

1791 he became instructor to the first battalion of volunteers of the Bas-Rhin. He served with his battalion in 1792, and rapidly rose to the position of adjutant-general, colonel, and chief of the staff to General Lefebvre. Soult it was who practically directed the operations of Lefebvre's division in 1794, and after the battle of Fleurus he was promoted general of brigade by the representatives on mission. For the next five years he was constantly employed in Germany under Jourdan, Moreau, Kléber, and Lefebvre. The attack of the French left at the battle of Altenkirchen, which won the day, was directed by Soult, and in 1799 he was promoted general of division and ordered to proceed to Switzerland. It was at this time that he laid the foundations of his military fame, and he particularly distinguished himself in Masséna's great Swiss campaign, and especially at the battle of Zurich. He accompanied Masséna to Genoa, and acted as his principal lieutenant throughout the protracted siege of that city, during which he operated with a detached force without the walls, and after many successful actions he was wounded and taken prisoner at Monte Cretto on 13th April 1800. The victory of Marengo restoring his freedom, he received the command of the southern part of the kingdom of Naples, and in 1802 he was appointed one of the four generals commanding the guard of the consuls. Though he was one of those generals who had served under Moreau, and who therefore, as a rule, disliked and despised Napoleon, Soult had the wisdom to show his devotion to the ruling power; in consequence he was in August 1803 appointed to the command in chief of the camp of Boulogne, and in May 1804 he was made one of the first marshals of France. When Napoleon decided to lead the troops of the camp of Boulogne into Germany, Soult took the command of the right wing, and it was by his capture of the heights of Pratzen that the great battle of Austerlitz was decided. He played a great part in all the famous battles of the grand army, except the battle of Friedland, and after the conclusion of the peace of Tilsit he returned to France and was created duke of Dalmatia. In the following year he was appointed to the command of the 2d corps of the army with which Napoleon intended to conquer Spain, and after winning the battle of Gamonal he was detailed to the emperor to pursue Sir John Moore, whom he only caught up at Coruña. For the next four years Soult remained in Spain, but it is impossible to do more than allude to his most important feats of arms. In 1809, after his defeat by Sir John Moore, he invaded Portugal and took Oporto, but, deluded by the idea of becoming king of Portugal, he neglected to advance upon Lisbon, and was eventually dislodged from Oporto by Sir Arthur Wellesley. After the battle of Talavera he was made major-general of French troops in Spain, and on 12th November 1809 won the great victory of Ocaña. In 1810 he invaded Andalusia, which he speedily reduced, with the exception of Cadiz. In 1811 he marched north into Estremadura, and took Badajoz, and when the Anglo-Portuguese army laid siege to it he marched to its rescue, and fought the famous battle of Albuera (16th May). In 1812, however, he was obliged, after Wellington's great victory of Salamanca, to evacuate Andalusia, and was soon after recalled from Spain at the request of Joseph Bonaparte, with whom he had always disagreed. In March 1813 he assumed the command of the 4th corps of the grand army and commanded the centre at Lützen and Bautzen, but he was soon sent, with unlimited powers, to the south of France to try and repair the damages done by the great defeat of Vittoria. His campaign there is the finest proof of his genius as a general, although he was repeatedly defeated by the English under Wellington, for his soldiers were but raw conscripts, while those of Wellington were the veterans of many campaigns.

Such was the military career of Marshal Soult. His political career was by no means so creditable. After the first abdication of Napoleon he declared himself a royalist, received the order of St Louis, and acted as minister for war from 3d December 1814 to 11th March 1815. When Napoleon returned from Elba Soult at once declared himself a Bonapartist, and acted as major-general to the emperor in the campaign of Waterloo. For this conduct he was exiled, but not for long, for in 1819 he was recalled and in 1820 again made a marshal of France. He once more tried to show himself a fervent royalist and was made a peer in 1827. After the revolution of 1830 he made out that he was a partisan of Louis-Philippe and constitutional royalty, and served as minister for war from 1830 to 1834, as ambassador extraordinary to London for the coronation of Queen Victoria in 1838, and again as minister for war from 1840 to 1844. In 1848, when Louis Philippe was overthrown, Soult again declared himself a republican. He died at his castle of Soultberg near his birthplace in 1851.

SOUND. See ACOUSTICS.

SOUNDING to ascertain the depth of the sea has been practised from very early times for purposes of navigation, but it is only since the introduction of submarine telegraphy that extensive efforts have been made to obtain a complete knowledge of the contour of the ocean-bed. As early as the middle of last century a few deep soundings were recorded in various parts of the world: Ellis made one in 1749 of 891 fathoms off the north-west coast of Africa. But these early results must be accepted only with great caution, for the methods then in use were not such as to ensure accuracy at any depth greater than a few hundred fathoms. Sir John Ross, the arctic explorer, was much in advance of his times as regarded such investigations; he invented a "deep-sea clam" for bringing up a portion of the bottom, and on September 1, 1819, in Possession Bay, made a successful sounding at a depth of 1000 fathoms, which is especially memorable because it was clear, from the organisms which came up entangled in the line, that animal life existed at that depth.

The operation of sounding is readily performed in shallow water by letting down a weight attached to a cord, which is marked off into fathoms by worsted tucked under the strands, the tens and hundreds being indicated by different colours. The bottom of the weight usually presents a hollow, which is filled with tallow, so that a portion of the material from the bottom may be brought up and give an indication of its nature. Sometimes a valved cavity is used instead of the tallow. It is easy to see that the longer the line let out the greater will be its friction in passing through the water, the more slowly the weight will descend, and the slighter will be the shock transmitted to the upper extremity when it reaches the bottom; indeed, at what are now considered very moderate depths this becomes quite imperceptible: hence in deep-sea sounding the line is carefully watched as it runs out, and the time each 100-fathom mark enters the water is noted down. Owing to the increasing friction these intervals gradually lengthen, but any sudden increment indicates that the bottom has been reached, for it shows that the weight has ceased to act, and that further descent of the line is due merely to its own gravitation. For instance, in one of the "Challenger" soundings, with a line 1 inch in circumference, and with a weight of 4 cwts. attached, the time occupied in descending from 2900 to 3000 fathoms was 2 m. 10 s.; from 3000 to 3100 fathoms 2 m. 13 s., and from 3100 to 3200 fathoms 3 m. 14 s., this sudden increase showing that the bottom had been reached in the interval.

Furthermore, the weight required to sink a line in deep

water with sufficient rapidity for purposes of accurate observation is so great that it is found impracticable to bring it up again without putting an undue strain upon the rope or seriously prolonging the operation. Hence in 1854 Brooke, an American, devised an apparatus by which the weight was detached when it reached the bottom and only a small tube containing a sample of the bottom was brought up. This was in fact a modification of an apparatus which had been devised by Hooke in the 17th century; he made an arrangement in which a light sphere was sunk by a heavy weight, but was liberated on reaching the bottom,—the depth being then deduced from the time which elapsed between the sinking of the globe and its reappearance at the surface. Of the various modifications of Brooke's sounding machine, perhaps the most famous is that constructed by the blacksmith of H.M.S. "Hydra," and commonly known as the "Hydra sounding rod." It was used on the cruises of the "Lightning" and "Porcupine" and during the earlier part of the "Challenger" expedition. This apparatus is shown in fig. 1, where AB is the rod, terminating in a tube below so that it may bring up a sample of the bottom; the weights F fit loosely round it and are supported by the wire E which passes over the stud D, where a spring presses against it, the strength of which is so adjusted that it is unable to displace the wire as long as the strain of the weights

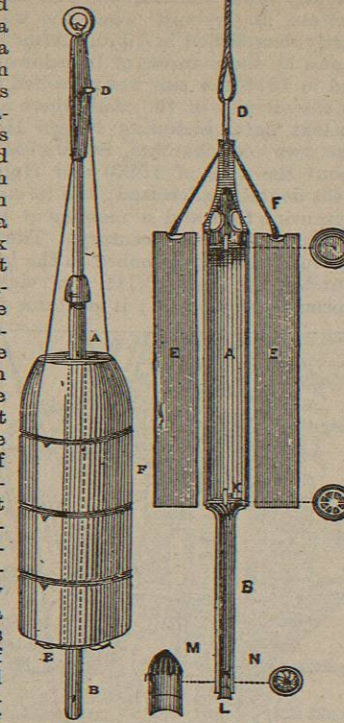


Fig. 1.

Fig. 2.

is upon it, but so soon as this is relieved by their resting on the bottom the wire is thrust off the stud, and

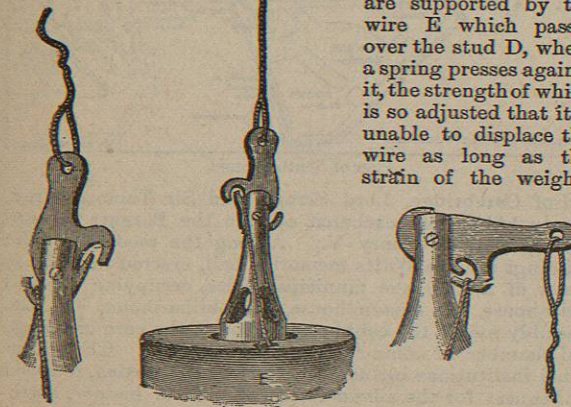


Fig. 3.

Fig. 4.

Fig. 5.

is upon it, but so soon as this is relieved by their resting on the bottom the wire is thrust off the stud, and

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when the line is hauled in the weights and wire are left behind.

An improved apparatus has recently been invented by Mr J. Y. Buchanan, and used by him on board the telegraph ships "Dacia" and "Buccaneer," which can be used either in shallow or deep water, and has the advantage of bringing up samples both of the water and of the mud from the bottom. It consists of a hollow cylinder A, fig. 2, at the top and bottom of which are india-rubber valves H, K, opening upwards, so that water passes freely through them during the descent but is retained as soon as a plug of mud occupies the tube B. The weight EE which surrounds the cylinder is supported by a wire F passing over a peculiar hook D, shown separately in figs. 3, 4, 5; when sounding in shallow water it is not necessary to detach the weight, and the wire is therefore placed as in fig. 3; when working at greater depths the wire rests on the other side of the hook, as in fig. 4,—the result being that on the bottom being reached it falls into the upper part of the notch, fig. 5, and continues to press the tube into the mud, but when hauling up commences the wire slips out altogether and the weight is left at the bottom. A valve L, M, N is sometimes used to retain the sample of the bottom.

At the present time deep-sea sounding is extensively practised for telegraphic purposes, and is almost entirely conducted by means of wire instead of rope, a method introduced by Sir William Thomson. The friction of the wire in passing through the water is of course very much less than that of rope, and hence it runs out and can be hauled in much more rapidly; a smaller sinker may be used, and in very many instances it can be recovered. It is customary in sounding for cables to make very frequent observations (once in from 1 to 50 miles), for it is found that the laying can be accomplished with much less risk of accident if the contour of the ocean-bed be accurately known. The saving of time by the use of wire is very considerable; but the advantage is not so obvious in running out as in hauling in, because a heavier weight is used to increase the rate, this of course involving a loss of iron sinkers. For instance, an apparatus similar to that mentioned above as being used by the "Challenger" took on an average 24 m. 22 s. to sink 2000 fathoms, whilst in a recent sounding by the "Albatross" the weight ran out 2000 fathoms in 20 m. 30 s. and was hauled in in 21 m. 9 s.—a rate which would have been quite unattainable by the aid of rope. The saving in the matter of sinkers is by no means inconsiderable; instead of 3 or 4 cwts., only 50 to 60 lb are used, and Sigsbee has calculated that this difference is sufficient to pay for any extra loss there may be by the breaking of the wire. Captain Magnaghi of the Italian navy and Captains Sigsbee and Belknap of the American Survey have successfully developed the method of sounding with wire, and owing to its use the last-mentioned officer was able to survey the route from San Francisco to Japan, doing all his sounding by hand, which would have been quite impossible had hempen rope been used. When soundings are made for scientific purposes it is customary to ascertain the temperature, both at the bottom and at intermediate depths, by a thermometer of special construction.

For further information, see Sir Wyville Thomson, *The Depths of the Sea* (London, 1874); *Narrative of the Cruise of H.M.S. "Challenger"* (London, 1885); Sigsbee, *Deep-Sea Sounding and Dredging* (Washington, 1880); Wille, *Norwegian North Atlantic Expedition*, pt. iv., "Apparatus and how used," 1876-78; Mill, *The Scottish Marine Station* (Edinburgh, 1885); and, for an improved apparatus used on board the "Talisman," *La Nature*, xli. p. 120, 1884; also the annual Reports of the U.S. Fish Commission. (W. E. HO.)

SOUTH, ROBERT (1633-1716), one of the wittiest of English divines, was the son of a London merchant, and was born at Hackney, Middlesex, in 1633. He was educated at Westminster school, whence in 1651 he was elected to Christ Church, Oxford. He became B.A. in 1654, and the same year wrote several Latin verses to congratulate Cromwell on concluding peace with the Dutch, which were published in a collection of university poems. The following year he published a Latin poem, entitled *Musica Incantans*. After commencing M.A. in 1657 he was in the habit before obtaining orders in 1658 of preaching as the champion of Calvinism against Socinianism and Arminianism. He was also at this time a strong supporter of Presbyterianism, but on the approach of the Restoration his views on church government under-

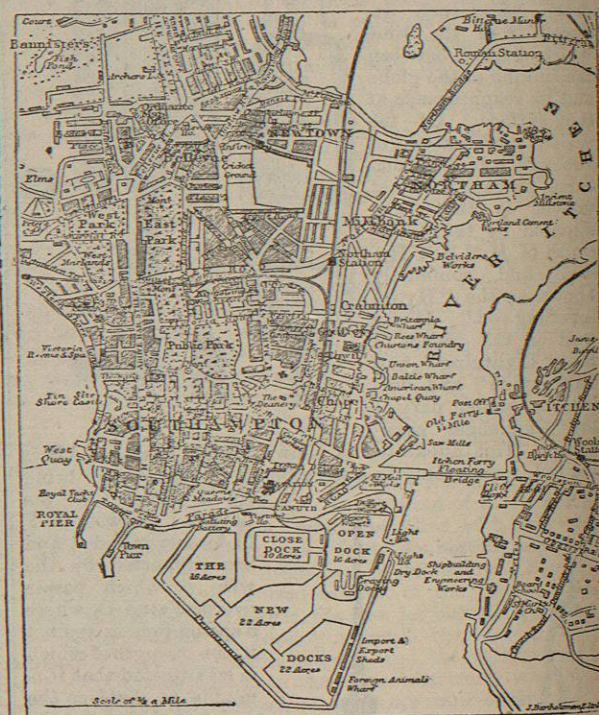
went a change. In fact he adhered successively to the triumphant party as represented by Cromwell, Charles, James, and William, and there are substantial grounds for the assertion of Anthony Wood that he was much indebted for his preferments to his zeal for "the powers that be." On 10th August 1660 he was chosen public orator of the university, and in 1661 domestic chaplain to Lord Clarendon. In March 1663 he was made prebend of Westminster, and shortly afterwards he received from his university the degree of D.D. In 1667 he became chaplain to the duke of York. He was a zealous advocate of the doctrine of passive obedience, and also strongly opposed the Toleration Act, declaiming in unmeasured terms against the various nonconformist sects. In 1676 he was appointed chaplain to Lawrence Hyde (afterwards earl of Rochester), ambassador-extraordinary to the king of Poland, and of his visit he sent an interesting account to Dr Edward Pocock in a letter, dated Dantzic, 16th December 1677, which was printed along with South's *Posthumous Works* in 1717. In 1678 he was promoted by the chapter of Westminster to the rectory of Islip, Oxfordshire. Owing, it is said, to a personal grudge, South in 1693 published *Animadversions on Dr Sherlock's Book, entitled a Vindication of the Holy and Ever Blessed Trinity*, in which the views of Sherlock were attacked with much sarcastic bitterness. Sherlock, in answer, published a *Defence* in 1694, to which South replied in *Tritheism Charged upon Dr Sherlock's New Notion of the Trinity, and the Charge Made Good*. The controversy was carried by the rival parties into the pulpit, and occasioned such keen feeling that the king interposed to stop it. During the greater part of the reign of Anne South remained comparatively quiet, but in 1710 he showed himself a keen opponent of Sacheverell. He died 8th July 1716, and was buried in Westminster Abbey.

The style of South is vigorous, pungent, and brilliant, though tending to exuberance. His sermons are strongly practical, but his theory of life is not ascetic. His wit generally inclines towards sarcasm, and it was probably the knowledge of his quarrelsome temperament that prevented his promotion to a bishopric. If he sacrificed principle to his desire for preferment, his ambition was not of a sordid kind, for he was noted for the extent of his charities. He published a large number of single sermons, and they appeared in a collected form in 1692 in six volumes, reaching a second edition in his lifetime in 1715. His *Opera Posthumæ Latina*, including his will, his Latin poems, and his orations while public orator, with memoirs of his life, appeared in 1717. His *Works* were published with a memoir by the Clarendon press in 1823, and have been several times reprinted. The contemporary notice of South by Wood in his *Athenæ* is characterized by a strongly hostile tone, partly to be explained by a criticism of South at Wood's expense.

SOUTH AFRICAN REPUBLIC. See TRANSVAAL.

SOUTHAMPTON, a municipal and parliamentary borough, which gives name to Hampshire, or the county of Southampton, and one of the principal seaports on the south coast of England, is beautifully situated at the head of Southampton Water, forming the mouth of the Test, on a sloping peninsula, bounded on the east by the Itchen, at the terminus of the South-Western Railway, 79 miles south-west of London, 13 south-south-west of Winchester, and 24 west-north-west of Portsmouth. Southampton is also a county of itself,—the county of the town of Southampton. It preserves much of its antique appearance, but, although in the older parts the streets if picturesque are narrow and irregular, it may still claim the distinction it enjoyed in Leland's time of ranking "as one of the fairest that is in England," handsome and spacious shops lining the principal streets, while the suburbs are studded with numerous villas and mansions embosomed in woods. There are still considerable remains of the old town walls built in the time of Richard II., the most remarkable being a portion of the west walls, with an

arcade on its exterior face. Four of the seven gates are comparatively well preserved—North or Bar Gate, South Castle Gate, Westgate, and Blue Anchor Gate. The finest of these is Bargate, in a room above which is the ancient Guildhall, where the quarter sessions are held. The representations of Sir Bevis of Hampton and the giant Ascupart which formerly stood on each side have recently been obliterated. The castle, originally a Saxon fortress, and rebuilt when the walls were erected, was partly demolished in 1650. After its rebuilding had been begun by the marquis of Lansdowne in 1805, it was sold, and in 1818 the site was parcelled out for building plots. In the vicinity of the castle there are some houses of very ancient date, including King's House (Early Norman). The two old churches, St Michael's (originally Norman about the date of 1080) and Holyrood, have been in a great degree modernized; the former contains a beautiful Byzantine font and a monument to Sir R. Lyster, chief justice in the 16th century. The French chapel of St Julien, originally attached to the hospital of God's House, founded by Henry VIII. for eight poor persons, is of Norman architecture; it contains the burial-place of the



Plan of Southampton.

earl of Cambridge, Lord Scrope, and Sir Thomas Grey, who in 1415 were executed outside the Bargate for conspiring against Henry V. Among the modern public buildings are the Watts memorial hall, erected in 1876 at a cost of £8000, the municipal office, occupying the old audit-house, the custom-house, the philharmonic hall, the assembly rooms, the county court-house, the corn exchange and chamber of commerce, and two theatres. The educational institutions include the Hartley Institution, founded by bequest for the advancement of natural history, astronomy, antiquities, and classical and Oriental literature, and now embracing a library, reading-room, museum, art gallery, laboratories, and schools of science and art associated with South Kensington; the Edward VI. grammar school