

varied din of hammers beating, engines puffing, wheels whirring, and drills booming, so that "the air is filled with noises" of a very different kind from those that beset the ears of Caliban on his enchanted island. Plates of iron half an inch thick are punched as deftly as if they were sheets of cardboard. Plates of solid steel are planed as easily as if they were planks of wood. Everything is done with mathematical precision, yet with a speed that is marvellous.

It may be useful to repeat here some particulars regarding the statistics of the great undertaking. The total length of the bridge is 8,091 feet, or upwards of a mile and a half. The length of the main portion, from cantilever pier to cantilever pier, is 5,342 feet. The two main spans, north and south of Inchgarvie, are 1,710 feet each. In the approach viaducts there are fifteen spans—ten on the south side and five on the north—of which thirteen are spans of 168 feet each, the other two, next to the cantilever piers, being of 179 feet. The height of the rails above high water will be 150 feet. The breadth of each cantilever at base is 120 feet, at top 35 feet, and at the extremities 35 feet. The height of the cantilever columns is 350 feet. The number of men employed on the works is about 2,000. The estimated cost of the whole undertaking is £1,600,000. The work has now been in progress for two years and a half. It is expected to occupy another five years at least.—*Am. Eng.*

#### THE MESSAGERIES MARITIMES.

Although this great French steam shipping concern, in common with other important maritime enterprises, is not so prosperous now as it was a few years since, it was still enabled to give its shareholders a return upon their capital for 1884 at the rate of 5 per cent per annum. At the close of last year, the value of the company's fleet was returned at £4,769,825, showing an increase of £178,724 upon the corresponding total at the close of 1883. This increase was the result of the building of additional ships required to insure the satisfactory working of the company's varied services, and especially the due execution of the postal service undertaken between Marseilles, the Australian continent, and New Caledonia. The Yarra, a first-class steamer, built for the Australian line, was launched and equipped in the course of last year, and two cargo boats, the Cordouan and M. Dou, were also placed last year upon the list of ships in service. The Arethuse was equipped last year with a new engine, and is now employed upon the Saigon line. The Arethuse completes the list of ships engaged in the company's Cochin-China local service, the working of which was conceded to the undertaking in 1881 for a term of nine years. The vessels just mentioned, and sundry works executed to other ships still in the company's yards, represented a total capital outlay for 1884, of £260,435, which was reduced, however, by £81,711 written off capital in respect of the Euphrate and the Emirne, the hulls of which were recently sold in order to be broken up. We have stated that the whole outlay of capital made to the close of last year upon the company's fleet was £4,769,825; but we should add of this sum £2,649,317 had at the same date been written off out of revenue, so that the company's ships stood in the books December 31, 1884, for £2,160,508 and no more. The Council of Administration systematically writes 5 per cent year by year off the first cost of all vessels owned by the company, and in this way what we may term the sinking fund allocation was provided last year to the extent of £184,256, less £81,711 representing the value of the Euphrate and the Emirne, which, as we have just stated, have been sold in order that they may be broken up. The value of the stores in hand at the company's various working centres at the close of last year was £515,691, showing an increase of £9,024 as compared with the corresponding total at the close of 1882. The value of the tools, furniture, apparatus, and premises owned by the company at the close of 1884, was estimated at £638,783, showing an increase of £7,813, as compared with the corresponding total for 1883. The insurance fund formed by the company stood at the close of 1884 at nearly £320,000. No serious disaster was sustained by the company's fleet in 1884, but the insurance fund had to make good certain damages sustained in connection with the wreck of the Gironde upon the Brazilian coast in the course of 1883. In addition to the insurance fund, the company has also systematically formed what is termed a statutory reserve fund, that is, a fund formed by a deduction of 5 per cent from the profits of each year. At the close of 1884 the statutory reserve fund stood at £204,574.

The company had to contend last year with certain special difficulties, its interests having been prejudiced by the continuation of hostilities between France and China, and by quarantine impediments arising out of the choleraic epidemic at Marseilles and Toulon. It was hoped at first that this epidemic would be of comparatively little importance, but the disease unhappily spread to Italy, Egypt, and Algeria; and until the close of December business was profoundly troubled in the Mediterranean and Black Seas. The evil influence of the epidemic was even felt as remotely as Australia, the Mauritius and Rio de Janeiro. In consequence of these difficulties, the company's service was suspended during six months in the Black Sea, while as from August, the port of Shanghai was also closed to the company's vessels in consequence of the uncertain state of political affairs in the extreme East. The aggregate distance run by the company's vessels last year was 696,987 marine leagues as compared with 686,115 marine leagues in 1883. The increase of 10,872 marine leagues was to a great extent accounted for by the complete execution of thirteen voyages in connection with the Australian postal service, while in 1883 the corresponding number of voyages was only eleven. Notwithstanding the inconvenience occasioned by quarantine difficulties, the postal service undertaken by the company was regularly carried on last year—at any rate upon the more important lines. The average speed attained by the company's steamers last year was 11.73 knots per hour upon the Australian line 12.25 knots per hour upon the Brazilian and La Plata line, and 12.15 knots per hour upon the China line. The number of vessels employed in running the 696,987 marine leagues traversed last year, was 56, giving an average of 12,530 marine leagues per ship. The French Minister of Marine and the Colonies has applied to the company to unite its Australian line with the French establishment in Madagascar and the Mozambique Canal, by means of a French line to Saint Denis, Reunion, and Mosambique. A contract has been signed for the establishment of the proposed new service, which will involve an annual run of 14,456 marine leagues; the remuneration accorded to the company is £1 per marine league. A new line is also proposed to be established in connection with the Cochin China service, it being intended to run a small steamer between Saigon and Manila. This new service will involve an annual run of 7,878 marine leagues, and the remuneration accorded to the company is 16s. 10d. per marine league. In consequence of these new services the annual obligatory distance to be traversed by the company's steamers will, in future, be 573,758 marine leagues. The company carried last year 83,721 passengers, 394,647 tons of goods and specie, and securities to the value of £5,609,675. The receipts of every description on revenue account last year were £1,994,257. The working expenses, including sinking fund and insurance allocations, were £1,841,619, leaving a surplus of £152,638. Of this amount, £25,413 was absorbed by obligation interest, leaving a balance of £127,125 available for dividend upon the share capital, less 5 per cent to be carried to the statutory reserve fund. This latter allocation amounted for 1884 to £6,361. A dividend at the rate of 5 per cent upon the share capital absorbed £120,000, leaving a final balance of £864 to be carried to the credit of 1885, which, it is to be hoped, will be a year of fewer difficulties and more profitable results.—*Eng.*

#### PUPILAGE.

With the proposed extension and improvement of the educational work of the Architectural Association, the question of pupilage may not inappropriately be taken into consideration. The system of pupilage is not likely to become extinct yet a while, nor is it desirable in our opinion that it should. No student's education can be complete in the right sense without an office training, but as matters stand at present this training is in most cases very much of a farcial kind. And we question whether in more than a very few instances is there anything like that true relationship of master and pupil which ought to obtain. What we want from the profession is more of that correspondence of sympathy between master and pupil which used to exist in the painters' studios of former times. But how to obtain it? Well, it is difficult to see how such a relationship can be brought about under the present system of premiums and paid assistants. The pupil is generally regarded as a superior kind of office boy, and is left almost entirely to the care and attention of a clerk in charge, whose educating influence may be good enough of its kind but yet does not ex-