source and its mouth in the English Channel the air distance is only 250 miles, but that actually traversed (through the departments of Côte-d’Or, Aube, Seine-et-Marne, Seine-et- Oise, Seine, Eure, and Seine-Inférieure) is 482. Though shorter than the Loire and inferior in volume to the streams of the Rhone system when these are at their fullest, the Seine derives an exceptional importance from the regularity of its flow. This feature is due to the geological character of its basin, an area of 19,400,000 acres, entirely belonging to France (with the exception of a few communes in Belgium), and formed in three-fourths of its extent of per­meable strata, which absorb the atmospheric precipitation to restore it gently to the river by perennial springs. It is believed that the Seine never attains a volume so high as 90,000 cubic feet per second. At Paris its average per second is 9000, and after it has received all its tributaries it ranges between 24,000 and 25,000 cubic feet. At Paris it falls as low as 2650 cubic feet and in exceptional droughts the figure of 1200 has been reached. During the flood of 1876, which lasted fifty-five days, the volume between the quays at Paris rose to 58,600 cubic feet per second.

Rising at a height of 1545 feet above sea-level, at the base of the statue of a nymph erected on the spot by the city of Paris, the Seine is at first such an insignificant streamlet that it is often dry in summer as far as to Chatillon (722 feet). At Bar (531 feet) its waters feed the Haute-Seine Canal, so that there is uninterrupted navigation from this point to the sea (395 miles). At Troyes it has descended to 331 feet. It next passes Méry, and at Marcilly receives the Aube (right), from which point it becomes navigable ; here it is deflected in a south-westerly direction by the heights of La Brie, the base of which it skirts past Nogent and Montereau, at the latter point receiving the Yonne, its most important left-hand tributary. It then resumes its general north-westerly direction, receiving the Loing (left) at Moret, then passing Melun (121 feet), being joined at Corbeil by the Essonne (left), and after its junction with the Marne (right), a tributary longer than itself by 31 miles, reaches Paris. From this point to the sea its channel has been so deepened by recent works that vessels of 9 to 10 feet draught can reach the capital. The river then winds through a pleasant cham­paign country past St Cloud, St Denis, Argenteuil, St Germain, Conflans (where it is joined from the right by the Oise, 56 feet above the sea), Poissy, Mantes, Les Andelys, and Poses, where the tide first begins to be perceptible. It next receives the Eure (left), and passes Pont de l’Arche, Elbeuf, and Rouen, where the sea naviga­tion commences. The river has been dyked to Rouen so as to admit vessels of 20 feet draught, and large areas have thus been reclaimed for cultivation. @@1 At every tide there is a “bore” *(barre* or *mas*­*caret),* ranging usually from 8 to 10 feet. Between Rouen and the sea there are numerous windings, as in the neighbourhood of Paris ; after Caudebec and Quillebœuf (where the Rille is received from the left) the estuary begins, set with extensive sandbanks, between which flows a narrow navigable channel. At Tancarville (right) is the commencement of a canal to enable river boats for Havre to avoid the sea passage. The river finally falls into the English Channel between Honfleur on the left and Havre on the right. The Marne brings to the Seine the waters of the Ornain, the Ourcq, and the Morin ; the Oise those of the Aisne ; the Yonne those of the Arman­çon. The low elevation of the bounding hills has rendered it com­paratively easy to connect the Seine and its affluents with adjoining river basins by means of canals. The Oise and Somme are connected by the Picardy or Crozat Canal, which in turn is continued to the Scheldt by means of the St Quentin Canal and the Oise, and to the Sambre by that of Oise and Sambre. Between the Aisne and the Meuse is the Ardennes Canal, and the Aisne and the Marne are united by a canal which passes Rheims. The Marne has similar communica­tion with the Meuse and the Rhine, the Yonne with the Saône (by the Burgundy Canal) and with the Loire (by that of Nivernais). The Seine itself is connected with the Loire by the Loing Canal dividing at Montargis into two branches,—those of Orleans and Briare.

SEINE, the department of France which has Paris as its chief town, was formed in 1790 of part of the pro­vince of Île-de-France. It lies between 48° 44' and 48° 58' N. lat. and 2° 10' and 2° 34' E. long. and is entirely surrounded by the department of Seine-et-Oise, from which it is separated at certain parts by the Seine, the Marne, and the Bièvre. The area of the department is only 118,306

acres, and of this surface a seventh or a sixth is occupied by Paris ; the suburban villages also are close together and very populous. In actual population (2,799,329 in 1881) as well as in density (23·7 persons per acre) it holds the first place. Flowing from south-east to north-west through the department, the Seine forms three links : on the right it receives above Paris the Marne, and below Paris the Rouillon, and on the left hand the Bièvre within the pre­cincts of the city. The left bank of the Seine is in general higher than the right and consists of the Villejuif and Chatillon plateaus separated by the Bièvre ; the highest point (568 feet) is above Chatillon and the lowest (105) at the exit of the Seine. Below Paris the river flows be­tween the plain of Gennevilliers and Nanterre (commanded by Mont Valérien) on the left and the plain of St Denis on the right. On the right side, to the east of Paris, are the heights of Avron and Vincennes commanding the course of the Marne. Communication is further facilitated by various canals (see Paris).

Market gardens occupy about 3700 acres within and without the city, and by means of irrigation and manuring are made to yield from ten to eleven crops per annum (see Paris). Some districts are specially celebrated,—Montreuil for its peaches, Fontenay-aux- Roses for its strawberries and roses, and other places for flowers and nurseries. The department produced in 1883 326,326 bushels of wheat, 4042 of meslin, 75,003 of rye, 3415 of barley, 337,837 of oats, 1,656,009 of potatoes, 14,650 of pulse, and 15,400 tons of beetroot. Altogether, 60,000 persons are engaged in agriculture. The live stock in 1881 comprised 95,796 horses (70,296 in Paris), 4174 cattle, 280 calves, 8159 sheep, 3626 pigs, and 660 goats. Vineyards, producing 366,748 gallons of wine annually, cover 2460 acres. The principal woods (Boulogne and Vincennes) belong to Paris. It is partly owing to the number of quarries in the district that Paris owes its origin : Chatillon and Montrouge in the south yield freestone, and Bagneux and Clamait in the south and Montreuil and Romainville in the east possess the richest plaster quarries in France. Within the circuit of Paris are certain old quarries now forming the cata­combs. Most of the industrial establishments in the department are situated in Paris or at St Denis. Pantin (17,857 inhabitants in 1881) on the Ourcq Canal is the seat of a national factory of tobacco, and also of glass-works, and Aubervilliers (19,437) on the St Denis Canal is the seat of great chemical works. Along the Seine, below Paris, Boulogne (25,615) is partly occupied by laundry establish­ments ; Puteaux (15,586) manufactures woollen goods, and has dye- works, printing works, cloth-dressing works, and engineering works of considerable importance ; Clichy (24,320) manufactures crystal and has a large gaswork, &c. Above Paris, Ivry (18,442) has iron-works and engineering works; Choisy-le-Roi (6978) has factories for the making of porcelain, glass, soda, chemicals, morocco, and waxcloth ; Montreuil (18,693), near Vincennes, makes patent leather, porcelain, &c. The department is of course traversed by all the railway lines which converge in Paris, and also contains the inner circuit railway and part of the outer circuit,—making a total of 122 miles of railway, to which are to be added numerous tram­ways, 72 miles of national roads, and 458 of other roads. There are 3 arrondissements (Paris, St Denis, and Sceaux), 28 cantons (20 in Paris), and 72 communes. The department forms the archi­episcopal diocese of Paris, falls within the jurisdiction of the Paris court of appeal, and is divided between the four *corps d’armée* of Amiens, Rouen, Le Mans, and Orleans. Among the important in­stitutions in the department are the lyceums of Vanves and Sceaux, the lunatic asylum at Charenton, the veterinary college of Maisons- Alfort, and the great Bicêtre hospital at Gentilly.

SEINE-ET-MARNE, a department of northern France, was formed in 1790 of almost the entire district of Brie (half of which belonged to Champagne and half to Île-de- France) and a portion of Gâtinais (from Ile-de-France and Orléanais). Lying between 48° 7' and 49° 6' N. lat. and 2° 23' and 3’ 13' E. long., it is bounded N. by the departments of Oise and Aisne, E. by Marne and Aube, S. by Yonne and Loiret, and W. by Seine-et-Oise. The whole department belongs to the basin of the Seine, and is drained partly by that river and partly by its tributaries the Yonne and the Loing from the left, and from the right the Voulzie, the Yères, and the Marne, with its affluents the Ourcq, the Petit Morin, and the Grand Morin. With the exception of the Loing, flowing from south to north, all these streams cross the department from east to west,

@@@1 Comp. River Engineering, vol. xx. p. 579 ; see also the valuable paper “The River Seine,” in *Proc. Inst. Civ. Eng.,* vol. lxxxiv., 1886, by L. F. Vernon-Harcourt.