



Ship Building

The Muslim world was littered with shipyards making ships and vessels of various sizes and types. In Spain, for example, the economy of the ninth and tenth centuries considerably stimulated, alongside the construction of war ships (arsenal=dar al-sina'a), the development of a naval industry aimed for sailing along the coasts of the kingdom, and for more distant places, whether to the Baleiric islands, the North African coast or Egypt. Outside Almeira, there were many Spanish ports which constituted more or less important bases for warships, and also were endowed with ship building yards, called either *Dar al-insha*, or *Dar sina't al-marakib* (or simply *Dar al-sina'a*), amongst them Alcacer do Sal, Silves, Seville, Algeciras, Malaga, Alicante, Denia.

The impact of Muslim ship construction is not just perceptible through the large vocabulary of Arabic words to be found in modern Western languages, the best known instances being those of Arsenal, that of Admiral (Amir al-bahr, originally,) but in the impact of Muslim ship construction on the West.

Science, Management and Industrial growth

Ibn al-Haytham revolutionised optics, and consultation of any of his works, *Kitab al-Manazir* in



particular, will surprise more than one how many industrial items (the camera, telescopes, glasses etc.) owe to his pioneering work. It was, indeed, Ibn al-Haytham, who completely dismissed Greek inane optical theories, of Euclid and Ptolemy, that the eye sends out visual rays to the object of vision. He demonstrated instead that the form of the perceived object passes into the eye and is transmuted by its lens. He found the relation between the positions of a source of light and its image formed by a lens. He discussed the propagation of light and colours, optical illusions, and reflection of light, and gave methods for measuring the angles of incidence and refraction. Ibn al-haytham's experiments, recreated by Omar, are an excellent precursor of all that has to do with optical technology and industry. Muslim physics also included the determination of the specific gravity of certain metals and precious stones, and work on meteorology, on tides, and on such problems of applied mechanics as the following: windmills and water-wheels (which the Muslims were the first to develop), balances, wells, water clocks, agricultural methods, irrigation, canal and road building, the preparation of iron and steel, methods of working metals, constructing scientific instruments, paper-making, leather work, and silk and cotton cloth manufacture.

The Muslim management and administrative skills can be seen in Norman Sicily. In the departments of government, finance, legislation, the regulations of commerce, in the protection and encouragement of agriculture, in the maintenance of order, Sicily offered the best case in Europe, except in Muslim Spain. Its coinage was one of the purest, the most convenient, the most beautifully executed that had ever been put in circulation by any government, and the regulations of the kingdom concerning the rural economy of its people were minute and specific, even paternal, in their character. The supervision exercised by government officials over all occupations was most precise, weights and measures, for instance, were prescribed by law, and any departure from honest dealing in this respect was visited with the severest penalties. Officers were appointed in every town for the detection of false weights and the sale of spurious merchandise. The laws of hygiene were understood and enforced with a degree of intelligence unknown to many European communities even early in the 20th century, and unwholesome provisions could not be exposed for sale in the markets.

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