Miscellaneous.

LONGEVITY AS A MEASURE OF HAPPINESS.

During his last expedition to Central Asia, Professor Vambéry managed to interview the Emir of Samarcand—a sort of Mohammedan prince-cardinal and primate of the Eastern Sunnites. As Imam of the local lyceum, the Emir appeared to take a natural interest in the progress of European science, but when his guest expatiated on the material prosperity of the Western Giaours, he interrupted him with a less expected question.

"The happiest people on earth, you call them? What age do they generally attain to?" Vambéry seems to have returned an evasive reply, though he admits that the query was not altogether irrelevant—at least from the stand-point of an Oriental who values existence for its own sake. But, even in the less unpretending West, longevity is not a bad criterion of happiness. Misfortune kills; nature takes care to shorten a life of misery—for reasons of her own, too, for, in a somewhat recondite (but here essential) sense, the survival of the happiest is also the survival of the fittest. The progress of knowledge tends to circumscribe the realm of accident and with it the belief in the existence of unmerited evils. In spite of prenatal influences and unprecalculable mishaps, the management of the individual is the most important factor in the sum total of weal or woe. If we could see ourselves as Omniscience sees us, we would probably recognize our worst troubles as the work of our own hands; and we thus recognize them now with sufficient clearness to be half ashamed of them. Most men nowadays dislike to confess their bad luck. We have ceased to ascribe diseases to the malice of capricious demons, and even in Spain the commander of a beaten army would hesitate to plead astrological excuses. Polycrates held that a plucky man can bias the stars, and the popular worship of success may be founded on an instinctive perception of a similar truth. Sultan Achmed went too far in his habit of strangling his defeated pashas, but the world in general agrees with him that there must be something wrong about a generally unsuccessful man. After two or three decided defeats, the partisans of a popular leader will give him up for lost, and after a series of disasters the damaged man himself generally begins to share their opinion and lose heart, or, as the ancients expressed it, admits the decree of fate—that is, his own inability to prevail in the struggle for existence; and it is curious how swiftly a physical collapse often follows upon such a giving way of the moral supports. The storms of every political, social and financial crisis extinguish hundreds of life-flames; lost hope is a fatal (though a silent and sometimes an unconfessed and unsuspected) disease. Good luck, on the other hand, tends to prolong life; the longevity of pensioners and sinecurists is almost proverbial, and there men who continue to live in defiance of all biological probabilies, merely because existence somehow or other has become desirable, as a liberal supply of external oxygen will nourish a lamp in default of the inner oil. At the beginning of the Franco-Prussian war, King William and his chancellor and staff-officers were already gray-headed veterans, and it is no accident that they are nearly all alive yet; while nearly all the ministers and marshals of the exploded empire have followed their leader—"weary of life and tired of buttoning and unbuttoning," as a captain of H. M. S. explained his suicide.—*Manufacturer and Builder.*

THE CHANNEL TUNNEL.

Work on the tunnel between England and France, begun at a point near Dover, is steadily progressing. The depth of the shaft, which is a pit 9 or 10 feet in diameter, is about 160 feet, the bottom being about 100 feet below the level of low water. Very little water makes its way through the crevices between the planks with which the shaft is lined, the moisture trickling down all coming from near the surface. At the bottom and within the tunnel, apparently throughout its length, the hard, homogeneous gray chalk was found to be quite dry, and no signs appear even of such inconsiderable springs as are tapped in the fissures of the corresponding strata on the French coast at Sangatte. The tunnel has been driven beneath the seaward base of Shakespeare's Cliff—that is, in an easterly direction, towards the head of the Admiralty Pier, for a distance of over 1,100 yards, or nearly two-thirds of a mile, with a slope downward of 1 foot in 80, the furthest point where the boring is now going on being about 140 feet below the level of the sea. The shaft is approximately two miles from the head of the Admiralty Pier, and when the tunnel has been carried about half the distance or a mile from the shaft, a bend will be made towards the French shore. At the eastern end of the tunnel through the cliff, perhaps three-quarters of a mile from the shaft hitherto spoken of, another shaft, called No. 3, is being sunk. Here, when the works have made a little more progress, will be the engines for pumping the air into the tunnel, and for pumping out the water which always finds its way into tunnels of any great length. This point, it will be observed, is commanded by the heavy gun at the head of the Admiralty Pier and by the guns on the land fortifications. At the end of the tunnel a Beaumont cutting machine is at work. The length of this machine from the borer to the tail end is about 33 feet. Its work is done by the cutting action of short steel cutters fixed in two revolving arms, seven cutters in each, the upper portion of the frame in which the borer is fixed moving forward five-16ths of an inch with every complete revolution of the cutters. In this way a thin paring from the whole face of the chalk in front is cut away with every turn of the borer, and a circular tunnel is formed having a diameter of 7 feet. A man in front shovels the crumbled débris into small buckets, which, traveling on an endless band, shoot the dirt into a "skip" tended by another man. The skip, when filled, is run along a tramway to the mouth of the shaft. At present these trolleys, each holding about one-third of a cubic yard, are drawn by men, but before long it is expected that small compressed air engines will be used for traction. The rate of progress made with the machine is about 100 yards per week, but Colonel Beaumont anticipates no difficulty in making the machine cut its way at the rate of three-eights of an inch per revolution, and getting five revolutions per minute, which would give a rate of advance of two inches per minute.

A very important question has been raised with regard to the supply of compressed air. Carried in 4-inch pipes, it now reaches the machine with a pressure of about 20 pounds, the pressure at the compressor at the shaft mouth being from 30 to 35 pounds; but by increasing the diameter of the supply-pipe to 8 inches the loss of working value by friction would be greatly diminished, if not rendered inappreciable. The liberated and expanded air given off by the machine serves to ventilate the tunnel sufficiently at present for the workers, and one advantage which it is held would be gained by the use of compressed air engines, is that the pure sea air compressed at the surface would be given off, when it had done its work in driving the engine, in more than sufficient quantity to supply the fresh oxygen required by the travelers in a train. Each engine, being charged with 1,200 cubic feet of air at a pressure of 70 atmospheres, or the equivalent of over 80,000 cubic feet of free air, would, argues the inventor, while traveling at the rate of 30 miles an hour, and giving out 4,000 cubic feet per mile, supply 2,000 cubic feet of fresh air per minute.

The work in the tunnel is carried on by the light of Swan's incandescent lamps, the electricity being generated by Siemens' machines.—*Manuf. and Builder.*

DESIGN FOR A DOUBLE COTTAGE.

Our architectural illustration this month is for a double cottage, intended for occupation by two families. The whole structure is so arranged as to look like one building, thus making quite a pretentious villa, being a decided improvement on the plan of building two alike side by side, and also being somewhat cheaper than building two separate ones. Building village houses in pairs has not only an advantage in cost, but secures more room on the usually somewhat limited lots, and a better appearance generally, consequently enhancing the value of the property. Three houses can be arranged together also with advantrge.

The arrangement of the apartments, which is a very convenient one, is so well shown on the plans that explanation is unnecessary.

The estimated cost of erection of this twin cottage is about $5,000. It can be built, if desired, at a less cost. The same house, thoroughly built in a good locality, would be a desirable residence for a prosperous merchant.

The plan is by J. A. Wood, architect, of 240 Broadway, New York, the architect of E. B. Sutton's park and cottages at Babylon, L. I., and deer range at Islip, where one of the most complete farm houses in the country is just being completed.—*Manufacturer and Builder.*