simply a ring of iron, about 2 feet in diameter, flattened and steeled for about one-third of its circumference, having a bag of strong leather attached to it by leathern thongs. The ring and bag were fixed to a pole, which, on being used, was lowered to the bottom from the side of a barge moored in the canal or river. A rope made fast to the iron ring was then wound up by a windlass placed at the other end of the barge, and the spoon was thus dragged along the bottom, and was guided in its progress by a man who held the pole. When the spoon reached the end of the barge where the windlass was placed, the winding was still continued, and the suspending rope being nearly perpendicular, the bag was raised to the surface, bringing with it the stuff excavated while it was being drawn along the bottom. The windlass being still wrought, the whole was raised to the gunwale of the barge, and the bag, being emptied, was again hauled back to the opposite end of the barge, and lowered for another supply. This system is slow, and only adapted to a limited depth of water and a soft bottom. But it has been generally employed in canals, and is much used in the Thames. The writer had occasion to use it at the Fossdyke Canal, in Lincolnshire, where 135,000 tons were raised in the manner described.

Dredging by Bucket between two Lighters.—Another plan, practised at an early period in rivers of considerable breadth, was to moor two large barges, one on each side; between them was slung an iron dredging bucket, which was attached to both barges by chains wound round the barrels of a crab winch worked by six men in one barge, and round a simple windlass, worked by two men in the other. The bucket, being lowered at the side of the barge carrying the windlass, was drawn across the bottom of the river by the crab winch on the other barge; and, having been raised and emptied, it was hauled across by the opposite windlass for a repetition of the process. This plan was in use in the Tay till 1833.

Steam Dredges.—In all large operations these and other primitive appliances have now, as is well known, been superseded by the steam dredge, which was first employed, it is believed, in deepening the Wear at Sunderland about the year 1796. The Sunderland machine was made for Mr Grimshaw by Boulton and Watt. Receiving improvements from Mr Hughes, Mr Rennie, Mr Jessop, and others, the steam dredge, as now generally constructed, is a most powerful machine in skilful hands, excavating and raising materials from depths of 15 to upwards of 30 feet of water according to the size of the machinery, at a cost not very different from, and in some cases even less than, that at which the same work could be performed on dry land.

As to the kind of work that may be accomplished by dredging, it may be stated that almost all materials, excepting solid rock or very large boulders, may now be dredged with ease. Loose gravel is probably the most favourable material to work in; but a powerful dredge will readily break up and raise indurated beds of gravel, clay, and boulders, and even find its way through the surface of soft rock, though it will not penetrate very far into it. In such cases it is usual to alternate on the bucket-frame a bucket for raising the stuff, with a rake or pronged instrument for disturbing the bottom. The writer in his own experience has raised boulders weighing upwards of a ton with a powerful dredge of the ordinary construction, and removed disintegrated or rotten rock at least to a limited depth, and he believes that in many cases the surfaces of submerged rocks may, by means of such appliances, be to some extent broken up and removed, so as to obtain in certain situations a considerable increase of depth, without recourse to cofferdams, which involve great expense.

The construction of large river steam dredges is now carried on by many engineering firms. The main feature of the machine is the bucket-ladder, which is lowered through an ark formed in the vessel till it reaches the bottom. Along this ladder a series of buckets traverse which cut into the bottom at the lower extremity of the ladder and return loaded with the excavated material, which is discharged at the top of the bucket-ladder into a lighter or barge prepared for its reception. The machines are sometimes made with single and sometimes with double ladders, sometimes discharging at the stern of the vessel and sometimes at both sides, but it is obviously impossible to give illustrative drawings of the different forms of dredgers in sufficient detail to be practically useful. It may be stated that a first-class dredging machine to work in 30 feet water, and discharge over either side, of 60 horse-power complete, costs at present prices about £16,000 to £18,000. The steam hoppers employed to receive and remove the dredgings carry about 500 tons of excavations; they are 70 horse-power, and steam at about 9 miles per hour. The hopper barges are made with opening hinged bottoms, which can be opened when the place of deposit is reached, and the dredgings easily and quickly discharged. These steam barges cost about £8000. Large dredges, such as those constructed by Messrs Wingate of Glasgow for the Tyne and other places, will excavate at the rate of 460 tons per hour when working on favourable ground.

Hopper Dredge.—Some improvements that have been suggested on the dredging plant hitherto used deserve notice. Among these may be mentioned that of Messrs Simons & Company, Renfrew, who have patented and constructed what they have called a hopper-dredge, combining in itself the advantages of a dredge for raising the material and a screw hopper vessel for conveying it to the place of discharge, both which services are performed by the same engines and the same crew. Messrs Simons have constructed seven hopper dredges on this plan, varying from 200 to 1000 tons of "hopper capacity."

Silt Dredge.—Another of the recently suggested improvements is that by Mr C. Randolph, who, in 1870, proposed that, instead of the ordinary dredging buckets, pipes should be lowered until they come into contact with the sand or mud at the bottom. The tops of these pipes were to be in communication with powerful centrifugal pumps, so that the velocity of the in-flowing water through the pipes could be made so great as to carry with it a large percentage of the sand or mud from the bottom; and when the solid matter, and the water in which it is suspended, were raised to the desired height, they would flow freely to any required place for deposit of the suspended material. It is not known that this plan has been carried into practical operation.

Dredging at Amsterdam and Suez Canals.—Another arrangement is that of raising the material by buckets in the ordinary way, and thereafter receiving it in a vessel and floating it off by pipes to the place of deposit. This, of course, can only be done where the place of deposit is close to the spot whence the material is dredged. Two plans have been proposed for effecting this. One of these has been used in the Amsterdam Canal, where the stuff is discharged from the buckets into a vertical cylinder, and is there mingled with water by a revolving Woodford-pump and sent off under pressure to the place of deposit in a semi-fluid state. At the Amsterdam Canal this was done by pipes made of timber, and hooped with iron like barrels. These wooden cylinders were made in lengths of about 15 feet, connected with leather joints, and floated on the surface of the water, conveying the stuff to the requisite distance, like the hose of a fire engine, under a head of pressure, it is believed, of 4 or 5 feet, and depositing it over the banks of the canal. A somewhat similar process was employed on the Suez Canal,—not, however, by using pumps, but simply by running the stuff to the banks on steeply inclined shoots, which were supplied with water when the material raised did not contain sufficient water to cause it to run freely. It is obvious, however, that these arrangements can only be applied in situations where the material to be excavated is of a very soft nature, and where the place of deposit is close at hand. In keeping clear the Suez Canal such appliances may be very useful, as the soft deposit of the canal has only to be raised and projected over the banks on either side.

American Dredges.—Dredging in Canada and the United States is done by what are called *Dipper* and *Clam-shell* dredges, the bucket dredge being seldom used.

The *dipper dredge* consists of a barge, with a derrick-crane reaching over the stern, suspending a large wrought-iron bucket which brings up the dredged material. To the bucket is attached a pole 6 inches by 4 inches in cross section, by which means it is guided while being drawn along the bottom; it is then raised, and its bottom being made to drop open, the contents fall into the barge moored alongside of the dredge. The bottom of the bucket is kept closed by a catch, which, by means of a rope, can be withdrawn at the proper moment. The *clam-shell* is a box made of two similar pieces of wrought iron hinged together at one end; by a simple arrangement of the gearing the clam, mouth open, drops down and sinks into the bottom, and the first effect of heaving up is to close it, thus imprisoning a quantity of material which is raised and deposited as in the case of the dipper. Both kinds of dredges are worked by a steam-engine, and rough as they appear to be, they are extensively employed in deepening and widening river channels, making or deepening canals, and other such works.

This is not the place to discuss the merits of different apparatus, which perhaps can only be settled by the actual performance of different arrangements when fully tested by practice. Having thus briefly noticed them, a few practical observations on dredging, as more immediately applicable to British rivers, have still to be mentioned.

Longitudinal and Cross Dredging.—In river dredging two systems are pursued. One plan consists in excavating a series of longitudinal furrows parallel to the axis of the stream, the other in dredging cross furrows from side to side of the river. It is found that inequalities are left between the longitudinal furrows when that system is practised, which do not occur, to the same extent, in side or *cross dredging*; and the writer invariably finds cross dredging to leave the most uniform bottom. To explain the difference between the two systems of dredging it may be stated that in either case the dredge is moored from the head and stern by chains about 250 fathoms in length. These chains in improved dredges are wound round windlasses worked by the engine, so that the vessel can be moved ahead or astern by simply throwing them into or out of gear. In longitudinal dredging the vessel is worked forward by the head chain, while the buckets are at the same time performing the excavation, so that a longitudinal trench is made in the bottom of the river. When the dredge has proceeded a certain length, it is stopped and permitted to drop down and commence a new longitudinal furrow, parallel to the first one. In cross-dredging, on the other hand, the vessel is supplied with two additional moorings, one on each side; and these chains are, like the head and stern chains, wound round barrels wrought by the engine. In commencing to work by cross dredging we may suppose the vessel to be at one side of the channel to be excavated. The bucket frame is set in motion, but, instead of the dredge being drawn forward by the head chain, she is drawn to the opposite side of the river by the side chain, and, having reached the extent of her work in that direction, she is then drawn a few feet forward by the head chain, and, the bucket frame being still in motion, the vessel is hauled across by the opposite chains to the side whence she started. By means of this transverse motion of the dredge a series of cross furrows is made; she takes out the whole excavation from side to side as she goes on, and leaves no protuberances such as are found to exist between the furrows of longitudinal dredging, even where it is executed with great care. The two systems will be best explained by reference to fig. 1, where A and B are the head and stern moorings, and C and D the side moorings; the arc *ef* represents the course

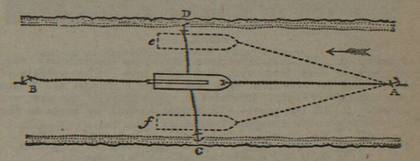


FIG. 1.

of the vessel in cross dredging; while in longitudinal dredging, as already explained, she is drawn forward towards A, and again dropped down to commence a new longitudinal furrow.

Blasting combined with Dredging.—In some cases, however, the bottom is found to be too hard to be dredged until it has been to some extent loosened and broken up. Thus at Newry, Mr Rennie, after blasting the bottom in a depth of from 6 to 8 feet at low water, removed the material by dredging at an expense of from 4s. to 5s. per cubic yard. The same process was adopted by Messrs Stevenson at the bar of the Erne at Ballyshannon, where, in a situation exposed to a heavy sea, large quantities of boulder stones were blasted, and afterwards raised by a dredger worked by hand at a cost of 10s. 6d per cubic yard.

Sir William Cubitt also largely employed blasting in connection with dredging on the Severn, of which an instructive account is given in the *Minutes of Proceedings of the Institution of Civil Engineers*, from which the following particulars are taken:—

"It appears that a succession of marl beds, varying from 100 yards to half a mile in length, were found in the channel of the Severn, which proved too hard for being dredged, the whole quantity that could be raised being only 50 or 60 tons per day, while the machinery of the dredgers employed was constantly giving way. Attempts were first made to drive iron rods into the marl bed, and to break it up; a second attempt was made to loosen it by dragging across its surface an instrument like a strong plough. But these plans proving unsuccessful, it was determined to blast the whole surface to be operated on. The marl was very dense, its weight being 146 lb per cubic foot;[1] and it was determined to drill perpendicular bores, 6 feet apart, to the depth of 2 feet below the level of the bottom to be dredged out. The bores were made in the following manner, from floating rafts moored in the river. Pipes of $\frac{7}{16}$th inch wrought iron, 3½ inches diameter, were driven a few inches into the marl. Through these pipes holes were bored, first with a 1¼ inch jumper, and then with an auger. The holes were bored 2 feet below the proposed bottom of the dredging, as it was expected that each shot would dislocate or break in pieces a mass of marl of a conical form, of which the bore-hole would be the centre and its bottom the apex; so that the adjoining shots would leave between them a pyramidal piece of marl where the powder would have produced little or no effect. By carrying the shot holes lower than the intended dredging, the apex only of this pyramid was left to be removed; and in practice this was found

[1] Clay weighs about 109 lb, and sandstone about 155 lb per cubic foot.

to form but a small impediment. Fig. 2 is a section of the bore-holes, and fig. 3 a plan in which the inner dotted circles represent the diameters of the broken spaces at the level of the bottom

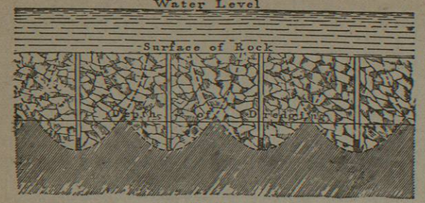


FIG. 2.

of dredging. The cartridges were formed, in the ordinary way, with canvas, and fired with Bickford's fuse. The weights of powder used for bore-holes of 4 feet, 4 feet 6 inches, and 5 feet were respectively 2 lb, 3 lb, and 4 lb. The effect of the shot was generally to lift the pipes—which were secured by ropes to the

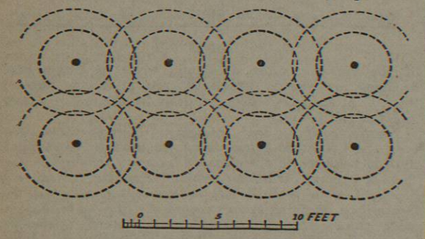


FIG. 3.

crafts—a few inches. Mr Edwards says that not one in a hundred shots missed fire, and these shots were generally saved by the following singular expedient :—The pointed end of an iron bar, ¾ inch diameter, was made red hot, and, being put quickly through the water, and driven through the tamping as rapidly as possible, was, in nine cases out of ten, sufficiently hot to ignite the gunpowder and fire the shot.

The cost of each shot is calculated as follows :—

Use of material	£0	1	0
Labour	0	3	3
Pitched bag for charge	0	0	3
3 lb of powder at 5½d.	0	1	4½
15 ft. of patent fuse at $\frac{1}{6}$ of a penny	0	0	9
Pitch, tallow, twine, coals, &c.	0	0	4½
Cost per shot	£0	7	0

Each shot loosened and prepared for dredging about four cubic yards, so that the cost of blasting was 1s. 9d. per yard. The cost of dredging the material, after it had been thus prepared, was 2s. 3d., making the whole charge for removing the marl 4s. per cubic yard."

One of the most recent successful combinations of blasting and dredging was that completed in 1875 by Mr John Fowler of Stockton at the river Tees, to whom the writer is indebted for the following particulars. The chief novelty was in the barge upon which the machinery was fixed. It was 58 feet by 28 feet by 4 feet, and had eight legs which were let down when the barge was in position. The legs were then fixed to the barge, so that on the tide falling it became a fixed platform from which the drilling was done. The holes were bored and charged, and when the tide rose the legs were heaved up and the barge removed, after which the shots were discharged. There were 24 boring tubes on the barge, and that was the limit which could at any time be done in one tide. The surface over which the blasting was done measured 500 yards in length by 200 yards in breadth, a small part of that surface being uncovered at low water. The depth obtained in mid-channel was 14 feet at low-water, the average depth of rock blasted being about 4 feet 6 inches. The holes, which were bored with the diamond drill, varied in depth from 7 to 9 feet, the distance between them being 10 feet. Dynamite in tin canisters fired by patent fuse was used as the explosive, the charges being 2 lb and under. The rock is Oolite shale of variable hardness, and the average time occupied in drilling 5-feet holes was twelve minutes.

The dredger raised the blasted rock,—the cost for blasting, lifting, and discharging at sea being about 4s. per cubic yard, including interest on dredging and other plant employed. The dredger sometimes worked a face of blasted material of from 7 to 8 feet. The quantity blasted was 110,000 cubic yards, and the contract for blasting so as to be lifted by the dredger was 3s. 1d. per cubic yard.

Dredging in Exposed Situations.—In some cases dredging has to be conducted in exposed situations such as the deepening of the "flats" at Londonderry and the bar at Carlingford. Messrs Stevenson found that dredging at the Foyle could not be conducted when the height of the waves exceeded 2½ feet; and Mr Barton at Dundalk so far confirms this, as he estimates a swell of 2 feet as the highest to work in.

Dredging on the River Clyde.—An important point connected with this subject is the cost at which dredging may be done when conducted on a large scale. This, of course, must depend on the character of the stuff to be raised and other circumstances; but the following information, kindly communicated by Mr James Deas, the engineer to the Trustees of the Clyde Navigation, cannot fail to be both interesting and useful.

Mr Deas says truly that the Clyde Trustees employ probably the largest dredging fleet of any trust in the kingdom, in maintaining and still deepening and widening the river to meet the ever-increasing demands of the shipping trade.

In the year 1871, for example, 904,104 cubic yards, or about 1,130,000 tons, were dredged from the river, of which 689,560 cubic yards were carried to sea by steam hopper barges, and 214,544 cubic yards deposited on land by means of punts. Of this 904,104 cubic yards, 345,209 cubic yards were deposit from the higher reaches of the river and its tributaries, and from the city sewers, and 558,895 cubic yards new material. The total cost for dredging and depositing was £35,448, or about 9·41 pence per cubic yard.

Owing to the difference in power of the dredging machines employed, and the character of the material lifted, the cost of dredging varies much. In 1871 the most powerful machine, working 2420 hours, lifted 430,240 cubic yards of silt and sand at a cost of 2·60 pence per yard; and this was deposited in Loch Long, 27 miles from Glasgow, by steam hopper barges, at 5·46 pence per yard. On the other hand, another dredger, working 2605 hours, lifted only 26,720 cubic yards of hard gravel and boulder clay, at the cost of 20·8 pence per cubic yard, which was deposited on the alveus of the river at the cost of 17·46 pence per cubic yard; another, working 1831¾ hours, lifted 122,664 cubic yards of silt, sand, and sewage deposit, at the cost of 5·67 pence per cubic yard, which was deposited on land at the cost of 16·40 pence per cubic yard; and another, working 2233 hours, lifted 65,160 cubic yards of till, gravel, and sand, at the cost of 5·89 pence per cubic yard, which was deposited on the alveus of the river at the cost of 9·83 pence per cubic yard.

The total quantity dredged from the river during the twenty-seven years prior to 1872 amounts to 13,617,000 cubic yards, or upwards of 17,000,000 tons. The dredging plant of the Clyde Trust comprises—

6 steam dredges,
14 steam hopper barges,
1 steam-tug,
3 diving-bells,
270 punts, and numerous small boats.

The expenditure for wages of crews, coal, and stores amounted in the year 1871 to fully £14,000, and for repairs £10,775. The value of the dredging plant employed is about £140,000.

Mr Deas has also kindly furnished the following tables, from which the reader will see the gradual increase that has been made on the size of the dredging machines to meet the increased depth of water and growing necessity of increased accommodation for the larger class of vessels which now frequent the river :—

General Dimensions of Dredgers employed on the Clyde in 1872.

No.	Year built.	Length.	Breadth.	Depth.	H.P.	Greatest depth can dredge in.	Single or double bucket ladder.	Remarks.
		Ft. in.	Ft. in.	Ft. in.		Ft.		
1	1851	99 9	32 4	10 0	40	22½	Double	Punt-loading Machine.
5	1841	95 6	22 6	10 4	24	18	Single	Do. Do.
6	1855	121 0	33 6	10 0	40	25	Double	Hopper Barge Do.
7	1860	108 6	23 6	9 0	25	25	Single	Punt Do.
8	1865	161 0	29 0	10 0	75	28	Do.	Hopper Barge Do.
9	1871	161 0	29 0	10 0	75	30	Do.	Do. Do.

The following are the details as regards the dredgers and barges employed on the Clyde:—

No. 8 *Dredger.*

Length, 161 ft.
Breadth moulded, 29 ft.
Depth, 10 feet
Engine, 75 horse power. Cylinder, 48 in. diameter. Stroke, 5 ft.
One bucket ladder, 90 ft. 9 in. between centres.
Size of buckets, 3 ft. 3 in. × 2 ft. 5 in. × 1 ft. 11 in.
When working in sand, can lift 190 cubic yards per hour.
Greatest depth can dredge in, 28 feet.
Working draught, 6 to 7 feet.
Wages per day of 10 hours as under :—

Master	7s. 0d.
Mate	3 9
Engineer	6 8
Fireman	3 8
Assistant do. and cook	3 4
Bow crabman	3 4
Stern crabman	3 4
Deck hands (3), each	3 2
" one at	3 0
Watchman	3 0
Coals	65 cwt.
Tallow	2 lb.
Oil (Lard)	16 gills.
Waste	1¼ lb

Steam Hopper Barge.

Length, 145 ft.
Breadth moulded, 25 ft.
Depth, 11 ft. 9 in.
Engines, 40 horse power.
Draught light (average), 5 ft. 6 in.
Draught loaded, 11 ft.
Speed, 8 to 9 miles per hour.
Capacity of hopper, 320 cubic yards, or say 400 tons
Average distance run, loaded, 20 miles.
Wages per day as under :—

Master	7s. 0d.
Mate	4 6
Engineer	5 10
Fireman	3 6
Deck hands (3), each	3 4
Coals per day of 10 hours	70 cwts.
Tallow " "	5 lb.
Oil " "	20 gills.
Waste " "	2 lb.

Quantity and cost of dredging done by No. 8 Dredger during year ending 30th June 1871 :—

Wages	£878	0	0
Coals	371	18	3
Stores	182	7	1
	£1432	5	4
Repairs	1469	6	11
	£2901	12	3
Interest and depreciation—cost of dredger, £17,653, at 10 per cent	1765	6	0
	£4,666	18	3

Time worked during year, 2419¾ engine hours.
Sand, silt, till, and gravel lifted, 430,240 cubic yards.

$\frac{430,240}{2419\frac{3}{4}\text{ hours}}$ = 177·80 cubic yards lifted per hour.

$\frac{£4666,\ 18s.\ 3d.}{430,240\text{ cubic yards}}$ = 2·60 pence cost per cubic yard lifted.

Quantity and cost of conveying and discharging the total dredgings lifted by Nos. 6 and 8 Dredgers during the year ending 30th June 1871 :—

Wages, coals, and stores	£6,917	0	5	
Repairs	3,255	7	9	
				£10,172 8 2
Interest and depreciation—cost of 10 hopper barges, £51,510, at 10 per cent				5,151 0 0
				£15,323 8 2

$\frac{£15,323,\ 8s.\ 2d.}{673,240\text{ cubic yards, total dredgings conveyed.}}$ = 5·46 pence cost per cubic yard.

Note.—Four hopper barges are required to keep one dredger in constant work.

Abstract of the Quantity and Cost per Cubic yard of Dredging and Depositing during the year ending 30th June 1871.

Dredger, etc.	Nature of stuff, and where dredged generally.	Total cubic yards lifted.	Cubic yards lifted per engine-hour.	Pence per cubic yard. Dredging.	Conveying and depositing by barges.	Towing punts to and from ground.	Discharging dredgers from punts.	Punts, boats, &c., used.	Total Cost.
No. 1 Dredger	Sand, silt, and sewage from Glasgow harbour.	122,664	66·96	5·67	...		2·68	10·00 [1]	3·52	22·07
No. 5 Dredger	Hard till, gravel, and sand, from Erskine Ferry, &c.	65,160	29·18	5·89	...		1·76	5·42 [2]	2·65	15·72
No. 6 Dredger	Sand, clay, and mud, from Ft. Glasgow, &c.	243,000	83·19	3·26	5·46		...	...	...	8·82
No. 7 Dredger	Hard till and clay from Erskine Ferry, Elderslie, &c.	26,720	10·26	20·81	...		2·34	5·42 [2]	9·70	38·27
No. 8 Dredger	Sand, silt, till, and gravel, from Glasgow and Bowling harbours, &c.	430,240	177·80	2·60	5·46		...	...	...	8·06
10 Hopper barges	...	...	...	...	average 5·46					
Tug steamer	...	...	...	...	...		average 2·83			

Nos. 1, 5, and 7 are punt-loading machines. Nos. 6 and 8 are hopper barge machines.

Reference is made to the following works :—*Ency. of Civil Engineering*, by Edward Cressy, London, 1847; "The Dredging Machine," Weale's *Quarterly Papers*, 1., London 1843; *The Improvement of the Port of London*, by R. Dodd, Engineer, 1798; "Account of Blasting on the Severn," by George Edwards, C.E., *Minutes of Proceedings of the Institution of Civil Engineers*, vol. iv. p. 361; "the River Clyde," by James Deas, C.E., *Minutes of Proceedings of the Institution of Civil Engineers*, vol. xxxvi. p. 124; *Principles and Practice of Canal and River Engineering*, by David Stevenson, 2d ed., A. & C. Black, Edinb. 1872, p. 126. (D. S.)

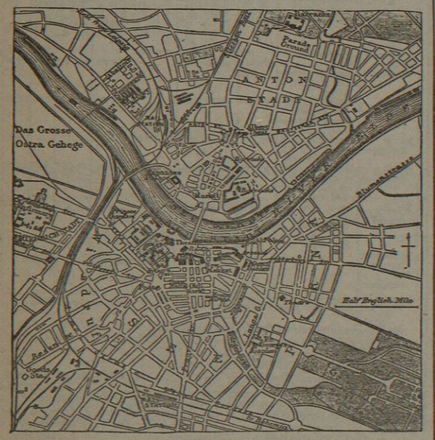
DRELINCOURT, CHARLES (1595–1669), an eminent minister of the French Calvinistic church, was born at Sedan on the 10th July 1595. He studied first at the university of his native town, and afterwards at Saumur under the celebrated Professor Mark Duncan. In June 1618 he undertook the charge of the French Protestant church at Langres, where his ministrations were highly appreciated. The church, however, failed to receive the necessary royal sanction, and early in 1620 Drelincourt

[1] Contractor's price for discharging at Blythswood Park, *including slip docks, and waggoning a distance of about ¼ mile.*

[2] Discharging by Trustees' men on river banks near Erskine Ferry, *beaching punts and wheeling.*

removed to Paris, where he was ordained minister of the church at Charenton. He was a popular and eloquent preacher, distinguished especially by his power of practically applying the words of Scripture. He was the author of a large number of works in devotional and polemical theology, several of which had great influence, and attained a very extensive circulation. His *Catechism* and his *Consolations against the Fear of Death* (*Consolations contre les frayeurs de la mort*) became well known in England by means of translations, which were very frequently reprinted. It has been said that Defoe wrote his fiction of Mrs Veal, who came from the other world to recommend the perusal of Drelincourt on death, for the express purpose of promoting the sale of an English translation of the work. His controversial works were very numerous. Directed entirely against Roman Catholicism, they did much to strengthen and consolidate the Protestant party in France. Drelincourt died on the 3d November 1669. In 1625 he had married the only daughter of a wealthy merchant, by whom he had a family of sixteen. Several of his sons were distinguished as theologians or physicians. The third, Charles, was professor of physic at the university of Leyden, and physician to the prince of Orange; the sixth, Peter, was ordained a priest in the Church of England, and became dean of Armagh.

DRESDEN, the capital of the kingdom of Saxony, is situated in a beautiful and richly cultivated valley on both sides of the Elbe, at an altitude of 402 feet above the level



Plan of Dresden.

of the Baltic, 72 miles E.S.E. of Leipsic, and 116 miles S.E. of Berlin, in 51° 3′ N. lat. and 13° 44′ E. long. It is approached on almost every side through avenues of trees, and the distance is bounded by gentle eminences covered with plantations and vineyards. On the left bank of the Elbe are the Altstadt, with three suburbs, and Friedrichstadt (separated from the Altstadt by the Weisseritz, a small affluent of the Elbe); on the right the Neustadt and Antonstadt. Two fine brdges connect the Alstadt and Neustadt,—one of them, the old bridge, erected 1727–31, being 1420 feet long, and having 16 arches. The other, built 1846–52, unites the railways on the right and left banks. The streets of the Altstadt are narrow and somewhat gloomy; those of the Neustadt wider and more regular. In 1875 there were 196,378 inhabitants, of whom 138,306 were on the left bank, 58,072 on the right. The vast majority of the population belong to the Lutheran Church.

On account of its delightful situation, and the many objects of interest it contains, Dresden is often called "the German Florence," a name first applied to it by Herder. The most imposing of the churches is the church of Our Lady, built 1726–45, with a cupola 311 feet high. The Roman Catholic church, built 1737–56, contains a magnificent organ by Silbermann, a number of statues by Mattielli, and pictures by Raphael Mengs, Sylvestre, and other artists. The church of St Sophia, begun in the 14th century, completed in the 16th, and restored in 1864–69, the Cross Church, the Russian church, and the synagogue are also noteworthy buildings. The Royal Palace, rebuilt in 1534 by Duke George, surmounted by a tower 387 feet high, the highest in Dresden, is externally unattractive, but the interior is splendidly decorated. In the palace chapel are pictures by Rembrandt, Nicolas Poussin, Guido Reni, and Annibale Caracci. The Prince's Palace, built in 1715, has a fine chapel, in which are various works of Torelli; it has also a library of 20,000 volumes. The Zwinger, begun in 1711, and built in the Rococo style, forms an inclosure within which is a statue of King Frederick Augustus I. It was intended to be the vestibule to a palace, but now contains a number of collections of great value. Until 1846 it was open at the north side; but this space has since been occupied by the Museum, a beautiful building in the Renaissance style, the exterior of which is adorned by statues of Michelangelo, Raphael, Giotto, Dante, Goethe, and other artists and poets, by Rietschel and Hähnel. The Brühl Palace was built in 1737 by Count Brühl, the minister of Augustus II. Near it is the Brühl Terrace, approached by a grand flight of steps, on which are groups, by Schilling, representing Morning, Evening, Day, and Night. The terrace commands a charming view of the Elbe and the surrounding country, and is a favourite promenade. The Japanese Palace, in the Neustadt, built in 1715 as a summer residence for Augustus II., receives its name from certain Oriental figures with which it is decorated; it is also sometimes called the Augusteum. Connected with it is a public garden, from which, as from the Brühl Terrace, fine views are obtained. Among the remaining buildings of note may be named the guard-house, the arsenal, and the court theatre, an edifice in the Renaissance style, built since 1871 to replace the theatre burnt in 1869. In the Neustadt there is an equestrian statue of Augustus the Strong, erected in 1737. The public monuments of Dresden also include the Maurice Monument, a relief dedicated by the elector Augustus to the memory of his brother; a statue of Weber, the musical composer, by Rietschel; statues of King Frederick Augustus II. and Theodor Körner, by Hähnel; and the Rietschel monument, on the Brühl Terrace, by Schilling.

The chief pleasure-ground of Dresden is the Grosser Garten, in which there are a summer theatre, the Rietschel Museum, and a château containing the Museum of Antiquities. The latter is composed chiefly of objects removed from the churches in consequence of the Reformation. Near the château is the zoological garden, formed in 1860, and excellently arranged. A little to the south of Dresden, on the left bank of the Elbe, is the village Räcknitz, in which is Moreau's monument, erected on the spot where he was fatally wounded in 1813. The mountains of Saxon Switzerland are seen from this neighbourhood. On the right bank, the slopes of which are covered

with villas, there are several popular places of public resort.

Dresden owes a large part of its fame to its extensive artistic, literary, and scientific collections. Of these the most valuable is its splendid picture gallery, founded by Augustus I. and increased by his successors at great cost. It is in the Museum, and contains about 2500 pictures, being especially rich in specimens of the Italian, Dutch, and Flemish schools. Among the Italian masters represented are Raphael, Titian, Correggio, Leonardo da Vinci, Paolo Veronese, Andrea del Sarto, Giulio Romano, Annibale Caracci, Guido Reni, and Carlo Dolci. Of the Flemish and Dutch schools there are paintings by Rubens, Vandyck, Rembrandt, and Ruysdael, Wouvermann, Dow, Teniers, Ostade, Potter, &c. The French school is represented, among others, by Poussin and Claude. The gem of the collection is Raphael's Madonna di San Sisto, for which a room is set apart. There is also a special room for the Madonna of the younger Holbein. Other paintings with which the name of the gallery is generally associated are Coreggio's La Notte and Mary Magdalene; Titian's Tribute Money and Venus; The Adoration and The Marriage in Cana, by Paolo Veronese; Andrea del Sarto's Abraham's Sacrifice; Rembrandt's Portrait of Himself with his Wife sitting on his Knee; The Judgment of Paris and The Boar Hunt, by Rubens; Vandyck's Charles I., his Queen, and their Children. In separate compartments there are a number of crayon portraits, most of them by Rosalba Carriera, and views of Dresden by Canaletto and other artists. Besides the picture gallery the Museum includes a magnificent collection of engravings and drawings. There are upwards of 350,000 specimens, arranged in twelve classes, so as to mark the great epochs in the history of art. A collection of casts, likewise in the Museum, is designed to display the progress of plastic art from the timeof the Egyptians and Assyrians to modern ages. This collection was begun by Raphael Mengs, who secured casts of the most valuable antiques in Italy, some of which no longer exist.

The Japanese Palace contains a public library of more than 300,000 volumes, with about 3000 MSS. and 20,000 maps. This library is especially rich in the ancient classics, and in works bearing on literary history and the history of Germany, Poland, and France. In the Japanese Palace there are also a valuable cabinet of coins and a collection of ancient works of art. A collection of porcelain, formerly in the Japanese Palace, but since 1876 in the "Museum Johanneum" (which once contained the picture gallery), is made up of specimens of Chinese, Japanese, East Indian, Sèvres, and Meissen manufacture, carefully arranged in chronological order. There is in the same building an excellent Historical Museum, in which there are many interesting relics of past times, besides objects which cast light on the history of races and of manners. In the Green Vault of the Royal Palace, so called from the character of its original decorations, there is an unequalled collection of precious stones, pearls, and works of art in gold, silver, amber, and ivory. The objects, which are about 3000 in number, are arranged in eight rooms. They include the regalia of Augustus II. as king of Poland; the electoral sword of Saxony; a group by Dinglinger, in gold and enamel, representing the court of the Grand Mogul Aurungzebe, and consisting of 132 figures upon a plate of silver 4 feet 4 inches square; the largest onyx known, 6⅝ inches by 2¼ inches; a pearl representing the dwarf of Charles II. of Spain; and a green brilliant weighing 40 carats. Besides the Green Vault the Royal Palace has a gallery of arms, consisting of more than 2000 weapons of artistic or historical value. In the Zwinger are the Zoological and Mineralogical Museums, and a collection of instruments used in mathematical and physical science.

The two chief art institutions in Dresden are the Royal Academy of Arts, founded in 1764, and the Royal Choir. The Art Union, founded in 1828, which has a permanent exhibition in the Brühl Terrace, is a private body; and there are a good many other private art societies more or less distinguished. Dresden is also the seat of a number of well-known scientific associations. The educational institutions of the town are both numerous and of a high order, including a technical college with a staff (in 1876) of 39 professors and teachers, three gymnasia, two real schools of the first class, and many schools of different ranks for popular education. The Catholics and Jews have schools of their own; and there are two seminaries for the education of teachers. Dresden has several important hospitals, asylums, and other charitable institutions.

Among the chief branches of industry are manufactures in gold and silver, turnery, straw plait, scientific and musical instruments, paper-hangings, artificial flowers, and painters' canvas. There are several large breweries; a considerable corn trade is carried on; and there is an extensive traffic in books and objects of art. A number of steam-ship companies provide for the navigation of the Elbe.

Dresden, which is known to have existed in 1206, is of Slavonic origin. It became the capital of Henry the Illustrious, margrave of Meissen, in 1270, but belonged for some time after his death, first to Wenceslas of Bohemia, and next to the margrave of Brandenburg. Early in the fourteenth century it was restored to the margrave of Meissen. On the division of the territory in 1485, it fell to the Albertine line, which has since held it. Having been burned almost to the ground in 1491, it was rebuilt; and in the 16th century the fortifications were begun and gradually extended. John George II., in the 17th century, formed the Grosser Garten, and otherwise greatly improved the town; but it was in the first half of the 18th century, under Augustus I. and Augustus II., who were kings of Poland as well as electors of Saxony, that Dresden assumed something like its present appearance. The Neustadt, which had been burned down in the 17th century, was founded anew by Augustus I.; he also founded Friedrichstadt. The town suffered severely during the Seven Years' War, being bombarded in 1760. Some damage was also inflicted on it in 1813, when Napoleon made it the centre of his operations; one of the buttresses and two arches of the old bridge were then blown up. The dismantling of the fortifications had been begun by the French in 1810, and was gradually completed after 1817, the space occupied by them being appropriated to gardens and promenades. Many buildings were completed or founded by King Anton, from whom Antonstadt derives its name. Dresden again suffered severely during the revolution of 1849, but all traces of the disturbances which then took place were soon effaced. In 1866 it was occupied by the Prussians, who did not finally evacuate it until the spring of the following year. Since that time numerous improvements have been carried out, and between 1871 and 1875 the population increased at the rate of rather more than 11 per cent. (J. SI.)

DREUX (*Durocassis*, *Drocæ*), a town of France in the department of Eure-et-Loir, on the Blaise, 21 miles north of Chartres. Noteworthy structures are the Gothic church of St Pierre; the town-house, partly in the Gothic and partly in the Renaissance style, built in the 16th century; and the remains of a castle of the 12th century, situated on the hill overlooking the town, within the inclosure of which is a chapel commenced in 1816 by the dowager duchess of Orleans, and completed and adorned at great cost by Louis Philippe. The chief industries of Dreux are dyeing and silk-weaving, and the manufacture of jewellery, serges, hosiery, candles, hats, and leather. In 1872 the population of the commune was 7418, of the town 6666.

Dreux was governed by counts in the Middle Ages. In 1188 it was taken and burnt by the English; and in 1562 Coligni and the prince of Condé were defeated in its vicinity by Montmorency. In 1593 Henry IV. captured the town after a fortnight's siege. Dreux was occupied by the Germans on October 9th, 1870, was subsequently evacuated, and was again taken, on November 17th, by General Von Tresckow.

DREW, SAMUEL (1765–1833), theologian, was born in the parish of St Austell, in Cornwall, March 3, 1765. His

father was a poor farm-labourer, and could not afford to send him to school long enough even to learn to read and write. At the age of seven he lost his mother, a woman of superior mind and religious character; and he was then sent to work with the tinners. At ten he was apprenticed to a shoemaker, and at twenty he settled in the town of St Austell, first as manager for a shoemaker; and about three years later he began business on his own account. He had already gained a reputation in his narrow circle as a keen debater and a jovial companion. He was first aroused to serious thought by the preaching of Adam Clarke; and the impression thus produced was deepened by the death of his elder brother. He now joined the Methodists, was soon employed as a class leader and local preacher, and continued to preach till a few months before his death. His opportunities of gaining knowledge were very scanty, but he strenuously set himself to make the most of them. It is stated that an accidental introduction to Locke's great essay determined the ultimate direction of his studies. In 1798 the first part of Paine's *Age of Reason* was put into his hands; and in the following year he made his first appearance as an author by publishing his *Remarks* on that work. The book was favourably received, and was re-published in 1820. Drew had begun to meditate a greater attempt before he wrote his *Remarks on Paine;* and the fruits of his laborious investigation were given to the world in the *Essay on the Immateriality and Immortality of the Soul*, in 1802. This work made him widely known, and for some time it held a high place in the judgment of the religious world as a powerful and conclusive argument on its subject. A fifth edition appeared in 1831. Drew continued to work at his trade till 1805, when he entered into an engagement which enabled him to devote himself entirely to literature. In 1809 he published his *Essay on the Identity and General Resurrection of the Human Body*, perhaps the most original of his works, which reached a second edition in 1822. In 1819 Drew removed to Liverpool, on being appointed editor of the *Imperial Magazine*, then newly established, and in 1821 to London, the business being then transferred to the capital. Here he filled the post of editor till his death, and had also the supervision of all works issued from the Caxton press. He was an unsuccessful competitor for a prize offered in 1811 for an essay on the existence and attributes of God. The work which he then wrote, and which in his own judgment was his best, was published in 1820, under the title of *An Attempt to demonstrate from Reason and Revelation the Necessary Existence, Essential Perfections, and Superintending Providence of an Eternal Being, who is the Creator, the Supporter, and the Governor of all Things* (2 vols. 8vo). This procured him the degree of M.A. from the university of Aberdeen. Among Drew's lesser writings are a *Life of Dr Thomas Coke* (1817), a *History of Cornwall* (1824), and a work on the divinity of Christ (1813). He died at Helston, in Cornwall, March 29, 1833. A memoir of his life by his eldest son appeared in 1834.

DREYSE, Johann Nicholas von (1787–1867), inventor of the needle-gun, was the son of a locksmith, and was born at Sömmerda the 20th November 1787. He served his apprenticeship in the shop of his father, and from 1806 to 1809 followed his calling at Altenburg and Dresden. From 1809 to 1814 he was in Paris, where he succeeded in finding employment in the gun-factory of the Swiss officer Pauli, patronized by Napoleon I. Afterwards he returned to Sömmerda, where, in partnership with Kronbiegel, he established a factory for the making of articles in iron by machine tools. In 1824 he patented a new percussion action for the gun, and continued thereafter to busy himself with experiments to improve in every way possible the process of shooting. In 1827 he invented the needle-gun, but without the advantage of breech-loading; and in 1836, having been encouraged in his endeavours by the Prussian Government, he invented his first complete needle-gun. A gunnery was opened by him in 1841, which ultimately supplied weapons for the troops of all the German states, and before his death employed about 1500 persons. In 1864 he and his family had the rank of nobility conferred on them. He died 9th December 1867.

DRIFFIELD (or Great Driffield, to distinguish it from the neighbouring hamlet of Little Driffield), a market-town of England, in the east riding of Yorkshire, 28 miles to the east of York, and 196 miles from London by road. The town—consisting of one principal street, from which some smaller ones diverge—is agreeably situated at the foot of the Wolds, and is connected with the port of Hull by a navigable canal. It stands in the centre of a fertile agricultural district. An important corn and cattle market is held in the town every Thursday, and there are four large stock-fairs annually at Little Driffield. Besides the parish church, a fine old edifice in different styles, the principal public buildings in Great Driffield are the places of worship for Independents, Methodists, and Baptists, the corn exchange, the dispensary, the mechanics' institute, and the station of the Hull and Scarborough railway. Carpets, cotton, and chemical manure are manufactured in the town; and in the neighbourhood are numerous flour-mills and mills for bone-crushing. Population in 1871, 8364.

DROGHEDA, a seaport, market-town, and municipal and parliamentary borough of Ireland, in the province of Leinster, about 4 miles from the mouth of the Boyne, and 31½ miles north of Dublin by rail. Though situated on the borders of Louth and Meath, it belongs to neither, as the town and surrounding district constitute a county of a city, with an area of 9 square miles, or 5780 acres. It occupies both banks of the river; but the northern division is the larger of the two, and has received greater attention in modern times. The ancient fortifications, still extant in the beginning of the century, have almost completely disappeared; but of the four gateways, one named after St Lawrence remains comparatively perfect, and there are considerable ruins of another. Great improvements have been effected in the town since 1840, under the encouragement bestowed by Benjamin Whitworth, M.P., who built a town-hall at his own expense in 1865, and furnished half the funds necessary for the construction of the water-works which now supply 800,000 gals. daily. Among the public buildings are a mansion-house or mayoralty, with a suite of assembly rooms attached; the "Tholsel," a square building with a cupola; a corn-market, the old linen-hall, an infirmary, a workhouse, and a prison; five Protestant churches, five Roman Catholic chapels, three friaries, and four nunneries. St Peter's Chapel formerly served as the cathedral of the Roman Catholic archbishopric of Armagh; and in the abbey of the Dominican nuns there is still preserved the head of Oliver Plunkett, the archbishop who was executed at Tyburn in 1681 on an unfounded charge of treason. There was at one time an archiepiscopal palace in the town, built by Archbishop Hampton about 1620; and the Dominicans, the Franciscans, the Augustinians, the Carmelites, and the knights of St John had monastic establishments. Of the Dominican buildings there still exists the stately Magdalen tower; the Franciscan friary is a striking ruin; and there are traces more or less distinct of the Augustinian priory, the priory of St Lawrence, and the hospital of St Mary. At the head of the educational institutions is a classical school endowed by Erasmus Smith; and among the public charities are an almshouse for twenty-four aged widows, and a foundation providing houses and annuities for thirty-six clergymen's widows. There is also a blue-coat school, founded about

1727 for the education of freemen's sons. The present building was erected by T. P. Cairnes in 1870. The industrial establishments comprise a large cotton factory, erected by Mr Whitworth in 1864, four extensive saw-mills, three flax-mills, six flour-mills, eight tanneries, five salt-works, four soap works, two extensive breweries, two newspaper offices, chemical manure works, and a large engineering factory for the making of steam-engines, iron-bridges, &c. A brisk trade is carried on, especially with Liverpool (which is distant 133 miles due east), and with Glasgow. The harbour has been greatly improved by the commissioners, and vessels of 400 tons can discharge at the quays. In 1873, 707, with a burden of 115,673 tons, entered the port; and the harbour receipts in 1871 were £3627. The tide reaches 2½ miles above the town to Oldbridge; and barges of 50 tons burden can proceed 19 miles inland to Navan. The river is crossed by a bridge for ordinary traffic, and by a splendid railway viaduct. Assizes, quarter sessions, and petty sessions are held in the town; the parliamentary borough returns one member to Parliament; and the municipal borough is governed by a mayor, 6 aldermen, and 18 councillors. The population of the municipal borough (area, 454 acres) was 17,365 in 1831, 16,845 in 1851, 14,740 in 1861, and 13,510 in 1871. The whole population, with the exception of about 1100, are Roman Catholics. The inhabitants of the parliamentary burgh, which has an area of 5785 acres, numbers 16,165.

In the earliest notices the town of Drogheda is called Inver-Colpa or the Port of Colpa; the present name signifies "The Bridge over the Ford." In 1152 the place is mentioned as the seat of a synod convened by the papal legate, Cardinal Paparo. In 1224 it was chosen by Lucas de Netterville, archbishop of Armagh, for the foundation of a Dominican friary; and in 1228 the two divisions of the town received separate incorporation from Henry III. But there grew up a strong feeling of hostility between Drogheda *versus Uriel*, and Drogheda *versus Midiam*, in consequence of trading vessels landing their cargoes in the latter or southern town, to avoid the pontage duty levied in the former or northern town. At length, after much blood had been shed in the dispute, Philip Bennett, a monk residing in the town, succeeded by his eloquence, on the festival of Corpus Christi, 1412, in persuading the authorities of the two corporations to send to Henry IV. for a new charter sanctioning their combination.

Drogheda has always been considered by the English a place of much importance. In the reign of Edward III. it was classed along with Dublin, Waterford, and Kilkenny, as one of the four staple towns of Ireland. Richard II. received in its Dominican monastery the submissions of O'Neal, O Donnell, and other chieftains of Ulster and Leinster. The right of coining money was bestowed on the town, and parliaments were several times held within its walls. In the reign of Edward IV. the mayor received a sword of state, and an annuity of £20, in recognition of the services rendered by the inhabitants at Malpus Bridge against O'Reilly; the still greater honour of having a university with the same privileges as that of Oxford remained a mere paper distinction, owing to the poverty of the town and the unsettled state of the country; and an attempt made by the corporation in modern times to resuscitate their rights proved unsuccessful. In 1495 Poyning's laws were enacted by a parliament held in the town. In the civil wars of 1641 the place was besieged by O'Neal and the Northern Irish forces; but it was gallantly defended by Sir Henry Tichbourne, and after a long blockade was relieved by the Marquis of Ormond. The same nobleman relieved it a second time, when it was invested by the Parliamentary army under Colonel Jones. In 1649 it was captured by Cromwell, after a short though spirited defence; and nearly every individual within its walls, without distinction of age or sex, was put to the sword. Thirty only escaped, who were afterwards transported as slaves to Barbados. In 1690 it was garrisoned by King James's army; but after the decisive battle of the Boyne,—the site of which, about 2½ miles to the west, is marked by an obelisk 150 high,—it surrendered to the conqueror without a struggle, in consequence of a threat that quarter would not be granted if the town were taken by storm. Its subsequent history is purely of local interest.

DROHOBYCZ, a town of Austria, in the Galician circle of Sambor, on the Tysminika, a right-hand affluent of the Dniester, at the junction of a branch line from Borysla with the main Galician railway. It possesses a castle, a beautiful Roman Catholic church, a synagogue, and a German high school; and its inhabitants, who number upwards of 12,000, deal in cattle, grain, earthenware, leather, and salt,—the last being obtained from the local brine-wells.

DROITWICH, a municipal and a parliamentary borough of England, in Worcestershire, on the Salwarpe, a left-hand tributary of the Severn, about seven miles by rail N.N.E. of Worcester. With the exception of its modern extensions, the town is built in a straggling and irregular fashion, but it numbers among its public edifices a court-chamber and market-house, two churches—St Andrew's and St Peter's—several chapels, and a hospital established by Lord Keeper Coventry, the revenues of which maintain about forty men and women, and educate about 100 young persons of both sexes. The principal occupation is the manufacture of the salt obtained from the brine springs, or *wyches*, to which the town probably owes both its name and its origin; and the annual quantity obtained is about 116,000 tons. These springs were known to the Romans, who had a station on the spot, as was shown by the remains of a villa, with some interesting and valuable relics, discovered during the formation of the Oxford and Wolverhampton railway. In Domesday-book mention is made of a tax levied on the salt, which must consequently have been manufactured in the 11th century. A charter was bestowed on Droitwich by King John. The population of the municipal borough, with its area of 1849 acres, was 3504 in 1871; that of the parliamentary borough, with its area of 27,577 acres, was 9510.

DRÔME, a department in the south-east of France, formed of parts of Dauphiné and Provence, is bounded W. by the Rhone, which separates it from Ardèche, N. and N.E. by Isère, E. by Hautes Alpes, S.E. by Basses-Alpes, and S. by Vaucluse, and lies between 44° 8′ and 45° 20′ 25″ N. lat. and 4° 41′ and 5° 55′ E. long. To the east it is covered by spurs of the maritime Alps, one of the largest of which forms part of its eastern boundary, and throws off ridges, mostly wooded, that run east and west with tolerable regularity. These ridges divide the department in its whole extent into three great valleys, having a general slope westwards to the Rhone, namely, that of the Isère in the north, that of the Drôme, which occupies the central portion of the province, and that of the Aygues, in the south. The Rhone and Isère are both navigable. The former receives the whole of the drainage of the department. The soil consists of clays and argillaceous sand with rolled pebbles. Irrigation canals are numerous, and are skilfully managed. The climate, except in the valleys bordering the Rhone, is rather cold, but on the whole bracing and healthy. Snow is visible on the mountain-tops during the greater part of the year. The principal forest-trees are the pine, beech, and oak. In the valleys flourish the olive, chestnut, vine, almond, mulberry, nut, and other fruit trees, and wheat and madder are grown. Black truffles are abundant. Besides agriculture the principal industries are the rearing of silk-worms and sheep, and the manufacture of wines, the best of which are the red and white Ermitage, of woollen, cotton, and dyed linen goods, spun and woven silk, paper, oil, ropes, earthenware, and leather. The wool and wood trades are considerable. The mineral products include iron, copper, lead, lignite, marble, granite, black and red potter's clay, millstones, chalk, and cement-stone. Drôme is divided into the arrondissements of Valence, Die, Montélimart, and Nyons, comprising 29 cantons and 366 communes. The capital is Valence. Of the total area of 652,155 hectares (1,610,823 acres) about 514,227 acres are arable, 415,866 under wood, 329,961 heath, 58,430 vineyards, and 49,203 meadow. The population in 1872 was 320,417.

DROMEDARY. See Camel, vol. v. p. 737.