companion of "his Liddesdale raids" happily put it, "he was makin' himsell a' the time, but he didna ken maybe what he was about till years had passed: at first he thought o' little, I daresay, but the queerness and the fun."

We may as well dispose at once of Scott's professional career. His father intended him originally to follow his own business, and he was apprenticed in his sixteenth year; but he preferred the upper walk of the legal profession, and was admitted a member of the faculty of advocates in 1792. He seems to have read hard at law for four years at least, but almost from the first to have limited his ambition to obtaining some comfortable appointment such as would leave him a good deal of leisure for literary pursuits. In this he was not disappointed. In 1799 he obtained the office of sheriff-depute of Selkirkshire, with a salary of £300 and very light duties. In 1806 he obtained the reversion of the office of clerk of

session. It is sometimes supposed, from the immense amount of other work that Scott accomplished, that this office was a sinecure. But the duties, which are fully described by Lockhart, were really serious, and kept him hard at fatiguing work, his biographer estimates, for at least three or four hours daily during six months out of the twelve, while the court was in session. He discharged these duties faithfully for twenty-five years, during the height of his activity as an author. He did not enter on the emoluments of the office till 1812, but from that time he received from the clerkship and the sheriffdom combined an income of £1600 a year, being thus enabled to act in his literary undertakings on his often-quoted maxim that "literature should be a staff and not a crutch."

Scott's profession, in addition to supplying him with a competent livelihood, supplied him also with abundance of opportunities for the study of men and manners. Characters of all types and shades find their way into courts of law. The wonder is that so much technical drudgery did not crush every particle of romance out of him; but such was the elasticity and strength of his powers that this daily attendance at the transaction of affairs in open court face to face with living men—under a strain of attention that would have exhausted an ordinary man's allowance of energy—seems rather to have helped him in giving an atmosphere of reality to his representations of the life of the past.

It was not, however, as a prosé writer that he was first to make a reputation. The common notion is that Scott, having made a reputation as a poet, was led to attempt romances in prose by a chance impulse, hitting upon the new vein as if by accident. The truth seems rather to be that, as it is his prose romances which give the fullest measure of his genius, so the greater part of his early life was a conscious or unconscious preparation for writing them; whereas his metrical romances, in every way slighter and less rich and substantial, were, comparatively speaking, a casual and temporary deviation from the main purpose of his life. According to his own account, he was led to adopt the medium of verse by a series of accidents. The story is told by himself at length and with his customary frankness and modesty in the *Essay on Imitations of the Ancient Ballad*, prefixed to the 1830 edition of his *Border Minstrelsy*, and in the 1830 introduction to the *Lay of the Last Minstrel*. The first link in the chain was a lecture by Henry Mackenzie on German literature, delivered in 1788. This apprized Scott, who was then a legal apprentice and an enthusiastic student of French and Italian romance, that there was a fresh development of romantic literature in German. As soon as he had the burden of preparation for the bar off his mind he learnt German, and was profoundly excited to find a new school founded on the serious study of a kind of literature his own devotion to which was regarded by most of his companions with wonder and ridicule. We must remember always that Scott quite as much as Wordsworth created the taste by which he was enjoyed, and that in his early days he was half-ashamed of his romantic studies, and pursued them more or less in secret with a few intimates. While he was in the height of his enthusiasm for the new German romance, Mrs Barbauld visited Edinburgh, and recited an English translation of Bürger's *Lenore*. Scott heard of it from a friend, who was able to repeat two lines—

"Tramp, tramp, across the land they speed;
Splash, splash, across the sea!"

The two lines were enough to give Scott a new ambition. He could write such poetry himself! The impulse was strengthened by his reading Lewis's *Monk* and the ballads in the German manner interspersed through the work. He hastened to procure a copy of Bürger, at once executed

translations of several of his ballads, published two of them in a thin quarto in 1796 (his ambition being perhaps quickened by the unfortunate issue of a love affair), and was much encouraged by the applause of his friends. Soon after he met Lewis personally, and his ambition was confirmed. "Finding Lewis," he says, "in possession of so much reputation, and conceiving that if I fell behind him in poetical powers, I considerably exceeded him in general information, I suddenly took it into my head to attempt the style of poetry by which he had raised himself to fame." Accordingly, he composed *Glenfinlas*, *The Eve of St John*, and the *Gray Brother*, which were published in Lewis's collection of *Tales of Wonder*. But he soon became convinced that "the practice of ballad-writing was out of fashion, and that any attempt to revive it or to found a poetical character on it would certainly fail of success." His study of Goethe's *Götz von Berlichingen*, of which he published a translation in 1799, gave him wider ideas. Why should he not do for ancient Border manners what Goethe had done for the ancient feudalism of the Rhine? He had been busy since his boyhood collecting Scottish Border ballads and studying the minutest details of Border history. He began to cast about for a form which should have the advantage of novelty, and a subject which should secure unity of composition. He was engaged at the time preparing a collection of the *Minstrelsy of the Scottish Border*. The first instalment was published in 1802; it was followed by another next year, and by an edition and continuation of the old romance of *Sir Tristram*; and Scott was still hesitating about subject and form for a large original work. It seems probable from a conversation recorded by Gillies that he might have ended by casting his meditated picture of Border manners in the form of a prose romance. But chance at last threw in his way both a suitable subject and a suitable metrical vehicle. He had engaged all his friends in the hunt for Border ballads and legends. Among others, the countess of Dalkeith, wife of the heir-apparent to the dukedom of Buccleuch, interested herself in the work. Happening to hear the legend of a tricky hobgoblin named Gilpin Horner, she asked Scott to write a ballad about it. He agreed with delight, and, out of compliment to the lady who had given this command to the bard, resolved to connect it with the house of Buccleuch. The subject grew in his fertile imagination, till incidents enough had gathered round the goblin to furnish a framework for his long-designed picture of Border manners. Chance also furnished him with a hint for a novel scheme of verse: Coleridge's fragment of *Christabel*, though begun in 1797—when he and Wordsworth were discussing on the Quantock Hills the principles of such ballads as Scott at the same time was reciting to himself in his gallops on Musselburgh sands—was not published till 1816. But a friend of Scott's, Sir John Stoddart, had met Coleridge in Malta, and had carried home in his memory enough of the unfinished poem to convey to Scott that its metre was the very metre of which he had been in search. Scott introduced still greater variety into the four-beat couplet; but it was to *Christabel* that he owed the suggestion, as one line borrowed whole and many imitated rhythms testify.

The *Lay of the Last Minstrel* appeared in January 1805, and at once became widely popular. It sold more rapidly than poem had ever sold before. Scott was astonished at his own success, although he expected that "the attempt to return to a more simple and natural style of poetry was likely to be welcomed." Many things contributed to the extraordinary demand for the *Lay*. First and foremost, no doubt, we must reckon its simplicity. After the abstract themes and abstruse, elaborately allusive style of the 18th century, the public were glad of verse that

could be read with ease and even with exhilaration, verse in which a simple interesting story was told with brilliant energy, and simple feelings were treated not as isolated themes but as incidents in the lives of individual men and women. The thought was not so profound, the lines were not so polished, as in *The Pleasures of Memory* or *The Pleasures of Hope*, but the "light-horseman sort of stanza" carried the reader briskly over a much more diversified country, through boldly outlined and strongly coloured scenes. No stanza required a second reading; you had not to keep attention on the stretch or pause and construe laboriously before you could grasp the writer's meaning or enter into his artfully condensed sentiment. To remember the pedigrees of all the Scotts, or the names of all the famous chiefs and hardy retainers "whose gathering word was Bellenden," might have required some effort, but only the conscientious reader need care to make it. The only puzzle in the *Lay* was the goblin page, and the general reader was absolved from all trouble about him by the unanimous declaration of the critics, led by Jeffrey in the *Edinburgh Review*, that he was a grotesque excrescence, in no way essential to the story. It is commonly taken for granted that Scott acquiesced in this judgment, his politely ironic letter to Miss Seward being quoted as conclusive. This is hardly fair to the poor goblin, seeing that his story was the germ of the poem and determines its whole structure; but it is a tribute to the lively simplicity of the *Lay* that few people should be willing to take the very moderate amount of pains necessary to see the goblin's true position in the action. The supernatural element was Scott's most risky innovation. For the rest, he was a cautious and conservative reformer, careful not to offend established traditions. He was far from raising the standard of rebellion, as Wordsworth had done, against the great artistic canon of the classical school

"True art is nature to advantage dressed."

To "engraft modern refinement on ancient simplicity," to preserve the energy of the old ballad without its rudeness and bareness of poetic ornament, was Scott's avowed aim. He adhered to the poetic diction against which Wordsworth protested. His rough Borderers are "dressed to advantage" in the costume of romantic chivalry. The baronial magnificence of Branksome, Deloraine's "shield and jack and acton," the elaborate ceremony of the combat between the pseudo-Deloraine and Musgrave, are concessions to the taste of the 18th century. Further, he disarmed criticism by putting his poem into the mouth of an ancient minstrel, thus pictorially emphasizing the fact that it was an imitation of antiquity, and providing a scapegoat on whose back might be laid any remaining sins of rudeness or excessive simplicity. And, while imitating the antique romance, he was careful not to imitate its faults of rambling, discursive, disconnected structure. He was scrupulously attentive to the classical unities of time, place, and action. The scene never changes from Branksome and its neighbourhood; the time occupied by the action (as he pointed out in his preface) is three nights and three days; and, in spite of all that critics have said about the superfluity of the goblin page, it is not difficult to trace unity of intention and regular progressive development in the incidents.

The success of the *Lay* decided finally, if it was not decided already, that literature was to be the main business of Scott's life, and he proceeded to arrange his affairs accordingly. It would have been well for his comfort, if not for his fame, had he adhered to his first plan, which was to buy a small mountain-farm near Bowhill, with the proceeds of some property left to him by an uncle, and

divide his year between this and Edinburgh, where he had good hopes, soon afterwards realized, of a salaried appointment in the Court of Session. This would have given him ample leisure and seclusion for literature, while his private means and official emoluments secured him against dependence on his pen. He would have been laird as well as sheriff of the cairn and the scaur, and as a man of letters his own master. Since his marriage in 1797 with Miss Charpentier, daughter of a French refugee, his chief residence had been at Lasswade, about six miles from Edinburgh. But on a hint from the lord-lieutenant that the sheriff must live at least four months in the year within his county, and that he was attending more closely to his duties as quartermaster of a mounted company of volunteers than was consistent with the proper discharge of his duties as sheriff, he had moved his household in 1804 to Ashestiel. When his uncle's bequest fell in, he determined to buy a small property on the banks of the Tweed within the limits of his sheriffdom. There, within sight of Newark Castle and Bowhill, he proposed to live like his ancient minstrel, as became the bard of the clan, under the shadow of the great ducal head of the Scotts. But this plan was deranged by an accident. It so happened that an old schoolfellow, James Ballantyne, a printer in Kelso, whom he had already befriended, transplanted to Edinburgh, and furnished with both work and money, applied to him for a further loan. Scott declined to lend, but offered to join him as sleeping partner. Thus the intended purchase money of Broadmeadows became the capital of a printing concern, of which by degrees the man of letters became the overwrought slave, milch-cow, and victim.

When the *Lay* was off his hands, Scott's next literary enterprise was a prose romance—a confirmation of the argument that he did not take to prose after Byron had "bet him," as he put it, in verse, but that romance writing was a long-cherished purpose. He began *Waverley*, but a friend to whom he showed the first chapters—which do not take *Waverley* out of England, and describe an education in romantic literature very much like Scott's own—not unnaturally decided that the work was deficient in interest and unworthy of the author of the *Lay*. Scott accordingly laid *Waverley* aside. We may fairly conjecture that he would not have been so easily diverted had he not been occupied at the time with other heavy publishing enterprises calculated to bring grist to the printing establishment. His active brain was full of projects for big editions, which he undertook to carry through on condition that the printing was done by Ballantyne & Co., the "Co." being kept a profound secret, because it might have injured the lawyer and poet professionally and socially to be known as partner in a commercial concern. Between 1806 and 1812, mainly to serve the interests of the firm, though of course the work was not in itself unattractive to him, Scott produced his elaborate editions of Dryden, Swift, the Somers Tracts; and the Sadler State papers. Incidentally these laborious tasks contributed to his preparation for the main work of his life by extending his knowledge of English and Scottish history.

Marmion, begun in November 1806 and published in February 1808, was written as a relief to "graver cares," though in this also he aimed at combining with a romantic story a solid picture of an historical period. It was even more popular than the *Lay*. Scott's resuscitation of the four-beat measure of the old "zestours" afforded a signal proof of the justness of their instinct in choosing this vehicle for their recitations. The four-beat lines of *Marmion* took possession of the public like a kind of madness: they not only clung to the memory but they would not keep off the tongue: people could not help spouting them

in solitary places and muttering them as they walked about the streets. The critics, except Jeffrey, who may have been offended by the pronounced politics of the poet, were on the whole better pleased than with the *Lay*. Their chief complaint was with the "introductions" to the various cantos, which were objected to as vexatiously breaking the current of the story.¹

The triumphant success of *Marmion*, establishing him as *facile princeps* among living poets, gave Scott such a *heerz*, to use his own words, "as almost lifted him off his feet." He touched then the highest point of prosperity and happiness. Presently after, he was irritated and tempted by a combination of little circumstances into the great blunder of his life, the establishment of the publishing house of John Ballantyne & Co. A coolness arose between him and Jeffrey, chiefly on political but partly also on personal grounds. They were old friends, and Scott had written many articles for the *Review*, but its political attitude at this time was intensely unsatisfactory to Scott. To complete the breach, Jeffrey reviewed *Marmion* in a hostile spirit. A quarrel occurred also between Scott's printing firm and Constable, the publisher, who had been the principal feeder of its press. Then the tempter appeared in the shape of Murray, the London publisher, anxious to secure the services of the most popular *littérateur* of the day. The result of negotiations was that Scott set up, in opposition to Constable, "the crafty," "the grand Napoleon of the realms of print," the publishing house of John Ballantyne & Co., to be managed by a dissipated and swaggering little tailor, whom he nicknamed "Rigdumfunnidos" for his talents as a mimic and low comedian. Scott interested himself warmly in starting the *Quarterly Review*, and in return Murray constituted Ballantyne & Co. his Edinburgh agents. Scott's trust in Rigdumfunnidos and his brother, "Aldiborontiphosphornio," and in his own power to supply all their deficiencies, is as strange a piece of infatuation as any that ever formed a theme for romance or tragedy. Their devoted attachment to the architect of their fortunes and proud confidence in his powers helped forward to the catastrophe, for whatever Scott recommended they agreed to, and he was too immersed in multifarious literary work and professional and social engagements to have time for cool examination of the numerous rash speculative ventures into which he launched the firm.

The *Lady of the Lake* (May 1810) was the first great publication by the new house. It was received with enthusiasm, even Jeffrey joining in the chorus of applause. It made the Perthshire Highlands fashionable for tourists, and raised the post-horse duty in Scotland. But it did not make up to Ballantyne & Co. for their heavy investments in unsound ventures. The *Edinburgh Annual Register*, meant as a rival to the *Edinburgh Review*, though Scott engaged Southey to write for it and wrote for it largely himself, proved a failure. In a very short time the warehouses of the firm were filled with unsaleable stock. By the end of three years Scott began to write to his partners about the propriety of "reefing sails." But apparently he was too much occupied to look into the accounts of the firm, and, so far from understanding the real state of their affairs, he considered himself rich enough to make his first purchase of land at Abbotsford. But he had hardly settled there in the spring of 1812, and begun his schemes for building and planting and converting a bare moor into a richly wooded *pleasance*, than his business troubles began, and he found himself harassed by fears of bankruptcy. Rigdumfunnidos concealed the situation as

¹ See Mr Hatton's *Scott*, in English Men of Letters Series, p. 56, for a good defence of these introductions. Scott advertised them originally as a separate publication.

long as he could, but as bill after bill came due he was obliged to make urgent application to Scott, and the truth was thus forced from him item by item. He had by no means revealed all when Scott, who behaved with admirable good-nature, was provoked into remonstrating, "For heaven's sake, treat me as a man and not as a milch-cow." The proceeds of *Rokeby* (January 1813) and of other labours of Scott's pen were swallowed up, and bankruptcy was inevitable, when Constable, still eager at any price to secure Scott's services, came to the rescue. With his help three crises were tided over in 1813.

It was in the midst of these ignoble embarrassments that Scott opened up the rich new vein of the *Waverley* novels. He chanced upon the manuscript of the opening chapters of *Waverley*, and resolved to complete the story. Four weeks in the summer of 1814 sufficed for the work, and *Waverley* appeared without the author's name in July. Many plausible reasons might be given and have been given for Scott's resolution to publish anonymously. The quaintest reason, and possibly the main one, though it is hardly intelligible now, is that given by Lockhart, that he considered the writing of novels beneath the dignity of a grave clerk of the Court of Session. Why he kept up the mystification, though the secret was an open one to all his Edinburgh acquaintances, is more easily understood. He enjoyed it, and his formally initiated coadjutors enjoyed it; it relieved him from the annoyances of foolish compliment; and it was not unprofitable,—curiosity about "the Great Unknown" keeping alive the interest in his works. The secret was so well kept by all to whom it was definitely entrusted, and so many devices were used to throw conjecture off the scent, that even Scott's friends, who were certain of the authorship from internal evidence, were occasionally puzzled. He kept on producing in his own name as much work as seemed humanly possible for an official who was to be seen every day at his post and as often in society as the most fashionable of his professional brethren. His treatises on chivalry, romance, and the drama, besides an elaborate work in two volumes on Border antiquities, appeared in the same year with *Waverley*, and his edition of Swift in nineteen volumes in the same week. The *Lord of the Isles* was published in January 1815; *Guy Mannering*, written in "six weeks about Christmas," in February; *Paul's Letters to his Kinsfolk* and *The Field of Waterloo* in the same year. *Harold the Damned*,¹ not to mention the historical part of the *Annual Register*, appeared in the same year with *The Antiquary*, *The Black Dwarf*, and *Old Mortality* (1816). No wonder that the most positive interpreters of internal evidence were mystified. It was not as if he had buried himself in the country for the summer half of the year. On the contrary, he kept open house at Abbotsford in the fine old feudal fashion and was seldom without visitors. His own friends and many strangers from a distance, with or without introductions, sought him there, and found a hearty hospitable country laird, entirely occupied to all outward appearance with local and domestic business and sport, building and planting, adding wing to wing, acre to acre, plantation to plantation, with just leisure enough for the free-hearted entertainment of his guests and the cultivation of friendly relations with his humble neighbours. How could such a man find time to write two or three novels a year, besides what was published in his own name? Even the few intimates who knew how early he got up to prepare his packet for the printer, and had some idea of the extraordinary power that he had acquired of commanding his faculties for the utilization of odd moments, must have

² This poem, like the *Bridal of Triermain*, did not bear his name on the title-page, but the authorship was an open secret, although he tried to encourage the idea that the author was his friend Erskine.

wondered at times whether he had not inherited the arts of his ancestral relation Michael Scot, and kept a goblin in some retired attic or vault.

Scott's fertility is not absolutely unparalleled; the late Mr Trollope claimed to have surpassed him in rate as well as total amount of production, having also business duties to attend to. But in speed of production combined with variety and depth of interest and weight and accuracy of historical substance Scott is still unrivalled. On his claims as a serious historian, which Carlyle ignored in his curiously narrow and splenetic criticism, he was always, with all his magnanimity, peculiarly sensitive. A certain feeling that his antiquarian studies were undervalued seems to have haunted him from his youth. It was probably this that gave the sting to Jeffrey's criticism of *Marmion*, and that tempted him to the somewhat questionable proceeding of reviewing his own novels in the *Quarterly* upon the appearance of *Old Mortality*. He was nettled besides at the accusation of having treated the Covenanters unfairly, and wanted to justify himself by the production of historical documents. In this criticism of himself Scott replied lightly to some of the familiar objections to his work, such as the feebleness of his heroes, *Waverley*, *Bertram*, *Lovel*, and the melodramatic character of some of his scenes and characters. But he argued more seriously against the idea that historical romances are the enemies of history, and he rebutted by anticipation Carlyle's objection that he wrote only to amuse idle persons who like to lie on their backs and read novels. His *apologia* is worth quoting. Historical romances, he admits, have always been failures, but the failure has been due to the imperfect knowledge of the writers and not to the species of composition. If, he says, anachronisms in manners can be avoided, and "the features of an age gone by can be recalled in a spirit of delineation at once faithful and striking, . . . the composition itself is in every point of view dignified and improved; and the author, leaving the light and frivolous associates with whom a careless observer would be disposed to ally him, takes his seat on the bench of the historians of his time and country. In this proud assembly, and in no mean place of it, we are disposed to rank the author of these works. At once a master of the great events and minute incidents of history, and of the manners of the times he celebrates, as distinguished from those which now prevail, the intimate thus of the living and of the dead, his judgment enables him to separate those traits which are characteristic from those that are generic; and his imagination, not less accurate and discriminating than vigorous and vivid, presents to the mind of the reader the manners of the times, and introduces to his familiar acquaintance the individuals of the drama as they thought and spoke and acted." This defence of himself shows us the ideal at which Scott aimed, and which he realized. He was not in the least unconscious of his own excellence. He did not hesitate in this review to compare himself with Shakespeare in respect of truth to nature. "The volume which this author has studied is the great book of nature. He has gone abroad into the world in quest of what the world will certainly and abundantly supply, but what a man of great discrimination alone will find, and a man of the very highest genius will alone depict after he has discovered it. The characters of Shakespeare are not more exclusively human, not more perfectly men and women as they live and move, than those of this mysterious author."

The immense strain of Scott's double or quadruple life as sheriff and clerk, hospitable laird, poet, novelist, and miscellaneous man of letters, publisher and printer, though the prosperous excitement sustained him for a time, soon told upon his health. Early in 1817 began a series of

attacks of agonizing cramp of the stomach, which recurred at short intervals during more than two years. But his appetite and capacity for work remained unbroken. He made his first attempt at play-writing¹ as he was recovering from the first attack; before the year was out he had completed *Rob Roy*, and within six months it was followed by *The Heart of Midlothian*, which by general consent occupies the highest rank among his novels. The *Bride of Lammermoor*, *The Legend of Montrose*, and *Ivanhoe* were dictated to amanuenses, through fits of suffering so acute that he could not suppress cries of agony. Still he would not give up. When Laidlaw begged him to stop dictating he only answered, "Nay, Willie, only see that the doors are fast. I would fain keep all the cry as well as the wool to ourselves; but as to giving over work, that can only be when I am in woollen."

Throughout those two years of intermittent ill-health, which was at one time so serious that his life was despaired of and he took formal leave of his family, Scott's semi-public life at Abbotsford continued as usual,—swarms of visitors coming and going, and the rate of production on the whole suffering no outward and visible check, all the world wondering at the novelist's prodigious fertility. Mr Ruskin lately put forward the opinion that there is a distinct falling off in the quality of Scott's work traceable from the time of his first serious illness, arguing as a proof of the healthiness of Scott's organization that "he never gains anything by sickness; the whole man breathes or faints as one creature; the ache that stiffens a limb chills his heart, and every pang of the stomach paralyses the brain." Yet, when the world was not aware of the state of the novelist's health, and novel after novel was received without any abatement of enthusiasm, but rather with growing wonder and admiration, no critic was acute enough to detect this, and it is somewhat unfortunate for the theory that Mr Ruskin has mistaken the date of Scott's first illness and included among the masterpieces produced in perfect health *Rob Roy* and *The Heart of Midlothian*, both composed through recurrent fits of intense bodily pain. The first of the series concerning which there were murmurs of dissatisfaction was *The Monastery*, which was the first completed after the re-establishment of the author's bodily vigour. The failure, such as it was, was due rather to the subject than the treatment, and *The Abbot*, in which Mary Queen of Scots is introduced, was generally hailed as fully sustaining the reputation of "the Great Unknown." *Kenilworth*, *The Pirate*, *The Fortunes of Nigel*, *Pevelev of the Peak*, *Quentin Durward*, *St Ronan's Well*, *Redgauntlet*, followed in quick succession in the course of three years, and it was not till the last two were reached that the cry that the author was writing too fast began to gather volume. *St Ronan's Well* was very severely criticized and condemned. And yet Mr Leslie Stephen tells a story of a dozen modern connoisseurs in the Waverley novels who agreed that each should write down separately the name of his favourite novel, when it appeared that each had without concert named *St Ronan's Well*. There is this certainly to be said for *St Ronan's*, that, in spite of the heaviness of some of the scenes at the "hottle" and the artificial melodramatic character of some of the personages, none of Scott's stories is of more absorbing or more brilliantly diversified interest. Contradictions between contemporary popular opinion and mature critical judgment, as well as diversities of view among critics themselves, rather shake confidence in individual judgment on the

¹ *The Doom of Devorgoil*. This and his subsequent dramatic sketches, *Macduff's Cross*, *Halidon Hill*, and *The Ayrshire Tragedy*, were slight compositions, dashed off in a few days, and afford no measure of what Scott might have done as a dramatist if he had studied the conditions of stage representation.

veged but not particularly wise question which is the best of Scott's novels. There must, of course, always be inequalities in a series so prolonged. The author cannot always be equally happy in his choice of subject, situation, and character. Naturally also he dealt first with the subjects of which his mind was fullest. But any theory of falling off or exhaustion based upon plausible general considerations has to be qualified so much when brought into contact with the facts that very little confidence can be reposed in its accuracy. *The Fortunes of Nigel* comes comparatively late in the series and has often been blamed for its looseness of construction. Scott himself always spoke slightly of his plots, and humorously said that he proceeded on Mr Bayes's maxim, "What the deuce is a plot good for but to bring in good things?" Yet so competent a critic as Mr Hutton has avowed that on the whole he prefers *The Fortunes of Nigel* to any other of Scott's novels. An attempt might be made to value the novels according to the sources of their materials, according as they are based on personal observation, documentary history, or previous imaginative literature. On this principle *Ivanhoe* and *The Tales of the Crusaders* might be adjudged inferior as being based necessarily on previous romance. But as a matter of fact Scott's romantic characters are vitalized, clothed with a verisimilitude of life, out of the author's deep, wide, and discriminating knowledge of realities, and his observation of actual life was coloured by ideals derived from romance. He wrote all his novels out of a mind richly stored with learning of all kinds, and in the heat of composition seems to have drawn from whatever his tenacious memory supplied to feed the fire of imagination, without pausing to reflect upon the source. He did not exhaust his accumulations from one source first and then turn to another, but from first to last drew from all as the needs of the occasion happened to suggest.

Towards the close of 1825, after eleven years of brilliant and prosperous labour, encouraged by constant tributes of admiration, homage, and affection such as no other literary potentate has ever enjoyed, realizing his dreams of baronial splendour and hospitality on a scale suited to his large literary revenues, Scott suddenly discovered that the foundations of his fortune were unsubstantial. He had imagined himself clear of all embarrassments in 1818, when all the unsaleable stock of John Ballantyne & Co. was bargained off by Rigdum to Constable for Waverley copyrights, and the publishing concern was wound up. Apparently he never informed himself accurately of the new relations of mutual accommodation on which the printing firm then entered with the great but rashly speculative publisher, and drew liberally for his own expenditure against the undeniable profits of his novels without asking any questions, trusting blindly in the solvency of his commercial henchmen. Unfortunately, "lifted off their feet" by the wonderful triumphs of their chief, they thought themselves exempted like himself from the troublesome duty of inspecting ledgers and balancing accounts, till the crash came. From a diary which Scott began a few days before the first rumours of financial difficulty reached him we know how he bore from day to day the rapidly unfolded prospect of unsuspected liabilities. "Thank God," was his first reflexion, "I have enough to pay more than 20s. in the pound, taking matters at the worst." But a few weeks revealed the unpleasant truth that, owing to the way in which Ballantyne & Co. were mixed up with Constable & Co., and Constable with Hurst & Robinson, the failure of the London house threw upon him personal responsibility for £130,000.

How Scott's pride rebelled against the dishonour of bankruptcy, how he toiled for the rest of his life to clear

of this enormous debt, declining all offers of assistance and asking no consideration from his creditors except time, and how nearly he succeeded, is one of the most familiar chapters in literary history, and would be one of the saddest were it not for the heroism of the enterprise. His wife died soon after the struggle began, and he suffered other painful bereavements; but, though sick at heart, he toiled on indomitably, and, writing for honour, exceeded even his happiest days in industrious speed. If he could have maintained the rate of the first three years, during which he completed *Woodstock*, three *Chronicles of the Canongate*, *The Fair Maid of Perth*, *Anne of Geierstein*, the *Life of Napoleon* (involving much research, and equal in amount to thirteen novel volumes), part of his *History of Scotland*, the Scottish series of *Tales of a Grandfather*, besides several magazine articles, some of them among the most brilliant of his miscellaneous writings, and prefaces and notes to a collected edition of his novels,—if he could have continued at this rate he might soon have freed himself from all his encumbrances. The result of his exertions from January 1826 to January 1828 was nearly £40,000 for his creditors. But the terrific labour proved too much even for his endurance. Ugly symptoms began to alarm his family in 1829, and in February of 1830 he had his first stroke of paralysis. Still he was undaunted, and not all the persuasions of friends and physicians could induce him to take rest. "During 1830," Mr Lockhart says, "he covered almost as many sheets with his MS. as in 1829," the new introductions to a collected edition of his poetry and the *Letters on Demonology and Witchcraft* being amongst the labours of the year. He had a slight touch of apoplexy in November and a distinct stroke of paralysis in the following April; but, in spite of these warnings and of other bodily ailments, he had two more novels, *Count Robert of Paris* and *Castle Dangerous*, ready for the press by the autumn of 1831. He would not yield to the solicitations of his friends and consent to try rest and a change of scene, till fortunately, as his mental powers failed, he became possessed of the idea that all his debts were at last paid and that he was once more a free man. In this belief he happily remained till his death. When it was known that his physicians recommended a sea voyage for his health, a Government vessel was put at his disposal, and he cruised about in the Mediterranean and visited places of interest for the greater part of a year before his death. But, when he felt that the end was near, he insisted on being carried across Europe that he might die on his beloved Tweedside at Abbotsford, where he expired on 21st September 1832. He was buried at Dryburgh Abbey on 26th September following.

A complete list of Scott's works is given in the *Catalogue of Scott Exhibition, 1871*, Edinburgh, 1872. The standard biography of Scott is that by Lockhart referred to above; see also Allan, *Life of Scott*, Edinburgh, 1894.

SCOTT, WILLIAM. See STOWELL, LORD.

SCOTT, WINFIELD (1786-1866), American general, was born near Petersburg, Virginia, 13th June 1786, the grandson of a Scottish refugee from the field of Culloden. He was a student at William and Mary College in 1805, and was admitted to the bar at Richmond, Virginia, in 1807. One of the sudden war excitements of the time changed the course of his life, and he obtained a captain's commission in the United States army in 1808. He served on the Niagara frontier throughout the war of 1812-15, and became one of its leading figures, rising rapidly through all the grades of the service to that of major-general, which was then the highest. Among other curious testimonials to his valour and conduct, he received from Princeton College in 1814 the honorary degree of doctor of laws, a distinction on

which he never ceased to look with peculiar satisfaction. In 1841 he became the senior major-general of the army, and in 1855, after he had passed out of political life, the exceptional grade of lieutenant-general was created for him. His most noteworthy military achievement was his conduct of the main campaign against Mexico in 1847. Landing (9th March) at Vera Cruz with but 5500 men, he fought his way through a hostile country to the capital city of Mexico, which he captured 14th September, thereby practically ending the war. His service, however, was not confined to the army; from 1815 until 1861 he was the most continuously prominent public man of the country, receiving and justifying every mark of public confidence in his integrity, tact, and reasonableness. At a time (1823) when duelling was almost an imperative duty of an officer, he resisted successfully the persistent efforts of a brother officer (Andrew Jackson) to force him into a combat; and the simple rectitude of his intentions was so evident that he lost no ground in public estimation. In 1832, when ordered to Charleston by President Jackson during the "nullification" troubles, he secured every advantage for the Government, while his skilful and judicious conduct gave no occasion to South Carolina for an outbreak. In like manner, in the Black Hawk Indian troubles of 1832-33, in the Canadian "Patriot War" of 1837-38, in the boundary dispute of 1838 between Maine and New Brunswick, in the San Juan difficulty in 1859, wherever there was imminent danger of war and a strong desire to keep the peace, all thoughts turned instinctively to Scott as a fit instrument of an amicable settlement, and his success always justified the choice. Such a career seemed a gateway to political preferment, and his position was strengthened by the notorious fact that, as he was a Whig, the Democratic administration had persistently tried to subordinate his claims to those of officers of its own party. In 1852 his party nominated him for the presidency; but, though his services had been so great and his capacity and integrity were beyond question, he had other qualities which counted heavily against him. He was easily betrayed into the most egregious blunders of speech and action, which drew additional zest from his portly and massive form and a somewhat pompous ceremoniousness of manner. He destroyed his chances of election in the North. The Southern Whigs, believing him to be under the influence of the Seward or anti-slavery wing of the party, cast no strong vote for him, and he was overwhelmingly defeated in both sections, completing the final overthrow of his party. In 1861 he remained at the head of the United States armies, in spite of the secession of his State, until November, when he retired on account of old age and infirmities. After travelling for a time in Europe, he published in 1864 his autobiography, a work which reveals the strong and weak points of his character,—his integrity and complete honesty of purpose, his inclination to personal vanity, his rigid precision in every point of military precedent and etiquette, and his laborious affectation of an intimate acquaintance with *belles lettres*. He died at West Point, New York, 29th May 1866.

The *Autobiography of Lieutenant-General Winfield Scott, LL.D.*, in two volumes, gives the facts of his career at length. For his defeat in 1852, see Von Holst's *Constitutional History*, vol. iv. p. 171 of the original, p. 206 of the English translation.

SCOTUS. See DUNS SCOTUS and SCHOLASTICISM.

SCRANTON, a city of the United States, capital of Lackawanna county, Pennsylvania, on a plateau at the junction of the Roaring Brook and the Lackawanna river, 162 miles north of Philadelphia. It is the centre of the great coal-mining district in the country and the seat of a large number of iron and steel works, rolling-mills, blast-furnaces, &c., and extensive factories for the production of

rails, locomotives, mining machinery, steam-boilers, stoves, carriages, edge-tools, &c. A public library, a theatre, an academy of music, a hospital, a public hall, a driving park, a Roman Catholic cathedral, a home for the friendless, and a museum of Indian stone relics are among the more prominent features of the place. The population was 9223 in 1860, 35,092 in 1870, and 45,850 in 1880.

Slocum Farm, as the site was called subsequent to 1798, saw its first blast-furnace erected in 1840 by George and Selden Scranton, who soon added a rolling-mill and the manufacture of rails. The opening of the railway in 1856 gave a great stimulus to the new town (1854), which obtained a city charter in 1866. It is divided into twenty-one wards, of which the 4th, 5th, 6th, 14th, 15th, and 18th are known as Hyde Park, the 1st, 2d, and 3d as Providence.

SCREAMER, a bird inhabiting Guiana and the Amazon valley, so called in 1781 by Pennant (*Gen. Birds*, p. 37) "from the violent noise it makes,"—the *Palamedea cornuta* of Linnaeus. First made known in 1648 by Maregrave under the name of "Anhima," it was more fully described and better figured by Buffon under that of *Kamichi*, still applied to it by French writers. Of about the size of a Turkey, it is remarkable for the curious "horn" or slender caruncle, more than three inches long, it bears on its crown, the two sharp spurs with which each wing is armed, and its elongated toes. Its plumage is plain in colour, being of an almost uniform greyish black above, the space round the eyes and a ring round the neck being variegated with white, and a patch of pale rufous appearing above the carpal joint, while the lower parts of the body are white. Closely related to this bird is another first described by Linnaeus as a species of *Parra* (JACANA, vol. xiii. p. 531), to which group it certainly does not belong, but separated therefrom by Illiger to form the genus *Chauna*, and now known as *C. chavaria*, very generally in English as the "Crested Screamer,"¹ a name which was first bestowed on the SERIEMA (*q.v.*). This bird inhabits the lagoons and swamps of Paraguay and Southern Brazil, where it is called "Chajá" or "Chaka," and is smaller than the preceding, wanting its "horn," but having its head furnished with a dependent crest of feathers. Its face and throat are white, to which succeeds a blackish ring, and the rest of the lower parts are white, more or less clouded with cinereous.

According to Mr Gibson (*Ibis*, 1880, pp. 165, 166), its nest is a light construction of dry rushes, having its foundation in the water, and contains as many as six eggs, which are white tinged with buff. The young are covered with down of a yellowish brown colour. A most singular habit possessed by this bird is that of rising in the air and soaring there in circles at an immense altitude, uttering at intervals the very loud cry of which its local name is an imitation. From a dozen to a score may be seen at once so occupying themselves. The young are often taken from the nest and reared by the people to attend upon and defend their poultry, a duty which is faithfully² and, owing to the spurs with which the Chaka's wings are armed, successfully discharged. Another very curious property of this bird, which was observed by Jacquin, who brought it to the notice of Linnaeus³ is its emphysematous condition,—there being a layer of air-cells between the skin and the muscles, so that on any part of the body being pressed a crackling sound is heard. In Central America occurs another species, *C. derbiana*, chiefly distinguished by the darker colour of its plumage. For this a distinct genus, *Ichthyornis*, was proposed, but apparently without necessity, by Reichenbach (*Syst. Avium*, p. xxi.).

The taxonomic position of the *Palamedeidae*, for all will

¹ Under this name its curious habits have been well described by Mr W. H. Hudson (*Gentleman's Magazine*, Sept. 1885, pp. 280-287).

² Hence Latham's name for this species is "Faithful Jacana,"—he supposing it to belong to the genus in which Linnaeus placed it.

³ "Tacta manu cutis, sub pennis etiam lanosa, crepat ubique fortiter" (*Syst. Nat.*, ed. 12, l. p. 260).

allow to the Screamer the rank of a Family at least, has been much debated, and cannot be regarded as fixed. Their Anserine relations were pointed out by Prof. Parker in the *Zoological Proceedings* for 1863 (pp. 511-518), and in the same work for 1867 Prof. Huxley placed the Family among his *Chenomorphæ*; but this view was contravened in 1876 by Garrod, who said, "The Screamer must have sprung from the primary avian stock as an independent offshoot at much the same time as did most of the other important families." Accordingly in 1880 Mr Sclater regarded them as forming a distinct "Order," *Palamedææ*, which he, however, placed next to the true *Anseres*, from the neighbourhood of which, as has been already stated (*ORNITHOLOGY*, vol. xviii. p. 47), the present writer thinks the *Palamedeidae* can hardly be removed. (A. N.)

SCREW. The screw is the simplest instrument for converting a uniform motion of rotation into a uniform motion of translation (see *MECHANICS*, vol. xv. p. 754). Metal screws requiring no special accuracy are generally cut by taps and dies. A tap is a cylindrical piece of steel having a screw on its exterior with sharp cutting edges; by forcing this with a revolving motion into a hole of the proper size, a screw is cut on its interior forming what is known as a nut or female screw. The die is a nut with sharp cutting edges used to screw upon the outside of round pieces of metal and thus produce male screws. More accurate screws are cut in a lathe by causing the carriage carrying the tool to move uniformly forward, thus a continuous spiral line is cut on the uniformly revolving cylinder fixed between the lathe centres. The cutting tool may be an ordinary form of lathe tool or a revolving saw-like disk. (See *MACHINE TOOLS*, vol. xv. p. 153.)

Errors of Screws.—For scientific purposes the screw must be so regular that it moves forward in its nut exactly the same distance for each given angular rotation around its axis. As the mountings of a screw introduce many errors, the final and exact test of its accuracy can only be made when it is finished and set up for use. A large screw can, however, be roughly examined in the following manner. (1) See whether the surface of the threads has a perfect polish. The more it departs from this, and approaches the rough torn surface as cut by the lathe tool, the worse it is. A perfect screw has a perfect polish. (2) Mount upon it between the centres of a lathe and the slip a short nut which fits perfectly. If the nut moves from end to end with equal friction, the screw is uniform in diameter. If the nut is long, unequal resistance may be due to either an error of run or a bend in the screw. (3) Fix a microscope on the lathe carriage and focus its single cross-hair on the edge of the screw and parallel to its axis. If the screw runs true at every point, its axis is straight. (4) Observe whether the short nut runs from end to end of the screw without a wabbling motion when the screw is turned and the nut kept from revolving. If it wobbles the screw is said to be drunk. One can see this error better by fixing a long pointer to the nut, or by attaching to it a mirror and observing an image in it with a telescope. The following experiment will also detect this error. (5) Put upon the screw two well-fitting and rather short nuts, which are kept from revolving by arms bearing against a straight edge parallel to the axis of the screw. Let one nut carry an arm which supports a microscope focused on a line ruled on the other nut. Screw this combination to different parts of the screw. If during one revolution the microscope remains in focus, the screw is not drunk; and, if the cross-hairs bisect the line in every position, there is no error of run.

Making Accurate Screws.—To produce a screw of a foot or even a yard long with errors not exceeding $\frac{1}{1000}$ th of an inch is not difficult. Professor William A. Rogers of Harvard observatory has invented a process in which the tool of the lathe while cutting the screw is moved so as to counteract the errors of the lathe screw. The screw is then partly ground to get rid of local errors. But, where the highest accuracy is needed, we must resort in the case of screws, as in all other cases, to grinding. A long solid nut, tightly fitting the screw in one position, cannot be moved freely to another position unless the screw is very accurate. If grinding material is applied and the nut is constantly tightened, it will grind out all errors of run, drunkenness, crookedness, and irregularity of size. The condition is that the nut must be long, rigid, and capable of being tightened as the grinding proceeds; also the screw must be ground longer than it will finally be needed so that the imperfect ends may be removed.

The following process will produce a screw suitable for ruling

gratings for optical purposes. Suppose it is our purpose to produce a screw which is finally to be 9 inches long, not including bearings, and $1\frac{1}{8}$ inches in diameter. Select a bar of soft Bessemer steel, which has not the hard spots usually found in cast steel, about $1\frac{1}{8}$ inches in diameter and 30 long. Put it between lathe centres and turn it down to 1 inch diameter everywhere, except about 12 inches in the centre, where it is left a little over $1\frac{1}{8}$ inches in diameter for cutting the screw. Now cut the screw with a triangular thread a little sharper than 60°. Above all, avoid a fine screw, using about 20 threads to the inch.

The grinding nut, about 11 inches long, has now to be made. Fig. 1 represents a section of the nut, which is made of brass, or better

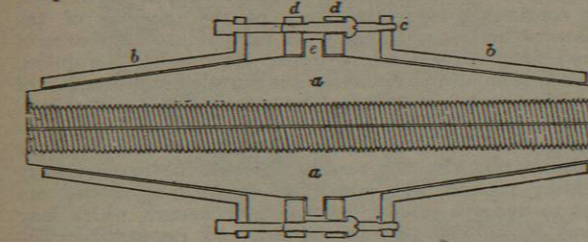


FIG. 1.—Section of grinding nut.

of Bessemer steel. It consists of four segments, a, a, a, a , which can be drawn about the screw by two collars, b, b , and the screw c . Wedges between the segments prevent too great pressure on the screw. The final clamping is effected by the rings and screws, d, d , which enclose the flanges, e , of the segments. The screw is now placed in a lathe and surrounded by water whose temperature can be kept constant to 1° C., and the nut placed on it. In order that the weight of the nut may not make the ends too small, it must either be counterbalanced by weights hung from a rope passing over pulleys in the ceiling, or the screw must be vertical during the whole process. Emery and oil seem to be the only available grinding materials, though a softer silica powder might be used towards the end of the operation to clean off the emery and prevent future wear. Now grind the screw in the nut, making the nut pass backwards and forwards over the screw, its whole range being nearly 20 inches at first. Turn the nut end for end every ten minutes and continue for two weeks, finally making the range of the nut only about 10 inches, using finer washed emery and moving the lathe slower to avoid heating. Finish with a fine silica powder or rouge. During the process, if the thread becomes too blunt, recut the nut by a short tap so as not to change the pitch at any point. This must of course not be done less than five days before the finish. Now cut to the proper length; centre again in the lathe under a microscope; and turn the bearings. A screw so ground has less errors than from any other system of mounting. The periodic error especially will be too small to be discovered, though the mountings and graduation and centering of the head will introduce it; it must therefore finally be corrected.

Mounting of Screws.—The mounting must be devised most carefully, and is indeed more difficult to make without error than the screw itself. The principle which should be adopted is that no workmanship is perfect; the design must make up for its imperfections. Thus the screw can never be made to run true on its bearings, and hence the device of resting one end of the carriage on the nut must be rejected. Also all rigid connexion between the nut and the carriage must be avoided, as the screw can never be adjusted parallel to the ways on which the carriage rests. For many purposes, such as ruling optical gratings, the carriage must move accurately forward in a straight line as far as the horizontal plane is concerned, while a little curvature in the vertical plane produces very little effect. These conditions can be satisfied by making the ways V-shaped and grinding with a grinder somewhat shorter than the ways. By constant reversals and by lengthening or shortening the stroke, they will finally become nearly perfect. The vertical curvature can be sufficiently tested by a short carriage carrying a delicate spirit level. Another and very efficient form of ways is V-shaped with a flat top and nearly vertical sides. The carriage rests on the flat top and is held by springs against one of the nearly vertical sides. To determine with accuracy whether the ways are straight, fix a flat piece of glass on the carriage and rule a line on it by moving it under a diamond; reverse and rule another line near the first, and measure the distance apart at the centre and at the two ends by a micrometer. If the centre measurement is equal to the mean of the two end ones, the line is straight. This is better than the method with a mirror mounted on the carriage and a telescope. The screw itself must rest in bearings, and the end motion be prevented by a point bearing against its flat end, which is protected by hardened steel or a flat diamond. Collar bearings introduce periodic errors. The secret of success is so to

design the nut and its connexions as to eliminate all adjustments of the screw and indeed all imperfect workmanship. The connexion must also be such as to give means of correcting any residual periodic errors or errors of run which may be introduced in the mountings or by the wear of the machine.

The nut is shown in fig. 2. It is made in two halves, of wrought iron filled with boxwood or lignum vite plugs, on which the screw is cut. To each half a long piece of sheet-steel is fixed which bears against a guiding edge, to be described presently. The two halves are held to the screw by springs, so that each moves forward almost independently of the other. To join the nut to the carriage, a ring is attached to the latter, vertical and which can turn round a The bars fixed midway on the two halves against this ring at points 90° distant Hence each half does its share independently in moving the carriage forward, parallelism between the screw and the tricity in the screw mountings thus the forward motion of the carriage. The which the steel pieces of the nut rest can form as to correct any small error of run the screw. Also, by causing it to move forwards periodically, the periodic error mountings can be corrected.

In making gratings for optical purposes the periodic error must be very perfectly eliminated, the periodic displacement of the lines only one- inch from their mean position will produce "ghosts" in the spectrum.¹ Indeed this is the most sensitive method of detecting the existence of this error, and it is practically impossible to mount the most perfect of screws without introducing it. A very practical method of determining this error is to rule a short grating with very long lines on a piece of common thin plate glass; cut it in two with a diamond and superimpose the two halves with the rulings together and displaced sideways over each other one-half the pitch of the screw. On now looking at the plates in a proper light so as to have the spectral colours show through it, dark lines will appear, which are wavy if there is a periodic error and straight if there is none. By measuring the comparative amplitude of the waves and the distance apart of two lines, the amount of the periodic error can be determined. The phase of the periodic error is best found by a series of trials after setting the corrector at the proper amplitude as determined above.

A machine properly made as above and kept at a constant temperature should be able to make a scale of 6 inches in length, with errors at no point exceeding $\frac{1}{1000}$ th of an inch. When, however, a grating of that length is attempted at the rate of 14,000 lines to the inch, four days and nights are required and the result is seldom perfect, possibly on account of the wear of the machine or changes of temperature. Gratings, however, less than 3 inches long are easy to make. (H. A. R.)

SCRIBE, AUGUSTIN EUGÈNE (1791-1861), the most popular playwright of France, was born at Paris on 24th December 1791, and died there on 20th February 1861. His father was a silk merchant and he was well educated, being destined for the bar. But, having a real gift for the theatre (a gift which unfortunately was not allied with sufficient literary power to make his works last), he very soon broke away from professional study and at the age of twenty produced, in collaboration, as is common in France, the first of a series of dramas which continued for fifty years. *Les Dervis* (1811) is usually cited as the first play in which he took a hand, though, as for some time he did not sign his work, identification is somewhat difficult. He achieved no distinct success till 1816, when *Une Nuit de Garde Nationale* made him in a way famous. Thenceforward his fertility was unceasing and its results prodigious. There may be in existence a complete list of Scribe's works, but we have never seen any that pretended to be such. He wrote every kind of drama—vaudevilles,

¹ In a machine made by the present writer for ruling gratings the periodic error is entirely due to the graduation and centering of the head. The uncorrected periodic error from this cause displaces the lines $\frac{1}{1000}$ th of an inch, which is sufficient to entirely ruin all gratings made without correcting it.