

supplied to the furnace if admitted only in front, and accordingly there have been many plans devised for supplying it also at the back. In some cases currents of air are induced by steam-jets; but this plan has not proved very successful. The best inventions are on the regenerative principle. In them the air, before entering the furnace, is made to circulate through chambers heated externally by the products of combustion, and, having thus acquired a high temperature and absorbed heat that would otherwise have been lost, is admitted through openings at the bridge. Many of these appliances are almost absolutely smokeless, and they are much in use.

The advocates of the total or partial disuse of smoke-producing coals are variously in favour of the following substitutes—anthracite, coke, liquid fuel, and gas.

For some purposes anthracite and other coals containing a high percentage of carbon may be, and have long been, advantageously used as fuel. They yield a much smaller percentage of distillation products than ordinary coals, and produce no smoke, or almost none. But they are difficult to ignite, and in small fires difficult to keep burning; they give very little flame, and are comparatively expensive, so that they are under considerable disadvantage as compared with the usual kinds of coal. Many of the grates and stoves exhibited at South Kensington were specially devised for burning anthracite, and some of them are decidedly successful; but it is not likely that anthracite will ever take the place of bituminous coal to any great extent in the British Isles. There the great coal-fields undoubtedly are the natural sources of fuel, and no proposal involving a complete neglect of this fact can ever be successfully carried out.

This remark, however, does not apply to the use of coke and of gas, which are themselves made from coal. Coke is produced in large quantities both for its own sake and as a bye-product in the manufacture of gas for lighting purposes, and is largely used in various kinds of furnace. It gives no smoke; but it resembles anthracite also in being but ill adapted to use in open grates on account of the difficulty of ignition and the absence of flame (see FUEL).

In America, where natural petroleum is obtained in such enormous quantities, the experiment has been made of using it as the source of heat for boilers. A jet of superheated steam (at about 600° Fahr.) is blown into the hot combustion chamber and the oil and air enter mixed with it. The results are said to be excellent,—the fire smokeless and the efficiency high. The residue from coal-tar, after the naphtha and light oils have been recovered from it, can also be advantageously used in this way. The chief disadvantage attending the use of liquid fuels such as petroleum seems to lie in the fact that they are somewhat dangerous, fatal accidents having occurred in America; and the range of their application is necessarily limited. To use them for the heating of houses is of course quite out of the question.

Of all the schemes and inventions for the abatement of smoke that one which proposes to distil coal in one operation, and to burn the products of the distillation in another and quite separate operation, is without doubt the most thoroughly scientific; and to it, rather than to patent grates and furnaces, we must look for the ultimate solution of the question. Many arguments may be adduced in favour of gas-heating as opposed to coal-heating, the most important of which are here briefly given. (1) Coal gives, on distillation, not only gas and coke, which are both good heating agents, but intermediate products, many of which are of commercial value; these include ammonia, benzene, carbolic acid, anthracene, &c. As science advances the value of coal-tar will probably be enhanced by further discoveries; already it gives the raw material for the pre-

paration of numberless beautiful dyes, of antiseptics, and of some drugs, and quite lately a substance described as an admirable substitute for sugar has been prepared from it. All these intermediate products are now, according to our barbarous methods of burning coal, used simply as fuel. (2) Gas can be laid on in pipes to any spot, can be lit or turned out at any moment, and can be so managed that less heat is frittered away and more applied to the specific object than in the case of coal-burning. (3) It produces no smoke and leaves no ash or cinder, so that cleanliness is attained and much labour and expense are saved. (4) The coke produced during the preparation of the gas has uses of its own as solid fuel and for other purposes. (5) As has been already said, sulphur is an ingredient of all coals, and sulphuric acid is one of the necessary results of burning them; not to be got rid of by "smoke abatement." Coal gas, however, can to a great extent be freed from sulphur compounds, and it is possible that the purification methods in vogue may hereafter be improved, so that we have here a means, if any exist, of curing the chief evils of our present system,—injury to our respiratory organs, production of fogs, and destruction of vegetation in towns. The principal disadvantage of the proposal is to be found in the high cost of coal gas, which now varies generally from 3s. to 4s. per 1000 cubic feet, whereas it has been calculated that it would have to cost not more than 1s. or at most 1s. 6d. to compete successfully with coal. There is no doubt, however, that the cost might, and it probably will, be brought down to this, as the high rate is due to causes not inherent in the nature of things. Sir William Siemens proposed that two sets of mains should be laid in English towns, one for heating and one for lighting gas, and showed that the first and last portions of every preparation of gas are possessed of very low illuminating power, but if collected apart would do excellently for heating purposes, while the rest would be improved for lighting. It is probable, however, that electricity will ultimately drive gas out of the field as an illuminating agent and that it will then be relegated to its true place as a heating agent. When that is done coal will no longer be burnt as a whole, but only those of its products (gas and coke) which are good for heating and for nothing else.

Meanwhile, ordinary coal gas has already, expensive as it now is, been largely applied to certain purposes, notably to cooking stoves and other domestic requirements, to gas-engines (in which the generation of steam is unnecessary), and to bakers' ovens; and these inventions are calculated materially to diminish the smoke nuisance. In order to obtain an economical gas capable of being generated on the spot and used for operations on a large scale, Sir W. Siemens devised a gas-producer in which coal is partially burnt in a limited atmosphere and is wholly converted into gaseous products (chiefly carbonic oxide), only the ash being left. This "producer-gas" is a weak fuel, being largely diluted with atmospheric nitrogen, and is therefore inapplicable to domestic purposes; but for many others it suits admirably, one of the best examples of its application being Siemens's own regenerative gas furnace for melting steel (see SIEMENS). Other gas-producers have been patented, and the cost of the gas so made is as low as 4d. per 1000 cubic feet, or even less. It is probably, however, but a temporary substitute for true coal gas. In the use of this latter we shall, without doubt, find the true scientific solution of the smoke-abatement problem. As an example of what gaseous fuel can do, it may be mentioned that in Pittsburgh in Pennsylvania the furnaces are now being fed by natural oil gas and that that city, once one of the dirtiest of manufacturing towns, is becoming one of the cleanest.

*Literature.*—The specifications of patents may be consulted. See also C. W. Williams, *The Combustion of Coal and the Prevention of Smoke* (London, 1858); W. W. Barr, *Practical Treatise on the Combustion of Coal* (Indianapolis, 1879); *Official Report of the Smoke-Abatement Committee* (London, 1882); *Smoke-Abatement Exhibition Review* (London, 1882); and papers and discussions in the *Journal of the Society of Chemical Industry*, 1881 and following years. (O. M.)

SMOLENSK, a government of middle Russia, belonging partly to Great Russia and partly to White Russia, is bounded by Moscow and Kaluga on the E., Orel and Tchernigoff on the S., Moghileff and Vitebsk on the W., and Pskoff and Tver on the N. It covers an area of 21,638 square miles in the west of the great central plateau, its northern districts extending towards the hilly region of the Valdais, where the flat-topped gentle declivities reach about 1000 feet above the sea. The rivers being deeply cut in the plateau, the surface is also hilly in the western districts (Smolensk, Dorogobuzh), whence it slopes away gently towards immense plains on the east and south. Carboniferous limestones, containing a few layers of coal (in Yuchnoff) and quarried for building purposes, occupy the east of Smolensk; white Chalk appears in the southern extremity; while Tertiary sands, marls, and ferruginous clays cover all the west. The whole is overlain with a thick sheet of boulder clay, with irregular extensions to the north; Post-Tertiary sands are spread over wide surfaces; and peat-bog fills the marshy depressions. The soil, mostly clay, is generally unfertile, and stony and sandy in several districts. Many large rivers belonging to the basins of the Volga, the Oka, the Dnieper, and the Dwina have their origin in Smolensk. The Vazuza and the Gzhat, both flowing into the Volga, and the Moskva and the Ugra, tributaries of the Oka, are channels for floating timber. The two tributaries of the Dwina—the Kasplya and the Mezha—are of much more importance, as they and their affluents carry considerable numbers of boats to Riga. The Dnieper takes its origin in Smolensk and waters it for more than 300 miles; but neither this river nor its tributaries (Vop, Vyazma, Sozh, and Desna), whose upper courses belong to Smolensk, are navigable; timber only is floated down some of them. Many small lakes and extensive marshes occur in the north-west. One-third of the area is under forests. The population of Smolensk reached 1,191,172 in 1882, of whom only 106,133 lived in towns, and consists of White Russians in the west (46·7 per cent.), Great Russians in the east (42·6), and of a mixed population of both (10·4). Nearly 1000 Jews and 1000 Poles are scattered through the towns.

The climate is like that of middle Russia generally, although the moderating influence of the wet climate of western Europe is felt to some extent. The average yearly temperature at Smolensk is 45·5 Fahr. (January, 13·5; July, 67·2). Notwithstanding the unproductive soil and the frequent failures of crops (especially in the north-west), the chief occupation is agriculture. In 1884 3,040,000 acres were under crops, and 2,379,000 quarters of grain of various kinds were raised (2,930,400 in 1883)—the potato crop yielding 5,498,400 bushels. Nearly all the land is cultivated by the peasant communes,—only 766,500 acres (out of 6,868,900) in the hands of single individuals being under cultivation. Oats are an important crop. Hemp and flax are largely raised and exported. Cattle-breeding stands at a low level; the cattle of the peasantry suffer from a want of meadow and pasture land, which is mostly in private ownership. In 1882 there were 329,850 horses, 349,000 horned cattle, 401,000 sheep, and 162,000 pigs. The peasantry are mostly very poor, in consequence not only of the desolation inflicted on Smolensk in 1812, the effects of which are still felt, but also of insufficient allotments and want of meadows. Gardening and bee-keeping, which formerly flourished, have almost disappeared. The timber trade and boat-building are important sources of income, but do not furnish employment for all who are in need of it; more than one-half of the male population of west Smolensk leave their homes every year in search of work, principally as navvies throughout Russia. The manufactures are developing but slowly, and in 1882 employed only about 5100 workmen,—their annual production being valued at £328,800; of this amount the distilleries yielded nearly one-third. A few cotton-mills in the east have a production valued at £62,160 per annum. A lively

traffic is carried on on the rivers, principally the Kasplya, the Obzha, and the Ugra, where corn, hemp, hempseed, linseed, and especially timber are shipped to the amount of nearly £400,000 annually. A considerable quantity of corn is imported into the western districts. Smolensk is crossed by two important railways, from Moscow to Warsaw and from Riga to Saratoff; a branch-line connects Vyazma with Kaluga. The educational institutions embrace eleven gymnasias and progymnasias (330 boys and 1402 girls), and 394 primary schools (15,081 boys and 2142 girls). Smolensk is divided into twelve districts, the chief towns of which, with their populations in 1882, are—Smolensk (see below), Byetzi (7150), Dorogobuzh (8400), Duhovshina (3660), Elnya (4850), Gzhatsk (7050), Krasnyi (3550), Poryetehie (4650), Rostavl (9050), Sytchevka (5720), Vyazma (13,000), and Yuchnoff (3230).

SMOLENSK, capital of the above government, is situated on both banks of the Dnieper, at the junction of the railways from Moscow to Warsaw and from Riga to Orel, 262 miles by rail west-south-west of Moscow. The town, with the ruins of its old kremlin, is built on the high crags of the left bank of the Dnieper, its suburbs extending around and on the opposite bank of the river. Its walls are now rapidly falling into decay, as well as all other remainders of its past. The cathedral was erected in 1676-1772, on the site of a more primitive building (erected in 1101), which was blown up in 1611 by the defenders of the city. The picture of the Virgin brought to Russia in 1046, and attributed to St Luke, which is kept in this cathedral, is much venerated throughout central Russia. Two other churches, built in the 12th century, have been spoiled by recent additions. Smolensk is neither a commercial nor a manufacturing centre; its population was 35,830 in 1882.

Smolensk, one of the oldest towns of Russia, is mentioned in Nestor as the chief town of the Crivitchis, situated on the great commercial route "from the Varyaghs to the Greeks." It maintained a lively traffic with Constantinople down to the 11th century, when the principality of Smolensk included Vitebsk, Moscow, Kaluga, and parts of the present government of Pskoff. The princes of Kieff were often recognized as military chiefs by the *vryetche* (council) of Smolensk, who mostly preferred Mstislaff and his descendants, and Rostislaff Mstislavovitch became the head of a series of nearly independent princes of Smolensk. From the 14th century these last fell more and more under the influence of the Lithuanian princes, and in 1404 Smolensk was annexed to Lithuania. In 1449 the Moscow princes renounced their claims upon Smolensk; nevertheless this important city, which was both a stronghold and a commercial centre with nearly 100,000 inhabitants, was a constant source of contention between Moscow and Lithuania. In 1514 it fell under Russian dominion; but during the disturbances of 1611 it was taken by Sigismund III. of Poland, and it remained under Polish rule until 1654, when the Russians retook it; in 1688 it was definitively annexed to Russia. In the 18th century it played an important part as a basis for the military operations of Peter I. during his wars with Sweden. In 1812 it was well fortified; but the French took it, when it suffered much from conflagrations, and generally, during the war.

SMOLLETT, TOBIAS GEORGE (1721-1771), novelist, was born at Dalquhurn, in the valley of Leven, Dumbartonshire, in 1721. His buoyant humour and energy were the gifts of nature, and early experience furnished him with abundant provocation for the harsh and cynical views of human nature to be traced in his novels. At a very early age he was placed in a position calculated to harden the heart of a proud and sensitive child. His father, the youngest son of the laird of Bonhill, a Scottish legal dignitary, married against the ambition of his family, and died young, leaving three children, of whom the future novelist was the second son, entirely unprovided for. The boy, being thus left dependent on the charity of relatives, grudgingly and insolently bestowed, as it seemed to him, learned to look with suspicion on kindly professions. He seems to have received the ordinary book education of the place and period. He was sent to the neighbouring grammar-school of Dumbarton—taught at the time by one of the most eminent schoolmasters in Scotland—and thereafter to the university of Glasgow. He wished then to enter the army, as his elder brother had done, but much against his will was apprenticed to a surgeon. His



grandfather died when he was in his eighteenth year, without leaving any provision for the children of his youngest son, and in his nineteenth year Smollett left Glasgow and launched himself on London in quest of fortune with the tragedy of the *Regicide* in his pocket. He failed to get the tragedy accepted, and, reduced almost to starvation, was fain to take the situation of surgeon's mate on board a ship of the line. He was present in 1741 at the siege of Cartagena. He soon quitted the navy in disgust, but during his service of a few years he acquired, as Scott says, "such intimate knowledge of our nautical world as enabled him to describe sailors with such truth and spirit of delineation that, from that time, whoever has undertaken the same task has seemed to copy more from Smollett than from nature."

Returning to England in 1746, Smollett made a desperate attempt to live by his pen, publishing the satires *Advice and Reproof*—satire being then in fashion—and pushing the *Regicide* and other dramatic works on theatrical managers and patrons. He revenged himself in his satires for the rebuffs given to his plays. Whether he was over reduced to such straits as Mr Melopoy, whom Roderick Random met with in the Fleet, is not known for certain, but it is certain that he was sharply pinched; and he did not mend his circumstances by marrying a portionless lady whom he had met in the West Indies. His buoyant spirit was not in the least broken by adverse fortune, but it was considerably inflamed and embittered. His fierce and distempered mood when he wrote *Roderick Random* is reflected in the characters of the novel, which are drawn with a much more defiant and contemptuous hand than he used in any of his subsequent works. The author was not a cold-blooded cynic, but a proud warm-hearted man enraged by what he considered unjust usage. He was not in a mood to dwell upon lovable traits in human nature, or to find pleasure in pretty sentiments. The public, however, when *Roderick Random* was published—in 1748, a few months before *Tom Jones*—did not concern themselves with the character of the author. The wealth of humorous incident, the rapidly moving crowd of amusing figures, concealed all those harsher features in the picture of life which quiet reflexion can now trace to the circumstances of the author, smarting as he was under petty insults and real or fancied indignities. This novel at once raised Smollett into reputation. It was followed after an interval of three years by *Peregrine Pickle* (1751), the immediate popularity of which was helped by the insertion into the body of the novel of two stories from real life, the memoirs of a lady of quality (Lady Vane) and the memoirs of the philanthropist M'Kercher. This second masterpiece was written with a much lighter heart than the first, although it must be confessed that the hero is not much of an improvement on Roderick Random. Scott describes him as "the savage and ferocious Pickle, who, besides his gross and base brutality towards Emilia, besides his ingratitude to his uncle, and the savage propensity which he shows in the pleasure he takes to torment others by practical jokes, resembling those of a fiend in glee, exhibits a low and ungentlemanlike tone of thinking, only one degree higher than that of Roderick Random." There is, however, this difference, that the author seems much more conscious of the bad qualities of Pickle than of Random. He expends no sympathy or fine sentiment on either, but Random's defects are represented as the results of the harsh treatment he had himself received, while Pickle's appear rather as the outcome of a naturally harsh and insolent character. Both are far from being model gentlemen, but Pickle is several degrees lower rather than one degree higher than Random. In the second novel there is a still richer crowd of characters,

quaint, amusing, disgusting, and contemptible; but there is more of a tendency to secure variety by extravagant caricature. For some of the indecencies in the first edition Smollett apologized, and withdrew them in a second edition, but he still left enough to satisfy the greediest taste in that particular. He also withdrew a very offensive allusion to Fielding, and in his next novel, *The Adventures of Ferdinand, Count Fathom*, paid that great rival the compliment of imitation. Though Smollett was far from being a servile imitator, there can be no doubt that he profited greatly by Fielding's example in all the higher essentials of his craft. This, his third effort, although it has not the same exuberant humour and fresh variety of character, is vastly better in point of constructive skill and sustained power of description. It looks as if he had deliberately set himself to show that he too as well as the author of *Tom Jones* could make a plot. The vileness of Fathom's character is so repulsive that the novel is much less often read than others of Smollett's; but it is his greatest feat of invention, being not a mere string of lively adventures, but a connected series in the progressive movement of the villain's career. It contains some of Smollett's most cynical comments on human motives, as well as passages that illustrate strikingly his real goodness of heart. He was not at home, however, in the direct expression of tender sentiment; when any of his persons gush, they do so with such wordiness and extravagance as to give them an air of insincerity.

With the composition of *Count Fathom* in 1753 Smollett's invention seemed to be exhausted for the time. For the next ten years he occupied himself with miscellaneous literary work, translating *Don Quixote* (published 1755), compiling a *Compendium of Voyages and Travels* (1757), and producing a *History of England from the Landing of Cæsar to the Treaty of Aix-la-Chapelle* (1757), followed by a continuation down to the date of publication (1761-65). Smollett, in short, from the time of his first success made his living as a professional man of letters. He obtained a medical degree from a German university about 1752, and set up as a physician, but seems never to have acquired much practice. He turned this experience to account, however, by caricaturing in *Count Fathom* the arts of rising in the profession. He had very little more success in his attempts to write for the stage. The *Regicide* was never acted, and, when it was published in 1749 to expose the folly of managers in not accepting it, the verdict of the public was rather with the managers than with the author. Smollett's single success on the stage was a farce with a political object, *The Reprisals, or the Tars of Old England*, produced in 1757 to excite feeling against the French. As a journalist also Smollett was not particularly successful, partly perhaps because he attached himself to the losing side,—the Tory and High Church party. He edited their organ *The Critical Review* for some years, and in 1759 suffered imprisonment for an attack on Admiral Knowles. At the beginning of the reign of George III. he supported Lord Bute's ministry in *The Briton*, but *The Briton* was driven out of the field by Wilkes's *North Briton*. Altogether Smollett's revenue from play-writing and journalism seems to have been small, unless his party services were requited independently of the sale of his papers. But his name stood high with booksellers. He introduces himself in *Humphrey Clinker* as a dispenser of literary patronage, surrounded by a number of humble dependants. These were probably the hacks to whom he gave employment in his journals and in such booksellers' jobs as his translation of Voltaire and the compilation entitled *The Present State of all Nations, containing a Geographical, Natural, Commercial, and Political History of all the Countries of the Known World* (1763).

In the course of this vast miscellaneous task-work, under which Smollett's health gave way completely, he wrote by instalments for the *British Magazine* (in 1760 and 1761) the curious satirical romance of *Sir Lancelot Greaves*. It is only in externals that this work bears any resemblance to *Don Quixote*. The author seems to have hesitated between making Sir Lancelot a mere madman and making him a pattern of perfectly sane generosity. The fun and the seriousness do not harmonize. The young knight's craze for riding about the country to redress wrongs armed *cap-a-pie* is too harshly out of tune with the rightness of his sympathies and the grave character of the real abuses against which his indignation is directed. In execution the work is very unequal and irregular, but the opening chapters are very powerful, and have been imitated by hundreds of novelists since Smollett's time.

Upon the failure of his health in 1763 Smollett went abroad and lived in France and Italy for three years. He published two volumes of *Travels* soon after his return in 1766. Three years more he spent in England, trying in vain to get some consular post abroad, where the climate might suit his shattered constitution. His extremely clever and extremely coarse political satire, *The Adventures of an Atom*, published in 1769, was probably inspired partly by resentment at the neglect of his own claims by successive ministries. He left England soon after its publication, and spent the last two years of his life in a house at Monte Novo in the neighbourhood of Leghorn. Here, labouring under a painful and wasting disease, he composed his last work, *The Expedition of Humphrey Clinker*, published in 1771. This is generally regarded as his best novel. It certainly is the most pleasant reading, much softer and more humane in tone, while equally alive with vivid sketches and studies of character and a never-failing supply of ludicrous adventures. The loose and easy plan does not require for its execution the sustained power shown in *Count Fathom*; but, on the other hand, it leaves the novelist free to introduce greater variety of character and incident. None of his novels gives a better impression of Smollett's versatility than *Humphrey Clinker*, and there is none of them to which his successors have been more indebted. But whoever would understand how much the English novel owes to Smollett must read all his five fictions and not merely the most celebrated three. His influence upon novel-writing was wider even than Fielding's. He died at Monte Novo on 21st October 1771. (v. m.)

SMUGGLING denotes a breach of the revenue laws either by the importation or the exportation of prohibited goods or by the evasion of customs duties on goods liable to duty. Smuggling is, as might be expected, most prevalent where duties are high. The best preventive is the imposition of duties so low in amount and on so few articles that it becomes scarcely worth while to smuggle. Legislation on the subject in England has been very active from the 14th century downwards. In the reign of Edward III. the illicit introduction of base coin from abroad led to the provision of the Statute of Treasons (25 Edw. III. st. 5) making it treason to import counterfeit money as the money called "Lushburgh." Such importation is still an offence, though no longer treason. After the Statute of Treasons a vast number of Acts dealing with smuggling were passed, most of which will be found recited in the repealing Act of 6 Geo. IV. c. 105. In the 18th and the early years of the 19th century smuggling (chiefly of wine, spirits, tobacco, and bullion) was so generally practised in Great Britain as to become a kind of national failing, and the smuggler was often regarded as a popular hero, like the *contrabandista* of modern Spain. The prevalence of the offence a century and a half ago may be judged from the report of Sir J. Cope's committee in 1732 upon the

frauds on the revenue. The smuggler of the 18th century finds an apologist in Adam Smith, who writes of him as "a person who, though no doubt highly blamable for violating the laws of his country, is frequently incapable of violating those of natural justice, and would have been in every respect an excellent citizen had not the laws of his country made that a crime which nature never meant to be so." The gradual reduction of duties has brought the offence in the United Kingdom into comparative insignificance, and it is now almost confined to tobacco. Most of the existing legislation on the subject of smuggling is contained in the Customs Consolidation Act, 1876 (39 and 40 Vict. c. 36, ss. 169-217).

The main provisions are as follows. Vessels engaged in smuggling are liable to forfeiture and their owners and masters to a penalty not exceeding £500. Smuggled and prohibited goods are liable to forfeiture. Officers of customs have a right of search of vessels and persons. Fraudulent evasion or attempted evasion of customs duties renders the offender subject to forfeit either treble the value of the goods or £100 at the election of the commissioners of customs. Heavy penalties are incurred by resistance to officers of customs, rescue of person or goods, assembling to run goods, signalling smuggling vessels, shooting at vessels, boats, or officers of the naval or revenue service, cutting adrift customs vessels, offering goods for sale under pretence of being smuggled, &c. Penalties may be recovered either by action or information in the superior courts or by summary proceedings. In criminal proceedings the defendant is competent and compellable to give evidence. The Act applies to the United Kingdom, the Isle of Man, and the Channel Islands. Besides the Customs Act, 50 Geo. III. c. 41, s. 16 (the corresponding Act for Scotland is 55 Geo. III. c. 71, s. 9), enacts that a hawker's licence is to be forfeited on his conviction for knowingly selling smuggled goods. The Merchant Shipping Act, 1854 (17 and 18 Vict. c. 104, s. 243), makes any seaman or apprentice, after conviction for smuggling whereby loss or damage is caused to the master or owner of a ship, liable to pay to such master or owner such a sum as is sufficient to reimburse the master or owner for such loss or damage, and the whole or a proportional part of his wages may be retained in satisfaction of this liability. Additional provisions as to smuggling are also contained in 42 and 43 Vict. c. 21 and 44 and 45 Vict. c. 12. A smuggling contract is generally illegal. But it may be valid, and the vendor may recover the price of goods, even though he knew the buyer intended them to be smuggled, unless he actually aids in the smuggling so as to become *particeps criminis*. Contracts to defraud the revenue of a foreign state are, according to English decisions, not illegal. There is a German decision, more consonant with international morality, to the opposite effect.

The penalties for smuggling in the United States will be found mainly in tit. xxxiv. ch. 10 of the Revised Statutes. The seaman guilty of smuggling is liable to the same penalty as in England, and in addition to imprisonment for twelve months, s. 4596.

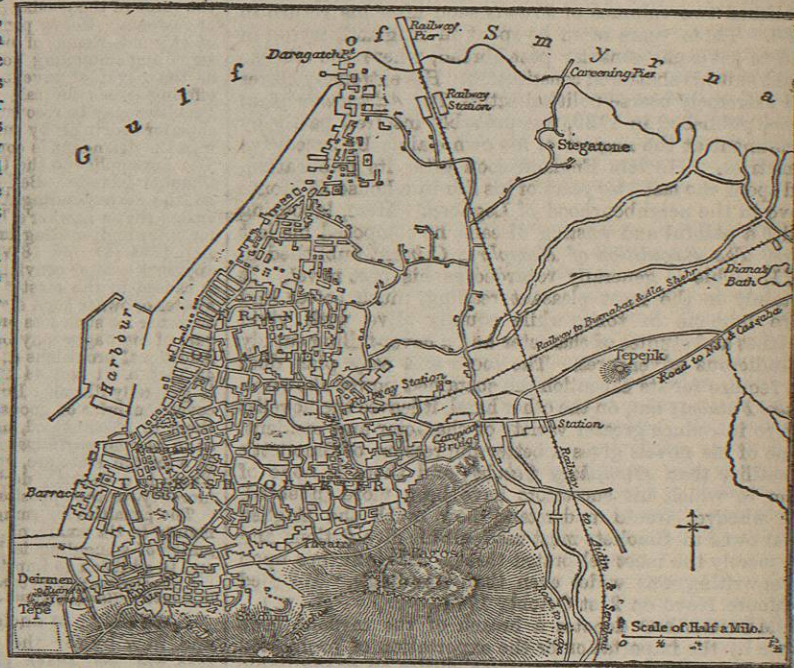
A considerable amount of historical information on this subject will be found in Dowell's *History of Taxation* and Pike's *History of Crime in England*.

SMYRNA, in ancient times one of the most important and now by far the greatest of the cities of Asia Minor (see vol. xv. Plate II.), has preserved an unbroken continuity of record and identity of name from the first dawn of history to the present time. It is said to have been a Lelegian city before the Greek colonists settled in Asia Minor. The name, which is said to be derived from an Amazon called Smyrna, is indubitably Anatolian, having been applied also to a quarter of Ephesus, and (under the cognate form Myrina) to a city of Æolis, and to a tumulus in the Troad. The Æolic settlers of Lesbos and Cyme, pushing eastwards by Larissa and Neonteichus and over the Hermus, seized the valley of Smyrna. It was the frontier city between Æolis on the north and Ionia on the south, and was more accessible on the south and east than on the north and west. At the same time it was by virtue of its favourable situation necessarily a commercial city, like the Ionian colonies. It is therefore not surprising that the Æolic element grew weaker; strangers or refugees from the Ionian Colophon settled in the city, and finally Smyrna passed into the hands of the Colophonians and became the thirteenth of the Ionian states. The change had taken place before 688, when the Ionian Onomastus of Smyrna won the boxing prize at



Olympia, but it was probably then a recent event. The Colophonian conquest is mentioned by Minnermus (before 600 B.C.), who counts himself equally a Colophonian and a Smyrnan. The Æolic form of the name, *Σμύρνα*, was retained even in the Attic dialect, and the epithet "Æolian Smyrna" remained long after the conquest. The favourable situation of Smyrna on the path of commerce between Lydia and the west raised it during the 7th century to the height of power and splendour. It lay at the eastern end of an arm of the sea, which reached far inland and admitted the Greek trading ships into the heart of Lydia. One of the great trade routes which cross Anatolia from east to west descends the Hermus valley past Sardis, and then diverging from the valley passes south of Mount Sipylus and crosses a low pass into the little valley, about 7 miles long and 2 broad, where Smyrna lies between the mountains and the sea. Miletus, and at a later time Ephesus, situated at the sea end of the other great trade route across Anatolia, competed for a time successfully with Smyrna for the conveyance of traffic from the interior; but both Ephesus and Miletus have long ago lost their harbours, and Smyrna now remains without a rival. It was of necessity in close relation with the Lydians, and when the Mermnad kings raised the Lydian power and aggressiveness it was one of the first points of attack. Gyges (687-653) was, however, defeated in a great battle on the banks of the Hermus; the situation of the battlefield shows that the power of Smyrna extended far to the east, and probably included the valley of Nymphæum (Nif). A strong fortress, the ruins of whose ancient and massive walls are still imposing, on a hill in the pass between Smyrna and Nymphæum, was probably built by the Smyrnan Ionians to command the valley of Nymphæum. According to the poet Theognis (about 500 B.C.), "pride destroyed Smyrna." Minnermus laments the degeneracy of the citizens of his day, who could no longer stem the Lydian advance. Finally, Alyattes (610-563) conquered the city, and Smyrna for 300 years lost its place in the list of Greek cities. It did not entirely cease to exist, but the Greek life and political unity were destroyed, and the Smyrnan state was organized on the village system (*ἑκαῖρο κομυδόν*). It is mentioned in a fragment of Pindar, about 500 B.C., and in an inscription of 388 B.C. A small fortification of early style, rudely but massively built, on the lowest slope of a hill behind Burnabat, is perhaps a fortified village of this period. Alexander the Great conceived the idea of restoring the Greek city; the two Nemeses who were worshipped at Smyrna are said to have suggested the idea to him in a dream. The scheme was, according to Strabo, carried out by Antigonus (316-301), and Lysimachus enlarged and fortified the city (301-281). The acropolis of the ancient city had been on a steep peak about 1250 feet high, which overhangs the north-eastern extremity of the gulf; its ruins still exist, probably in much the same condition as they were left by Alyattes. The later city was founded on the site which it still occupies, partly on the slopes of a rounded hill called Pagus near the south-east end of the gulf, partly on the low

ground between the hill and the sea. The beauty of the city when seen from the sea, clustering on the low ground and rising tier over tier on the hillside, is frequently praised by the ancients and is celebrated on its coins; the same impression still strikes the spectator, and must in ancient times have been much stronger, when magnificent buildings, an imposing acropolis, and the wide circle of massive walls combined with the natural scenery in one splendid picture. Smyrna is shut in on the west by a hill now called Deirmen Tepe, with the ruins of a temple on the summit. The walls of Lysimachus crossed the summit of this hill, and the acropolis occupied the top of Pagus. Between the two the road from Ephesus entered the city by the "Ephesian gate," near which was a gymnasium. Closer to the acropolis the outline of the stadium is still visible, and the theatre was situated on the northern slopes of Pagus. The line of the walls on the eastern side is



Plan of Smyrna.

unknown; but they certainly embraced a greater area than is included by the Byzantine wall, which ascends the castle hill (Pagus) from the Basmakhané railway station. Smyrna possessed two harbours,—the outer, which was simply the gulf, and the inner, which was a small basin, with a narrow entrance closed by a rope in case of need, about the place now occupied by bazaars. The inner harbour was partially filled up by Timur in 1402, but it had not entirely disappeared till the beginning of the 19th century. The modern quay has encroached considerably on the sea, and the coast-line of the Greek time was about 90 yards farther to the south. The streets were broad, well paved, and regularly laid out at right angles; many were named after temples; the main street, called the Golden, ran across the city from west to east, beginning probably from the temple on Deirmen Tepe, and continuing towards Tepejik outside the city on the east, where probably the temple of Cybele, the Metroon, stood. Cybele, worshipped under the name of Meter Sipylene, from Mount Sipylus, which bounds the Smyrna valley on the north,

was the tutelary goddess of the city. The plain towards the sea was too low to be properly drained, and hence in rainy weather the streets were deep with mud and water.

The river Meles, which flowed by Smyrna, is famous in literature and was worshipped in the valley. The most common and consistent tradition connects Homer with the valley of Smyrna and the banks of the Meles; his figure was one of the stock types on Smyrnan coins, one class of which was called Homeric; the epithet "Melesigenes" was applied to him; the cave where he was wont to compose his poems was shown near the source of the river; his temple, the Homereum, stood on its banks. The steady equable flow of the Meles, alike in summer and winter, neither swollen after rain nor dry during drought, its pleasant water, its short course, beginning and ending near the city, are celebrated by Aristides and Himerius. The description applies admirably to the stream which rises from abundant fountains, now known as Diana's Bath, some way to the east of the city, and flows into the south-eastern extremity of the gulf. The common belief that the torrent, dry except after rains, which flows by Caravan Bridge is the ancient Meles flatly contradicts the ancient descriptions.

In the Roman period Smyrna was the seat of a *conventus* which included southern Æolis and great part of the Hermus valley. It vied with Ephesus and Pergamum for the title "First (city) of Asia." A Christian church existed here from a very early time, having its origin in the considerable Jewish colony. POLYCARP (*q.v.*) was bishop of Smyrna. The bishops of Smyrna were originally subject to the metropolitan of Ephesus; afterwards they became independent (*αὐτοκέφαλοι*), and finally were honoured with metropolitan rank, having under them the bishops of Phocæa, Magnesia ad Sipylum, Clazomenæ, Sosandrus (Nymphæum?), Archangelus (Témnos?), and Petra (Ménemen?).

When Constantinople became the seat of government the trade between Anatolia and the west lost in importance, and Smyrna declined apace. A Turkish freebooter named Tsacha seized Smyrna in 1084 and maintained himself there for some time, but it was recovered by the generals of Alexius Comnenus. The city was several times afterwards ravaged by the Turks, and had become quite ruinous when the emperor John Ducas Vatatzes about 1222 rebuilt it. The famous chieftain Aidin conquered it about 1330 and made his son Amur governor. Soon afterwards the knights of Saint John established themselves in the town, but failed to conquer the citadel. In 1402 Timur stormed the town and massacred almost all the inhabitants. The Mongol conquest was only temporary, but Smyrna has remained till the present day in Mohammedan hands. It is now the greatest commercial city in the Levant; its population is about 200,000, of whom nearly half are Greeks. It is the terminus of the railway system which is gradually spreading over Anatolia. Two lines start from Smyrna: one ascends the Hermus valley by Magnesia and Sardis to Alashehr (Philadelphia), about 110 miles; the other goes south by Ephesus to the Meander valley beside Magnesia on the Meander and then ascends the valley to the neighbourhood of Laodicea on the Lycus, 143 miles. Since the revival of the Levant trade by the Genoese and Venetians Smyrna has been the emporium for the whole produce of Anatolia; the chief raw products exported are valonea, figs, raisins, opium, madder, liquorice, cotton, sponges, emery, &c.; almost the only articles of native manufacture which are exported from Smyrna are the carpets woven at Geurdiz, Coula, Ushak, and other places in the interior. Smyrna has frequently been partially destroyed by earthquakes; that of 178 A.D. is the most famous, and in 1658, 1768, and 1880 the town suffered severely.

(W. M. RA.)

SNAIL. In England the word "snail" in popular language is associated with Gasteropods which inhabit land or fresh water and which possess large conspicuous spiral shells; terrestrial Gasteropods in which the shell is rudimentary and concealed are distinguished as "slugs." In Scotland the word "slug" is absent from the vernacular vocabulary, both shell-bearing and shell-less inland molluscs being known as snails. Marine Gasteropods are occasionally termed "sea-snails," and the compounds "pond-snails," "river-snails," "water-snails" are in common use. The commonest land-snails are those species which constitute the family *Helicidae*, order *Pulmonata*, sub-order *Stylommatophora*. The other two families of the same sub-order, *Limacidae* and *Onchidiidae*, include all the slugs. In the first of these are comprised all the slugs known in Great Britain, and indeed in Europe. The *Onchidiidae* are entitled to the name "sea-slugs," as they are shell-less Pulmonates living on the seashore, though not actually in the sea. The term "water-snails" includes the whole of the remaining sub-order of the *Pulmonata*, namely, the *Basommatophora*, in which the eyes are sessile. This division comprises two families, *Limnæidae* and *Auriculidae*; some of the members of the first are amphibious, some entirely aquatic; the snails of the second family are found near but not in the water. Thus the whole of the *Pulmonata* which breathe air, are destitute of gill-plumes and operculum, and have a complicated hermaphrodite reproductive system, are either snails or slugs. But there are a considerable number of snails, both terrestrial and aquatic, which are not Pulmonates. The land-snails which have no gill-plume in the mantle-chamber and breathe air, but have the sexes separated, and possess an operculum belong to the order *Azygobranchia*, of which they form a distinct sub-order, the *Pneumonochlamyda*, containing three families, *Cyclostomidae*, *Helicinidae*, and *Aciculidae*. The fresh-water snails which are not Pulmonates are the *Paludinidae*, *Valvatidae*, and *Ampullaridae*, together with *Neritina*, a genus of the *Neritidae*. These all possess a fully developed gill-plume and are typical Azygobranchiates of the sub-order *Holochlamyda*, most of the members of which are marine.

The family *Helicidae* has a world-wide distribution. In *Helix* the spire forms a more or less obtuse-angled cone; there are above 1200 species, of which 24 are British. *Helix nemoralis*, L., of which *H. hortensis* is a variety, is one of the commonest forms. *Helix pomatia*, L., is the largest species, and is known as the "edible snail"; it is commonly eaten in France and Italy, together with other species. It was formerly believed to have been introduced into Britain by the Romans, but there is no doubt that it is a native. In *Succinea* the cone of the spire is acute-angled; three species are British. In *Vitrina* the spire is very flat and the surface glassy. In *Bulimus* the spire is elongated with a pointed apex. *Pupa* is named from its resemblance to a chrysalis, the apex being rounded. The shell of *Clausilia* is sinistral and its aperture is provided with a hinged plate. The commoner European slugs of small size all belong to the genus *Limax*, in which the opening of the mantle-chamber is posterior. *L. flavus* is the cellar slug. *L. agrestis*, *L. arborum*, *L. maximus*, occur in gardens and fields. The larger black slugs are species of *Arion*, of which two are British, *A. ater* and *A. hortensis*. *Testacella haliotidea* is common in Great Britain and throughout Europe.

The *Limnæidae* occur in all parts of the world. *Limnæus* contains the largest species. *L. pereger*, Müller, is ubiquitous in Great Britain and common all over Europe. All the species are usually infested with *Cercaria* and *Redia*, the larval forms of Trematode parasites of vertebrates. *L. truncatulus* harbours the *Cercaria* of *Fasciola hepatica*, the liver-fluke, which causes rot in sheep. *Ancylus*, which occurs in rivers, has a minute limpet-like shell. *Planorbis* has the spire of the shell in one plane. *Physa* is smaller than *Limnæus* and has the upper part of the spire much shorter. In the *Auriculidae* the aperture is denticulated. *Auricula* is confined to the East Indies and Peru. *Carychium minimum* is British.

Of the *Cyclostomidae* only one species, *Cyclostoma elegans*, Müller, is British; it hides under stones and roots. The *Helicinidae* are exotic, ranging from the West Indies to the Philippines. Of the *Aciculidae*, which are all minute, *Acicula lineata* is British.

The *Ampullaridae* are confined to the tropics. *Ampullaria* has very long tentacles and a long siphon formed by the mantle.