The timbers generally are about 1 inch by ¾ inch, and are sawn out of a clean piece of American elm, then planed and rounded. After being steamed they are fitted into the boat, and as soon as each is in position, and before it cools, it is nailed fast with copper nails. The gunwale is next fitted, a piece of American elm about 2 inches square; a breast-hook is fitted forward, binding the gunwale top strake, stern, and apron together; and aft the gunwale and top strake are secured to the transom by either a wooden or iron knee. A waring or stringer, about 3 inches by ¾ inch, of American elm, is then fitted on both sides of the boat, about 8 to 9 inches below the gunwale, on the top of which the thwarts or seats rest. The thwarts are secured by knees, which are fastened with clench bolts through the gunwale and top strake and also through the thwart and knee. The boat generally receives three coats of paint and is then ready for service.

The following are the dimensions of boats in the British merchant service:—

	Length.	Breadth.	Depth.
Lifeboat	28 ft. 6 in.	8 ft. 6 in.	3 ft. 6 in.
Cutter	26 ft.	7 ft.	3 ft.
Pinnace	24 ft.	6 ft. 6 in.	2 ft. 8 in.
Gig	18 ft.	5 ft. 6 in.	2 ft. 3 in.
Dingy	15 ft.	5 ft. 6 in.	2 ft. 3 in.

SHIPLEY, a town of England, in the West Riding of Yorkshire, is situated on the south bank of the Aire, in the neighbourhood of a picturesque pastoral country, at the junction of the Leeds and Bradford Railway with the Bradford, Skipton, and Colne line, 3 miles north of Bradford. The church of St Paul, an elegant structure in the Gothic style erected in 1820, was altered and improved in 1876. The manufacture of worsted is the principal industry, and there are large stone quarries in the neighbourhood. A local board was established in 1853. The population of the urban sanitary district (area 1406 acres) in 1871 was 11,757 and in 1881 it was 15,093.

SHIPPING. The island of Britain (to the shipping of which the present historical notice is mainly restricted) is well fitted to serve as a commercial depôt, both by the number of its natural harbours and the variety of its products. There is evidence that Phœnician traders visited it for tin, and in after times it served as one of the granaries of the Roman empire. On the other hand raw wool was the staple article of commerce in the Middle Ages, while the supremacy of English manufactures in modern days has contributed to the development of British shipping till it has grown out of all comparison with anything in ancient or mediæval times.

Britain must have been one of the most distant points that was visited by Phœnician or Carthaginian ships. Adventurous as their sailors were when compared with those of other races, and ready as they were to carry on trading on behalf of neighbouring states, it is not clear that they ever sailed across the Indian Ocean or ventured beyond the Persian Gulf, even in the service of the Egyptians (Brugsch). Their coasting habits led to the settlement of a chain of colonies along the Mediterranean shores, and that sea was wide enough to form a convenient barrier between the Greek and the Carthaginian settlements. When their empire was at length destroyed the Romans became the heirs of their enterprise, but do not appear to have pushed maritime adventure much further or opened out many new commercial connexions.

Though the Angle and Saxon tribes were doubtless skilled both in shipbuilding and in the management of their vessels at the time when they conquered Britain, these arts had greatly decayed during the four centuries that elapsed before the time of Alfred, who endeavoured to improve on existing models (*Eng. Chron.*, 897). Hence the necessity of resisting the Danes, with the subsequent fusion of Danish and other elements in our nationality, may be taken as marking the period when English shipping had its rise. Apart from incidental notices of communication with other lands, there is clear evidence, from the early English laws, of efforts to encourage commerce, particularly in the status which was accorded to traders and the protection afforded to merchant ships. The whole of these arrangements seem to imply that the merchant was the owner of the vessel, who "adventured" with his cargo, and sailed in his ship himself; but these voyages were probably undertaken for the most part to ports on the other side of the Channel, as it does not appear that English ships penetrated to the Mediterranean till the time of the crusades.

The steady development of English shipping during the Norman and early Plantagenet reigns may be inferred from the more frequent intercommunication with the Continent and the many evidences of the increasing importance of the commercial classes and trading towns. In the time of Edward III. the shipping interest suffered a temporary check from the removal of the staple to England, a step which was taken with the view of attracting foreign merchants to visit England (1353). This policy, however, was soon reversed, and the reign of that monarch was on the whole favourable to the development of shipping. He was himself fond of the sea, and commanded in person in naval engagements, and by taking possession of Calais and enforcing his sovereignty over the narrow seas he rendered the times more favourable for the development of commerce. More than one of the noble families of England have descended from the merchant princes of the 14th century. By this time also the compass, which had been introduced in a rude form as early as the 12th century, had been improved and had come into common use. But many years were to elapse before the enterprise of the 15th and 16th centuries made the most of the new facilities for undertaking long voyages; and the fortunes of English shipping, as depicted by a contemporary (*Libell of Englishe Policy*, 1436), continued to vary according to the state of political connexions with the Continent and the success of English monarchs in "keeping the narrow seas" free from the ravages of pirates. During this century, too, we hear far more of organizations of merchants to foreign parts, and of struggles between different bodies of traders. The "Merchants of the Staple" dealt in raw wool and the other staple commodities of the realm, which they exported to Calais; the "Merchant Adventurers," a powerful association which had developed out of a religious guild, dealt chiefly in woollen cloths, but they traded with any port where they could get a footing. This brought them into frequent collision with the "Merchants of the House," who had had a footing in London since before the Conquest. The chief attempt at accommodation took place in the time of Edward IV. (1474), but the quarrels and reprisals continued till the discovery of the New World had revolutionized trade, and the Hanse League, expelled by Elizabeth, were unable either to injure or to compete with English shipping.

Considering the interest which all the Tudor monarchs showed in developing shipping,[1] and the proverbial boldness and enterprise of the Cabots, Raleigh, Drake, and other sailors, it is remarkable that England obtained so little footing at first in the new lands which were discovered by Columbus (1492) or along the route that was

[1] The establishment of Trinity House by Henry VIII. for looking after pilots, buoys, &c., in 1512, is the most important result of his care for shipping.

opened up by vasco da Gama (1496). Eventually she inherited much of the commercial empires of Spain, Portugal, Holland, and France, but there was still comparatively little permanent acquisition, or establishment of trading factories, at the close of the 16th century. The fact was that such undertakings were beyond the power of private traders, and that Elizabeth was too penurious to make an attempt on such a scale as to command success. It was by the formation of companies that the difficulty was at length overcome, and that associated traders, or traders working on a joint stock, were able to establish factories in foreign parts, and thus to give a new impetus to English shipping. The African Company and others were failures, but there were many which had a long and successful career. The Levant Company was established in 1581, and had factories at Smyrna. The Eastland Company traded with the Baltic; it was established in 1579, and had factories in Prussia. The Hudson's Bay Company is much more recent, and only dates from 1670. But by far the greatest of these undertakings was the East India Company, which was founded in 1600, and which, after a long struggle with commercial rivals at home and Dutch competitors abroad, attained at length to the sovereignty of a large empire. The chief cause of complaint against this company in the early stages of its existence lay in the fact that it was a joint-stock company, and that therefore the proprietors had a monopoly of a valuable trade; the greater part of the other companies were regulated companies, and membership was open to any British subject who liked to pay the entrance fees and join with other merchants. The merchants thus associated agreed to abide by certain specified conditions, so as not to spoil the markets for one another, but develop the trade in which all were interested in a manner which should be advantageous to all. The Levant Company and Merchant Adventurers were regulated companies, and they led the attack on the East India Company as the monopoly of a few which injured the trade of other merchants. The controversy raged during the reigns of James I. and Charles I., and many of the leading merchants of the time—Mun, Malynes, Misselden, as well as Wheeler, the secretary of the Merchant Adventurers—took part in it. The advocates of the East India trade argued that, owing to the immense distance of their factories and the special difficulties of maintaining their position abroad, it was impossible to carry on their trade except on the joint-stock principle, and their plea prevailed in the long run.

The Merchant Adventurers and the whole system of regulated companies is less familiar to us in the present day, and it may be worth while to indicate the sort of regulations which were imposed on the members. One series of rules was directed at regulating the total export trade of certain classes of goods to the chief Continental ports, so that the markets abroad might not be overstocked, and that they might always be able to get remunerative prices. Other regulations allotted the proportion of goods which each member of the company should export, and the terms as to credit and so forth on which he should deal. Each factory was carefully regulated so as to secure a respectable and orderly life among the merchants resident abroad; none of them were to do business during the times of public preaching or on fast-days; and there was a curious administrative system by which the compliance of the members with these regulations was enforced.[1]

Those English merchants who traded to towns where the Adventurers had a factory, but did not comply with their regulations, were stigmatized as "interlopers," and they were greatly disliked by the regular traders, as they were accused of spoiling the market in various ways and, generally speaking, trading on any terms for an immediate advantage without regard to the steady and regular development of commerce. At a later time, there were interlopers within the East India Company's territories also.

[1] Wheeler in Brit. Mus. *Add.* MS. 18913.

The formation of these large companies for the purpose of undertaking long voyages marks a great revolution in the shipping of the country. The differentiation of the mercantile and defensive navy became more complete. There had of course been a certain number of royal ships from a very early time (see NAVY), but the fleet had not been regularly maintained in the 15th century, and the defence of the realm was practically left to individuals or associations. As late as the time of Elizabeth we find that the same thing was the case, and that the fleet which harassed the Armada consisted very largely of merchant ships. In the time of the naval wars with Holland, however, this is greatly changed, and the navy was much more effectively organized and regularly maintained. But even when the royal navy was thus organized it was felt that its continued effectiveness must depend on the maintenance of merchant shipping. The two were still interconnected, and just because special importance was attached to this arm as a means of defence there was a great deal of legislation for the purpose of indirectly promoting shipping and providing seamen. This was one of the aspects in which the prosperity of British fisheries was specially attended to; the consumption of fish was stimulated by insisting on the observance of Lent and of weekly fasts on Wednesdays and Fridays, when "the eating of fish was required politically and not spiritually" 5 Eliz. c. 5, § 13, 1 Jas. I. c. 29), and this was principally done as a means of inducing men to take to a seafaring life, and so to fit themselves for the defence of the country and for the manning of our merchant ships.

Considerable progress had also been made both in the art of sailing and in the building of ships. The vessels which composed the fleets of the crusaders appear to have been for the most part galleys, provided with a double row of oars; the huge prows which gave a superiority in hand-to-hand fighting with a grappled vessel were of no advantage when the use of cannon had revolutionized naval warfare. We thus find that the ships of this period were built on a different model, and many inducements were held out to those who built large ships. Both Elizabeth and Charles offered bounties for the building of larger craft (100 and 200 tons); in 1597 800 tons was the largest vessel that an English yard turned out. The legislature also was most assiduous in endeavouring to encourage this industry. The importation of naval stores of all kinds, the growth of hemp for cordage and of timber, were matters of constant care, both in England itself and in the policy which was dictated to her colonies.

It is easy enough to see that in these cases the encouragement of shipping was undertaken as an indirect means of increasing the power of the country, and the same thing is true of the complicated arrangements that were made for giving special inducements to trade in particular articles or with particular countries. Every one is of course familiar with the fact that during the 17th and 18th centuries efforts were made to regulate trade so that gold and silver might be brought into England. It is unnecessary to enumerate the expedients that were adopted at different times, or to discuss the vexed question as to how far those who advocated the system were in error. There can be no doubt that the possession of a treasure was vastly important for political purposes, and that trade was the only means by which a state which possessed no mines could procure treasure; and it is of course possible that some of the mercantilists laid too much stress on the desirability for political purposes of amassing wealth in this form. But the fundamental principle of this system of commercial policy lay in the connexion which was felt to exist between trade and industry. Trade, it was said, stimulated industry by providing a new market for its products. If two countries trade together, each will stimulate the trade of the other to some extent, but, if England

buys raw products from Portugal and Portugal buys manufactured cloth from England, then the operation of trade between them is such that Portugal stimulates English industry and sets English labour in motion to a far larger extent than English consumption stimulates that of Portugal; it was believed that this relative stimulus might be detected by examining the balance of trade, and that, if by an ingenious adjustment of duties the balance could be kept in her favour, the trade would be benefiting England more than it stimulated the progress of her possible rivals. In the present day we look at the volume of trade and trust that both are gainers; in those centuries they looked at the kind of gain that accrued and tried to ensure that England gained more than her possible enemies. Thus it was generally held that by commercial intercourse between England and France the French gained relatively more than the English; to the legislators of the time it seemed desirable to impose such conditions as should alter this state of affairs, or, if no agreement could be come to on the terms of a treaty, the trade should be stopped altogether, lest by continuing to overbalance England in trade the French should be enabled to overbalance her in power. These ideas of commercial policy dominated the whole of British legislation for shipping[1] from the beginning of the 17th century till after the Napoleonic wars; the preference which was given to English ships, English built and English manned, was enforced in a manner that was prejudicial to the development of the colonies by the Navigation Act of 1651, and was subsequently embodied in the orders in council. But these ideas are expressed most clearly in such discussions as those regarding the Methven treaty with Portugal. Without attempting to advocate a system of which the unwisdom has become patent in our own day, it may yet be worth while to note that it was during this régime that England acquired her position as the great shipping nation of the world, and passed the Dutch and French in the struggle for naval supremacy. Napoleon gave unconscious testimony to the effectiveness of the commercial policy for building up the strength of the nation when he sought to humble England, not by direct attack, but by destroying the trade and shipping by means of which she had raised herself to power.

This policy of subordinating the interests of shipping as a trade and means by which merchants acquired wealth to the policy and power of the nation as a whole had another side. Revenue for war expenses was furnished almost entirely by the mother country; neither Ireland nor the colonies contributed at all largely to the burden of maintaining the national struggle with Continental rivals. Hence it was undesirable that these dependencies should develop at the expense of the mother country, as by so doing they would reduce the fund from which parliament drew for the expenses of the realm. Hence, while England was always willing to develop resources or industries—like the linen trade in Ireland—which did not compete with and could not undersell existing English manufactures, her politicians were unwilling to allow her dependencies to become her competitors in trade so long as they did not co-operate in maintaining power. Hence the galling restrictions to which the Irish and the colonists were subjected, both with regard to the development of some of their resources and the carrying on of profitable trade with other colonies or foreign countries. But it must not be forgotten that English merchants suffered in the same sort of way, as changes of political relations at once brought about changes in the conditions of trade, and that in at least one case the interests of enterprising farmers at home were set aside in favour of protecting an established industry in the colonies. The subordination of the craftsman and trader interest to the public policy of the realm brought about a system of galling regulations which pressed hardly on many persons, though they were most obviously baneful to Ireland and the colonists, who had not so much interest in the political objects for which their wealth was sacrificed.

It is unnecessary to attempt to illustrate in detail the application of these principles; it only remains to add that, whether in spite of these regulations or because of them, the shipping of England increased vastly during the 18th century. This was partly due to the greater facilities which were granted for procuring capital for trading ventures. In mediæval times a merchant could hardly obtain the command of additional capital, unless by means of a temporary partnership, or loans on bottomry; but the objection to usury was fast giving way, and the public were willing to lend capital and to share in the profits of trading. The practice of trading on borrowed capital, and of obtaining temporary loans from goldsmiths, was common enough all through the 17th century, but the development of the banking system and the new forms of credit which thus became available gave still greater scope to the enterprising shipper. The full fruits of the new power were only shown, however, in the beginning of the 18th century, when the rivalry of the Old and New East India Companies and the story of the Darien expedition and the South Sea Bubble show how willing the British public were to pour their capital into trading undertakings. Among the companies which were started about this period there were two which have exercised a most salutary influence on British shipping. The Royal Exchange Assurance (6 Geo. I. c. 18) and the London Assurance revolutionized the whole system of marine assurance, and did so much to relieve skippers from the losses they suffered through the risks of commerce as to give considerable encouragement to the business. The plantations were developing into important settlements; the British merchant had outdone his Dutch rivals; and the East India Company was pursuing its course of progress in the East. There can be no wonder that, with so many opportunities for trading, and such new facilities for obtaining capital and assuring against risk, the shipping of the country developed during the 18th century. It is unnecessary to dwell on the shocks it received at the time when the American colonies asserted their independence (27 and 28 Geo. III.) or in the life and death struggle of the Napoleonic wars. The difficulty of recasting the restrictive system under which English merchants plied their trade was very great, and when it broke down in regard to America and Ireland (20 Geo. III. cc. 6, 10) it was becoming apparent that its days were numbered. The doctrines preached by Adam Smith soon began to bear fruit; the practical difficulty of regulating commerce rendered politicians more willing to let it regulate itself; and the controversy between the exclusive companies and the interlopers or independent merchants once more came to the front. It was during the reign of George IV. that the old system was practically abandoned and that the greater part of the old companies were dissolved, and trade to all parts of Africa, to the Levant, and to China became open to all British subjects. The East India Company maintained its position in part despite its many critics for another half century, and the peculiar conditions of the trade of the Hudson's Bay Company have made it desirable to maintain that privileged corporation till the present time.

It became still more obvious that the old policy of regulating the commerce of the country in the supposed interests of its power was being abandoned when Huskisson reformed the tariff in 1825. The measure he succeeded in carrying was not so thoroughgoing as the one he proposed, but its principle was that the customs duties should be levied for revenue objects only, and not with the view of maintaining British merchants in one particular employment of their capital. Later the repeal of the corn laws (1846) and navigation laws (1849) removed the last vestiges of the old commercial policy which had ruled over the development of British shipping almost from the earliest times, but which had been steadily and systematically pursued for three hundred years.

It was thus that Adam Smith's criticisms worked so effectively as to realize his dreams at no great interval of time. His deeper reasons for objecting to the commercial system of the 18th century lay in the fact that the colonial trade and shipping altogether seemed to him to have received an unhealthy stimulus, and that the country would be in a sounder economic position if capital were employed at home in developing native resources, and foreign trade built upon a foundation of highly developed native industry. But the removal of the stimulus did not have the effect he anticipated, or restore the "balance" between industry and shipping. England is far more dependent than ever before on her relations with foreign countries, and therefore on her shipping, for the materials of her manufacture and her food, as well as for markets for her products. She is further removed than ever from that condition of "opulence" which has, according to Adam Smith, the greatest promise of stability and progress.

This has undoubtedly been due to the immense developments in manufacturing in which England, with her wealth of coal and iron, led the way. This reacted on shipping in many ways. England came to be the workshop of the world, and her shipping was freighted with soft goods from Lancashire and Yorkshire, and with hardware and machinery, to be conveyed to the most distant parts of the globe. But not only were the opportunities for trading immensely increased; the application of the steam engine to transit by water has accelerated communication, and rendered it so regular and certain as to give an extraordinary stimulus to foreign trade. The first steamboat that was more than a mere toy made its trial in 1807, and since that time steam shipping has been more and more substituted for the old sailing vessels. Still more recently there has been a considerable change in the construction of ships, from the success which has attended iron shipbuilding. The first experiment, which was generally deemed exceedingly rash, was made in 1851.

It is impossible to get satisfactory data for a comparison of the relative importance of English and foreign shipping for a long period; but it may be assumed that the shipping of the Italian republics and of the Hanse League excelled that of England during the Middle Ages, that in the 16th century Spain was far ahead of her when she could send such fleets to the West and fit out a Spanish Armada, and that in the 17th and 18th centuries respectively England was much in the same position as the great rivals—Holland and France—with which she had to compete so keenly. We may compare the present position and the relative growth of tonnage during the last century, so far as figures are available for the purpose:—

	1790.	1880.		1790.	1880.
England	1,511,411	6,574,513	France	...	989,128
Spain	...	457,939	Holland	...	349,000
Italy	...	1,000,000	United States	502,146	4,000,000
Germany	...	1,300,000			

The following aggregates show the growth of the tonnage of British shipping:—in 1688, 12,500 tons (excluding fishing boats); in 1770, 682,811 (England and Scotland); in 1791, 1,511,401 (including colonies); in 1830, 2,199,959 (excluding colonies); in 1840, 2,768,262; in 1850, 3,565,133; in 1860, 4,658,687; in 1870, 5,690,789; in 1880, 6,574,513.

•See Macpherson, *Annals of Commerce*; Lindsay. *History of Merchant Shipping*. For earlier periods see Schanz, *Englische Handels-Politik*, and for later periods Leone Levi, *History of British Commerce*. (W. CU.)

SHÍRÁZ, a celebrated city in Persia, capital of Fars, from its site and thoroughly Iranian population may be considered the central point, as it were, of Farsi or Pársi (otherwise Persian) nationality. Owing to the pasture land in its vicinity some derive the name from the native word *shír*, "milk;" others again, asserting the number and physical powers of its inhabitants, accept the same word in its sense of "lion," or take the whole dissyllable as an obsolete word meaning the "lion's paunch." To this effect is cited a local saying to the effect that, "like the lion, it devours all they bring into it." Shíráz is situated in 29° 36′ 30″ N. lat. and 52° 32′ 9″ E. long., in a high plain or valley more than 20 miles long and less than half as broad, and is approached on the south from the sea—a distance of 170 miles[1]—through lofty mountain passes reaching some 7000 feet above the level of the waters of the Persian Gulf. On the north the approach is also through chains of mountains separating the plains of Shíráz from the valley of the Marv Dasht, intersecting which is the Band Amír river, more poetically than accurately described in *Lalla Rookh*. At Kodiyan, a few miles to the north-west of Shíráz, is the source of another river, which, crossing the high road south of the town under the name of the "Kára Agatch," falls into the sea about 70 miles below Bushahr (Bushire), after a tortuous course of 300 miles. The city has a handsome bazaar and some good private residences; but its unattractive streets are narrow, and, though not so crowded with beggars as Ispahan, contain many living objects distressing to the eye. The mosques and minarets, albeit of local repute, look more picturesque to the stranger in the distance than under close inspection. One fine view of the town is that on the north, at the pass between the mountains called "Allah Hu Akbar"—so named, it is conceived, because this would be the traveller's exclamation of delight when the landscape first opened out upon him. The country in this direction is studded with pleasant gardens. Besides these there are the tombs of the poets Hafiz and Sa'di—both within easy reach of the city. The first—a fine marble monument with a beautifully inscribed ode and other writings upon it—is not a mile from the gate, and is situated in an enclosure bearing the name Háfiziya. The most noted product of Shíráz is its wine, on the merits of which, however, there is much difference of opinion from outside judges. Dr Wills gives an original account of an experiment of his own in making the wine of Shíráz. Its cost in the production was 5½d. a bottle, and it sold a year after at more than three times that amount. Shíráz is moreover famous for inlaid work (wood and metal) called *khátam bandi* (from *khátam*, a seal). The population of the city is estimated under 30,000. The ordinary diseases are intermittent fever, diarrhœa, dysentery, typhoid, guinea-worm, cholera, diphtheria, small-pox, and ophthalmia.

Although the praises of Shíráz, its produce, inhabitants, climate, and surroundings of every kind, have been sung by poets for centuries, and are never disputed by Persians who are not Shírázis, yet it is impossible for the sober European traveller to deny that the reality falls far below the picture. We may feel thankful for the wine and the water, the gardens and the monuments, the fruits and the flowers (abundant here as in many other an oasis in the Shah's dominions); we may sympathize with the national pride in the possession of a Hafiz and a Sa'di; we may believe that the ladies of yore had "eyes brighter than the antelope's, hair clustering like their own dark grapes, and forms fairer and sweeter than the virgin rose," and that those of the present day would, if unveiled, strike the spectator with wonder; but one fact remains,—the modern town of Shíráz is not a paradise for those whose personal experience enables them to compare it with the ordinary cities of Europe.

According to Eastern authorities, Shíráz was founded (or refounded, for some accounts ascribe to it a fabulous antiquity) by a brother of the famous Hajjáj about the beginning of the 8th century, or rather by a cousin of Hajjáj called Mohammed b. Kásim b. Abú 'Okail. Six hundred years later it was the capital of the Muzaffar dynasty of princes, when it fell to the arms of Timur. But it attained its greatest reputation in the reign of Karim Khan, who embellished the city greatly and made it the special object of his care. On the downfall of this monarch it was sacked and laid waste by the cruel Agha Mohammed.

Shíráz has been often described by native geographers and European writers of travel. Among the latter may be mentioned Pietro della Valle, Herbert, Tavernier, Deslandes, and Chardin, in the 17th century, and in the present century Ouseley, Porter, Morier, Scott-Waring, Forster, Binning, and many quite recent travellers. Neither in his serious history nor lighter sketches does Sir John Malcolm give any detailed account of Shíráz as a city, but his notes on its climate may be cited. On one of the hottest days of June 1800 the thermometer registered 94° F. in the house and 100° in a tent. In May 1810 it never rose at noon above 88° nor fell below 74°. In the morning, at eight o'clock, it generally stood about 60°. In autumn the heat continued, but in winter it was seen to fall considerably below the freezing point. As late as March there is often a hoar frost on the ground. April, he adds, is a delightful month, the thermometer at sunrise being generally from 50° to 55°, at two P.M. 80° to 84°, and at nine P.M. about 64°.

SHIRE. See COUNTY.

SHIRLEY, a town of Hampshire, consists chiefly of comfortable houses occupied by persons in business in Southampton (2 miles south-east), of which it is practically a suburb. Within its limits are the Barlow home (1840), the Ellyet home (1879), and the children's hospital and dispensary for women (1884). The urban sanitary district of Shirley, formed in 1853, was extended by an Act which came into operation 29th September 1881, the name being also changed to Shirley and Freemantle. The population of the old district (area 1198 acres) in 1871 was 5339 and in 1881 it was 7856. The population of the new district (area 1392 acres) in 1871 was 9909 and in 1881 it was 12,939.

SHIRLEY, JAMES (1596–1666), dramatist, belonged to the great period of our dramatic literature, but, in Lamb's words, he "claims a place among the worthies of this period, not so much for any transcendent genius in himself, as that he was the last of a great race, all of whom spoke nearly the same language and had a set of moral feelings and notions in common." His career of playwriting extended from 1625 to the suppression of stage plays by parliament in 1642. Born in London in 1596, he had been educated for a profession—at Merchant Taylors' school, St John's College, Oxford, and Catherine Hall, Cambridge. The church was his destination, but he turned Roman Catholic, and made a living for two years as a schoolmaster. His first play, *Love Tricks*, seems to have been accepted while he was teaching at St Albans, and for eighteen years from that time he was a prolific writer for the stage, producing more than thirty regular plays, tragedies, and comedies, and showing no sign of exhaustion when a stop was put to his occupation by the Puritan edict. He turned again to teaching for a livelihood and prospered, publishing some educational works under the Commonwealth. Besides these he published

[1] It was pursued, but less systematically, all through the Tudor reigns or even earlier. Compare 1 H. VII. c. 8, 32 H. VIII. c. 14, 1 El. c. 13, also the Assize of Arms in 1181.

[1] As the crow flies, it is only 115 miles N.E. by E. of Bushahr.

during the period of dramatic eclipse three small volumes of poems and masques, in 1646, 1653, and 1659. He survived into the reign of Charles II., but, though some of his comedies were revived, he did not again attempt to write for the stage. It is said that he and his second wife died of the fright caused by the great fire of 1666.

There is little original force but much stage-craft and manipulative dexterity in Shirley's plays. He was born to great dramatic wealth, and he handled it freely. It has been remarked that he did not, like some of his great predecessors, take his plots from narrative fiction or history, but constructed them for himself. This is true; but he constructed them out of the abundance of materials that had been accumulated by more originative men during thirty years of unexampled dramatic activity. He did not strain after novelty of situation or character, but worked with confident ease and buoyant copiousness on the familiar lines, contriving situations and exhibiting characters after types whose effectiveness on the stage had been proved by ample experience. He spoke the same language with the great dramatists, it is true, but this grand style appears in him as the mechanical knack of an able and clever workman. It is often employed for the artificial elevation of commonplace thought. "Clear as day" becomes in this manner "day is not more conspicuous than this cunning"; while the proverb "Still waters run deep" is ennobled into—

> The shallow rivers glide away with noise—
> The deep are silent.

But it cannot be denied that he uses the poetic diction of his predecessors with ease, spirit, and judgment. His scenes are ingeniously conceived, his characters boldly and clearly drawn; and he never falls beneath a high level of stage effect.

His chief plays were—*Love Tricks*, a comedy, 1625; *The Maid's Revenge*, a tragedy, 1626; *The Brothers*, a comedy, 1626; *The Wittly Fair One*, a comedy, 1628; *The Wedding*, a comedy, 1628; *The Grateful Servant*, a tragi-comedy, 1629; *The Changes, or Love in a Maze*, 1632; *The Gamester*, a comedy, 1633; *The Example* (containing an imitation of Ben Jonson's *Humours*), 1634; *The Opportunity*, 1634; *The Traitor*, a tragedy (perhaps Shirley's best), 1635; *The Lady of Pleasure* (perhaps the best of his comedies), 1635; *The Cardinal*, a tragedy (an attempt to compete with Webster's *Duchess of Malfi*), 1641. An edition of his works in six volumes, with notes by Dyce and Gifford, was published in 1833.

SHODDY. See WOOL.

SHOEMAKING. The simplest foot-protector is the sandal, which consists merely of a sole attached to the foot, usually by leather thongs. The use of this the archæologist can trace back to a very early period; and the sandal of plaited grass, palm fronds, leather, or other material still continues to be the most common foot-covering among Oriental races. Where climate demanded greater protection for the foot, the primitive races shaped a rude shoe out of a single piece of untanned hide; this was laced with a thong, and so made a complete covering. Out of these two elements—sole without upper and upper without sole—arose the perfected shoe and boot, which consist of a combination of both. A collection illustrating the numerous forms and varieties of foot-covering, formed by M. Jules Jacquemart, is now in the Cluny Museum in Paris. It embraces upwards of 300 specimens of ancient, mediæval, and modern times, with a special series illustrating the artistic and historical side of the subject in France from the 15th century, and contains examples of the many varieties of foot-covering in use, especially in the East, at the present day. (Compare COSTUME.)

Wooden Shoes.—The simplest foot-covering, largely used throughout Europe, is the wooden shoe, made from a single piece of wood roughly cut into shoe form. The towns of Mende and Villefort (dep. Lozère) are the headquarters of the wooden shoe trade in France, about 1700 persons there finding employment in the manufacture. Analogous to this industry is the clog-making trade of the midland counties of England. Clogs, known also as pattens, are wooden soles to which shoe or boot uppers are attached. Sole and heel are made of one piece from a block of maple or ash two inches thick, and a little longer and broader than the desired size of shoe. The outer side of the sole and heel is fashioned with a long chisel-edged implement, called the clogger's knife or stock; a second implement, called the groover, makes a groove about one-eighth of an inch deep and wide round the side of the sole; and by means of a hollower the contour of the inner face of the sole is adapted to the shape of the foot. The uppers of heavy leather, machine sewed or riveted, are fitted closely to the groove around the sole, and a thin piece of leather-binding is nailed on all round the edges, the nails being placed very close, so as to give a firm durable fastening. These clogs are of great advantage to all who work in damp sloppy places, keeping the feet dry and comfortable in a manner impossible with either leather or india-rubber. They are consequently largely used on the Continent by agricultural and forest labourers, and in England and the United States by dyers, bleachers, tanners, workers in sugar-factories, chemical works, provision packing warehouses, &c. There is also a considerable demand for expensive clogs, with finely trimmed soles and fancy uppers, for use by clog-dancers and others on the stage.

Manufacture of Leather Shoes.—There are two main divisions of work comprised in ordinary shoemaking. The minor division—the making of "turn shoes"—embraces all work in which there is only one thin flexible sole, which is sewed to the upper while outside in and turned over when completed. Slippers and ladies' thin house boots are examples of this class of work. In the other division the upper is united to an insole and at least one outsole, with a raised heel. In this are comprised all classes, shapes, and qualities of goods, from shoes up to long-top or riding boots which reach to the knee, with all their variations of lacing, buttoning, elastic-web side gussets, &c. The accompanying cuts (figs. 1 and 2) show the parts and trade names of a riding boot, which is the supreme product of the craft.

Till within recent times shoemaking was a pure handicraft; but now machinery effects almost every operation in the art. On the factory system all human feet are treated alike; in the handicraft, the shoemaker deals with the individual foot, and he should produce a boot which for fit, comfort, flexibility, and strength cannot be approached by the product of machinery.

The shoemaker, after measuring the feet, cuts out upper leathers according to the size and pattern. These parts are fitted and stitched together by the "boot-closers"; but little of this closing is now done by hand. The sole "stuff" is next cut out and assembled, consisting of a pair of inner soles of soft leather, a pair of outer soles of firmer texture, a pair of welts or bands about one inch broad, of flexible leather, and lifts and top-pieces for the heels. These the "maker" mellows by steeping in water. He attaches the insoles to the bottom of a pair of wooden lasts, which are blocks the form and size of the boots to be made, fastens the leather down with lasting tacks, and, when dried, draws it out with pincers till it takes the exact form of the last bottom. Then he "rounds the soles," by paring down the edges close to the last, and forms round these edges a small channel or feather cut about one-eighth of an inch in the leather. Next he pierces the insoles all round with a bent awl, which bites into, but not through, the leather, and comes out at the channel or feather. The boots are then "lasted," by placing the uppers on the lasts, drawing their edges tightly round the edge of the insoles, and fastening them in position with lasting tacks. Lasting is a crucial operation, for, unless the upper is drawn smoothly and equally over the last, leaving neither crease nor wrinkle, the form of the boot will be bad. The welt, having one edge pared or chamfered, is put in position round

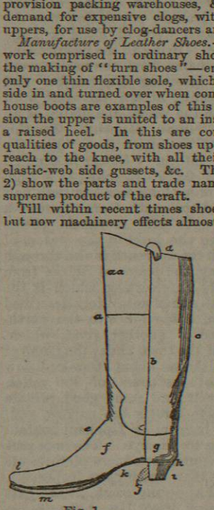

Fig. 1.

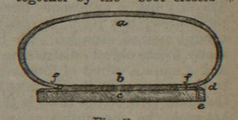

Fig. 2.

FIG. 1.—Parts of a boot. *aa*, the extension: *a*, the front; *b*, the side seam; *c*, the back: *d*, the strap; *e*, the instep; *f*, the vamp or front; *g*, the quarter or counter; *h*, the rand; *i*, the heel,—the front is the breast, the bottom the face; *j*, the lifts of the heel; *k*, the shank or waist; *l*, the welt; *m*, the sole.
FIG. 2.—Section of boot. *a*, the upper: *b*, the insole; *c*, the outsole; *d*, the welt: *e*, the stitching of the sole to the welt; *f*, the stitching of the upper to the welt.

the sides, up to the heel or "seat," and the maker proceeds to "inseam," by passing his awl through the holes already made in the insole, catching with it the edge of the upper and the thin edge of the welt, and sewing all three together in one flat seam, with a waxed thread. He then pares off inequalities and "levels the bottoms," by filling up the depressed part in the centre with a piece of tarred felt; and, that done, the boots are ready for the outsoles. After the leather for them has been thoroughly condensed by hammering on the "lap-stone," they are fastened through the insole with steel tacks, their sides are pared, and a narrow channel is cut round their edges; and through this channel they are stitched to the welt, about twelve stitches of strong waxed thread being made to the inch. The soles are now hammered into shape; the heel lifts are put on and attached with wooden pegs, then sewed through the stitches of the insole; and the top-pieces, similar to the outsoles, are put on and nailed down to the lifts. The finishing operations embrace pinning up the edge of the heel, paring, rasping, scraping, smoothing, blacking, and burnishing the edges of soles and heels, scraping, sand-papering, and burnishing the soles, withdrawing the lasts, and cleaning out any pegs which may have pierced through the inner sole. Of course, there are numerous minor operations connected with forwarding and finishing in various materials, such as punching lace-holes, inserting eyelets, applying heel and toe irons, hob-nailing, &c. To make a pair of common stout lacing boots occupies an expert workman from fourteen to eighteen hours.

The principal difficulties to overcome in applying machinery to shoemaking were encountered in the operation of fastening together the soles and uppers. The first success in this important operation was effected when means other than sewing were devised. In 1809 David Mende Randolph obtained a patent for fastening the soles and heels to the inner soles by means of little nails, &c. The lasts he used were covered at the bottom with plates of metal, and the nails, when driven through the inner soles, were turned and clinched by coming against the metal plates. To fix the soles to the lasts during the operation the metal plates were each perforated with three holes, in which wooden plugs were inserted, and to these the insoles were nailed. This invention may be said to have laid the foundation of machine boot-making. In the following year (1810) the inventor M. I. Brunel patented a range of machinery for fastening soles to uppers by means of metallic pins or nails, and the use of screws and staples was patented by Richard Woodman in the same year.

Apart from sewing by machine or hand, three principal methods of attaching soles to uppers are in use at present. The first is "pegging" with small wooden pins or pegs driven through outsole and insole, catching between them the edges of the upper. The points of the pegs which project through the insole are cut away and smoothed level with the leather either by hand or by a machine pegging rasp. The second is the system of "riveting or clinching" with iron or brass nails, the points of the nails being turned or clinched by coming in contact with the iron last used. The third method, screwing, has come into extensive use since the standard screwing machine was introduced in America by the Mackay Association of Boston, Massachusetts, and in Europe by the Blake & Goodyear Company of London. The standard screw machine, which is an American invention, is provided with a reel of stout screw-threaded brass wire, which by the revolution of the reel is inserted into and screwed through outsole, upper edge, and insole. Within the upper a head presses against the insole directly opposite the point of the screw, and the instant screw and head touch the wire is cut level with the outsole. The screw, making its own hole, fits tightly in the leather, and the two soles, being both compressed and screwed firmly together, make a perfectly water-tight and solid shoe. The surface of the insole is quite level and even, and as the work is really screwed the screws are steady in their position, and they add materially to the durability of the soles. The principal disadvantage in the use of standard screwed soles is the great difficulty met with in removing and levelling down the remains of an old sole when repairs are necessary.

The various forms of sewing-machine by which uppers are closed, and their important modifications for uniting soles and uppers, are also principally of American origin. But the first suggestion of machine sewing was an English idea. The patent secured by Thomas Saint in the English Patent Office in 1790, while it foreshadowed the most important features of the modern sewing-machine, indicated more particularly the devices now adopted in the sewing of leather. After the introduction of the sewing-machine for cloth work its adaptation to stitching leather both with plain thread and with heated waxed thread was a comparatively simple task. The first important step in the more difficult problem of sewing together soles and uppers by a machine was taken in the United States by Lyman R. Blake in 1858. Blake's machine was ultimately perfected as the Mackay sole-sewing machine,—one of the most successful and lucrative inventions of modern times. Blake secured his first English patent in 1859, his invention being thus described: "This machine is a chain-stitch sewing-machine. The hooked needle works through a rest or supporting surface of the upper part of a long curved arm which projects upwards from the table of the machine. This arm should have such a form as to be capable of entering a shoe so as to carry the rest into the toe part as well as any other part of the interior of it; it carries at its front end and directly under the rest a looper, which is supported within the end of the arm so as to be capable of rotating or partially rotating round the needle, while the said needle may extend into and through the eye of the looper, such eye being placed in the path of the needle. The thread is led from a bobbin by suitable guides along in the curved arm, thence through a tension spring applied to the arm, and thence upwards through the notch of the looper. The needle carrier extends upwards with a cylindrical block which can be turned round concentrically with it by means of a handle. The feed wheel by which the shoe is moved along the curved arm during the process of sewing is supported by a slider extending downwards from the block, and applied thereto so as to be capable of sliding up and down therein. The shoe is placed on the arm with the sole upwards. The feed wheel is made to rest on the sole." Blake's original machine was very imperfect and was incapable of sewing round the toe of a shoe; but a principal interest in it coming into the hands of Gordon Mackay, he in conjunction with Blake effected most important improvements in the mechanism, and they jointly in 1860 procured United States patents which secured to them the monopoly of wholly machine-made boots and shoes for twenty-one years. On the outbreak of the Civil War in America a great demand arose for boots, and, there being simultaneously much labour withdrawn from the market, a profitable field was opened for the use of the machine, which was now capable of sewing a sole right round. Machines were leased out to manufacturers by the Mackay Company at a royalty of from ½ to 3 cents on every pair of soles sewed, the machines themselves registering the work done. The income of the association from royalties in the United States alone increased from $38,746 in 1863 to $589,973 in 1873, and continued to rise till the main patents expired in 1881, when there were in use in the United States about 1800 Blake-Mackay machines sewing 50,000,000 pairs of boots and shoes yearly. The monopoly secured by the Mackay Company barred for the time the progress of invention, notwithstanding which many other sole-sewing machines were patented. Among the most important of these is the Goodyear & Mackay machines for welted shoes,—the first mechanism adapted for sewing soles on lasted boots and shoes. These machines originated in a patent obtained in 1862 in the United States by August Destory for a curved-needle machine for sewing outsoles to welts, but the mechanism was not successful till taken in hand by Charles Goodyear, son of the well-known inventor in india-rubber fabrics. The Goodyear & Mackay Company make two machines for welted goods, one for sewing the inseam and the second for stitching on the outsole. A large number of the latter form of machine are in use, many manufacturers preferring to secure the welt or a midsole by the standard screw machine, sewing to that the outsole with the Goodyear-Mackay machine. The same company adapt a circular-needle machine to the sewing of turn shoes, and this, with other similar machines, is in extensive use.

The range of machinery used in a well-equipped shoe-factory is very extensive, embracing machines for cutting leather, pressing rollers for sole leather, and presses with cutting-dies for stamping out sole and heel pieces. There are also, in addition to many kinds of sewing-machine, blocking or crimping appliances for moulding uppers or vamps, vamp-folding machines, eyeleting machines, lasting machines, trimming and paring machines for planing and smoothing the edges of soles and heels. For finishing there are scouring, sand-papering, and burnishing machines for the soles, and stamping machines for marks and monograms, with peg-cutting and nail-rasping machines for smoothing, cleaning out, and dressing the surface of the insole. In short, there is not a single operation necessary in shoemaking, however insignificant, for which machinery has not been devised.

The manufacture of india-rubber goloshes, shoes, and fishing-boots, &c., forms an important branch of the india-rubber industry rather than a department of shoemaking (see INDIA-RUBBER, vol. xii. p. 842). A very considerable trade exists in boots and shoes with outer soles of gutta-percha (see vol. xi. p. 339) in place of leather, the headquarters of that trade being in Glasgow. (J. P.A.)

SHOES, HORSE. The horny casing of the foot of the horse and other Solidungulates, while quite sufficient to protect the extremity of the limb under natural conditions, is found to wear away and break, especially in moist climates, when the animal is subjected to hard work of any kind. This, however, can be obviated by attaching to the hoof a rim of iron—a simple device which has been probably not surpassed in its beneficial effects by the introduction of steam-power locomotion. The animal itself has been in a very marked manner modified by shoeing, for without this we could have had neither the fleet racers nor

the heavy and powerful cart-horses of the present day. Shoeing does not appear to have been practised by either Greeks or Romans; but there is evidence that the art was known to the Celts, and that the practice became common after the overthrow of the Western empire towards the close of the 5th century. It is only recently that horse-shoeing was introduced in Japan, where the former practice was to attach to the horse's feet slippers of straw, which were renewed when necessary. In modern times much attention has been devoted to horse-shoeing, with the result of showing that methods formerly adopted caused cruel injury to horses and serious loss to their owners. The evils as summarized by Mr George Fleming, army (British) veterinary inspector, were caused by (1) paring the sole and frog; (2) applying shoes too heavy and of faulty shape; (3) employing too many and too large nails; (4) applying shoes too small and removing the wall of the hoof to make the feet fit the shoes; and (5) rasping the front of the hoof. According to modern principles (1) shoes should be as light as compatible with the wear demanded of them; (2) the ground face of the shoe should be concave, and the face applied to the foot plain; (3) heavy draught horses alone should have toe and heel calks on their shoes to increase foothold; (4) the excess growth of the wall or outer portion of horny matter should only be removed in re-shoeing, care being taken to keep both sides of the hoof of equal height; (5) the shoe should fit accurately to the circumference of the hoof, and project slightly beyond the heel; (6) the shoes should be fixed with as few nails as possible, six or seven in fore-shoes and eight in hind-shoes; and (7) the nails should take a short thick hold of the wall, so that old nail-holes may be removed with the natural growth and paring of the horny matter. Horse shoes and nails are now made with great economy by machinery. In rural districts, where the art of the farrier is sometimes combined with blacksmith work, too little attention is, in general, given to considerations which have an important bearing on the comfort, usefulness, and life of the horse.

SHOLAPUR, a British district of India, in the Deccan division of the Bombay presidency, with an area of 4521 square miles, lying between 17° 13′ and 18° 35′ N. lat. and 74° 39′ and 76° 11′ E. long. It is bounded on the N. by Ahmadnagar district, on the E. by the nizam's territory and Akalkot state, on the S. by Kaládgi district and some of the Patvardhan states, and on the W. by Sátára and Poona districts and the states of Phaltan and Panth Pratinidhi. Except in Karmala and Barsi subdivisions, situated in the north and east, where there is a good deal of hilly ground, the district is generally flat or undulating; but it is very bare of vegetation, and presents everywhere a bleak treeless appearance. The chief rivers are the Bhima and its tributaries—the Mán, the Nira, and the Sina—all flowing towards the south-east. Besides these there are several smaller streams. Lying in a tract of uncertain rainfall, Sholapur is peculiarly liable to seasons of scarcity; much, however, has been done by the opening of canals and ponds, such as the Ekrúk and Ashti tanks, to secure a better water-supply. The Great Indian Peninsular Railway enters the district at Pomalvádi in the north-west corner and crosses it in a south-easterly direction, a distance of nearly 150 miles. Sholapur has recently been connected with a branch of the Southern Mahratta Railway.

The population of Sholapur district in 1881 was 582,487 (294,814 males and 287,673 females). Hindus numbered 530,121, Mohammedans 48,967, and Christians 625. There are three towns with populations exceeding 10,000 each, viz., SHOLAPUR (*q.v.*), Pandharpur (16,910), Barsi (16,126). In 1883-84 there were 1,763,340 acres under cultivation, of which 22,282 were twice cropped, besides 325,987 acres of fallow or grass land. Joár, which forms the staple food of the people, occupied 923,706 acres, bajri 298,239, wheat 55,504, rice 25,027, pulses 185,528, and oil-seeds 147,914 acres. The produce of the district finds an easy outlet by the railway to Poona and Bombay. The chief exports are cotton, which comes from the nizam's dominions, oil, oil-seeds, ghi, turmeric, and cotton cloth; imports include salt, piece-goods, yarn, gunney bags, and iron ware. The chief industries are spinning, weaving, and dyeing. The silks and finer sorts of cotton cloth prepared in Sholapur bear a good name; blankets are also woven in large numbers. The gross revenue of the district in 1883-84 amounted to £129,429, of which the land-tax yielded £98,963.

Sholapur district passed from the Bahmani to the Bijápur kings and from them to the Maráthás. In 1818, on the fall of the Peshwa, it was ceded to the British, when it formed part of the Poona collectorate, but in 1838 it was made a separate collectorate. Since then its progress has been rapid.

SHOLAPUR, chief town and administrative headquarters of the above district, is situated in 17° 40′ 18″ N. lat. and 75° 56′ 38″ E. long., on the plain of the Sina. Its convenient situation between Poona and Haidarábád (Hyderabad), with a station on the Great Indian Peninsular Railway, has made it the centre for the collection and distribution of goods over a large extent of country. The town contained in 1881 a population of 59,890 (males 30 410, females 29,480).

SHOOTING for sporting purposes requires in the use of firearms two fundamental principles on which rests the attainment of dexterity. These are, first, that the weight of the weapon be such that the sportsman can carry and wield it with ease; and, secondly—of still greater importance—that the weapon be so adapted to his chest, arm, and eye that when it is raised and levelled in the act of taking aim it may be as part of his own body. An overheavy gun may be virtually lightened by being carried by an attendant and only handed to the sportsman when required; but a gun not exactly "fitting the shoulder," cannot possibly serve its user with accuracy. The reason is plain. The slight divergence of his line of aim from the axis of the barrel, due to the shape of the gun not permitting the coincidence of the two when the weapon is used rapidly, creates a far from slight divergence of the pellets at any range beyond a few yards, and the object fired at, if struck at all, is only struck by the outer and weaker pellets. The increasing wildness of game-birds, in Great Britain at least, especially of partridges, through the modern system of cutting grain close to the ground and so leaving no sheltering stubble, demands rapid aim and discharge of the gun, and in consequence the efforts of gunmakers have been directed to the production of weapons of great lightness combined with power and precision. How different were the conceptions of our immediate predecessors is exemplified in such statements as "a few additional pounds in the weight of a gun makes a deal of difference," and "the most approved guns" are those "weighing, according to the fancy of the shooter, from six to nine pounds." The most approved guns now vary in weight by a few ounces only, and their configuration not by inches, but by eighths and even sixteenths of an inch. There are also fine lines in their modelling which, while of great consequence, are imperceptible to the eye, and can only be demonstrated by the application of exact and delicate instruments. Yet each of these lines has an important purpose, and their combination produces the perfect weapon. An experienced gunsmith who has studied this branch of his business can catch the salient lines of a sportsman's figure with the eye of an artist, and by the further aid of tests and measurements can construct for him a proper gun, and thus lay the foundation of a correct style of shooting. On the other hand, an unsuitable gun can only be aimed correctly with slowness, and by some straining of the muscles of the neck. Under such conditions correct and rapid shooting is at least improbable; the spread of the shot alone prevents a complete miss. It is the correct configuration of the gun which brings into full effect the elaborate boring of the barrel, and gives those long shots of which sportsmen are so proud, and which are due to the central pellets flying straight to a very considerable distance, much beyond that of the outer pellets.

The next point in a gun is balance; that is, the metal in the barrels must be so apportioned and the general construction be so arranged that there is no tendency in the muzzle to droop at the moment of discharge, just when the faculties of the sportsman are absorbed in taking aim and his muscular energies are in abeyance. The gun should balance at a point a little in front of the trigger-guard. The centre of gravity should also be low, so that there may be nothing of what may be called "top-hamper,"—in other words, that his gun may not roll in his hand, but may keep on an even keel, as it were, while he is taking aim. If we weigh in the scales two guns of nearly the same weight, the one well the other ill balanced, the former, although feeling quite light in the hand, will generally be found to be really heavier than the latter,—a fact which is frequently the cause of much surprise to sportsmen. When properly balanced, a gun can be carried with much less fatigue.

The calibre—a much disputed point—is, within the bounds commonly used, a question more of the capability of the sportsman to carry weight than one touching his effectiveness in the field. It has been plausibly argued that it matters little how narrow the calibre of a fowling-piece is, and that even gauge "35" (·510 inch) is wide enough. It certainly would throw a few pellets of swan-shot effectively, especially if the barrel was not less than 40 inches long. But for all common purposes the most useful calibre is the twelve-bore, if the weight is not under 6¼ lb, or somewhat less for hammerless guns. When a less weight is required, "16" gauge (which in breech-loaders is really "15") is preferable. Calibre "20" belongs to toy-weapons, such guns being also uncertain in their delivery; and, as strong and effective "16" double-barrelled guns can now be made weighing only 6 lb, a smaller calibre can hardly be required, except under peculiar conditions. Against the advantage of less weight has to be set the important matter of recoil, and one cause of recoil is the elongation of the body of the shot (and especially of the small-sized shot used in such guns) when placed in the barrel or cartridge. The longer that body, and the smaller the shot, the greater the difficulty in starting it; hence, to bring a "20" as regards recoil to an equality with a "12," the weight of the charge of shot must be unduly reduced, with a more than proportionate reduction of the probability of killing, save in the exceptional cases where the size is not larger than snipe-shot. The shot in a "12" has no part at any appreciable distance from the wadding over the powder, and every pellet may fairly be said to receive a direct impetus from the explosion. An exceedingly light gun has also the fault of causing unsteadiness when the sportsman takes aim.

The length of the barrels need not exceed 30 inches. If a sportsman possesses a remarkably correct eye, he may safely go down to 26 inches or even less; but it must be borne in mind that the shorter the barrel the greater the necessity for a perfectly correct aim. Any divergence on a barrel under 26 inches is vastly increased at 30 or 40 yards. On the other hand, aim is more quickly taken with short barrels. Thirty inches is a sound medium.

Of late years there has been a run on what are termed "choke-bores" (see GUNMAKING, vol. xi. p. 281). But unless the choking is most mathematically true the flight of the shot will not be coincident with the axis of the barrel or the line of aim, but will "train off" in some oblique direction; and this obliquity will also be more or less affected by any required modifications of the charge. A choke-bore, therefore, restricts its user to narrow conditions in loading it. The velocity of the shot is also considerably reduced, the killing power depending less on that than on the object aimed at being struck with a greater number of pellets. Neither do all the pellets fly with equal velocity, so that, as was proved several years ago by ingenious experimentation (first announced by the present writer), these advance, as it were, in a narrow and prolonged column, whereas a properly bored "friction and relief" barrel throws its shot in the figure of a broad disk, with all the pellets travelling practically at the same rate,—the inner or central ones having, however, more sustained killing power, their "quality of motion" being of a higher degree and greatly prolonging the range. A weapon bored on the friction and relief method certainly puts the sportsman in a better position for all kinds of common game at fair sporting ranges; but since the introduction of breech-loaders barrels so bored have (undeservedly) fallen so greatly into disuse that the delicate art of friction and relief boring has nearly been lost. A purely cylindrical barrel only shoots well when perfectly clean,—a condition that every discharge impairs.

Aiming.

With a weapon that suits him, the sportsman will find that, on lifting it quickly to his shoulder, keeping both eyes open, and fixing them on any small object at some distance off, the barrels will be directly pointed towards that object without his having taken any slow or exact aim. To verify this, let him keep the gun in position and shut his left eye, when he will find still more plainly that his aim is true. The gun has been so constructed as to bring the rib between the barrels (for double-barrelled guns are always understood) right in front of his line of vision. In other words, the barrels and stock have been so constructed, inclusive of the fine lines already referred to, that, so far as the required purpose is concerned, the whole piece may be said to form an integral part of his own body. A few minutes' daily practice in so pointing a gun at any small object, although in a room, will give the sportsman dexterity in its use even before he has burned powder in it. How the shutting of one eye (unknown in billiards and similar games) in taking aim came to be practised in using firearms seems inexplicable to those who know how detrimental it is. The keeping of both eyes open was formerly not quite unknown, but was so little practised that, when the present writer took the matter up some thirty years ago and publicly advocated it, he was looked upon as being quite in error; but now his correctness is acknowledged, and what is termed the "two-eye" system is coming more and more into use. There are still many uncertain "shots" who are not aware that their frequently unaccountable misses are caused by the scientific fact that shutting one eye deprives them of the power of measuring distances, and also of watching the movement of a running or flying object. As a rule, whilst the right eye is actually taking aim, the left is acting subsidiarily and showing the right whether or not it is taking it correctly. It may be noted that almost all exceptionally good shots have the eyes set wide apart, and so take their observation from a broader base.

The attitude in taking aim should be free and upright, with the left foot somewhat advanced. The right elbow should never be raised to a horizontal level with the shoulder,—a common but bad practice. The gun should be lifted directly upwards, the but-end just grazing the right front of the chest when reaching its final position, the eyes all the while looking fixedly upon the object. To illustrate this by way of contrast, there is another bad style of throwing the gun forward, the shooter all the while trying to look along the rib (which cranes the neck), and then bringing it back against the shoulder before firing. This, however, is a waste of muscular power and quite throws out the adaptation of the stock to the shoulder, because it is impossible to bring back the gun quite correctly, and it has therefore to be readjusted (which can hardly be accomplished) before firing. Besides, all this consumes time, for which game will not tarry. In military phrase, three "motions" are required; with the proper style there is only one.

The question how far the left hand should be extended in taking aim is much disputed, but is really of secondary consequence. Pigeon-shooters extend it as far as they well can, because their great object is to prevent the muzzle from drooping at the moment of discharge; but from this, and also from their custom of planting their feet firmly and squarely upon the ground, so as to stand with their full front to their probable line of aim, no lesson in shooting game need be taken. Good game shots are not unfrequently poor shots at pigeons, and *vice versa*; to be expert at the former depends upon the acquisition of a certain knack, and above all of calculation in time, *i.e.*, of the power of estimating the average time from the