From 1850 onwards French cultivators were compelled, in order to keep up their silk supply, to import graine from uninfected districts. The area of infection increased rapidly, and with that the demand for healthy graine correspondingly expanded, while the supply had to be drawn from increasingly remote and contracted regions. Partly supported by imported eggs, the production of silk in France was maintained, and in 1853 reached its maximum of 26,000,000 kilos of cocoons, valued at 117,000,000 francs. From that period, notwith­standing the importation at great cost of foreign graine, reaching in some years to 60,000 kilos, the production of silk fell off with startling rapidity: in 1856 it was not more than 7,500,000 kilos of cocoons; in 1861 and 1862 it fell as low as 5,800,000 kilos; and in 1865 it touched its lowest weight of about 4,000,000 kilos. In 1867 de Quatrefages estimated the loss suffered by France in the 13 years following 1853, from decreased production of silk and price paid to foreign cultivators for graine, to be not less than one milliard of francs. In the case of Italy, where the disease showed itself later but even more disastrously, affecting a much more extended industry, the loss in 10 years de Quatrefages stated at two milliards. A loss of £120,000,000 sterling within 13 years, falling on a limited area, and on one class within these two countries, constituted indeed a calamity on a national scale, calling for national effort to contend with its devastating action. The malady, moreover, spread east­ward with alarming rapidity, and, although it was found to be less disastrous and fatal in Oriental countries than in Europe, the sources of healthy graine became fewer and fewer, till only Japan was left as an uninfected source of European graine supply.

A scourge which so seriously menaced the very existence of the silkworm in the world necessarily attracted a great amount of attention. So early as 1849 Guérin Méneville observed in the blood of diseased silkworms certain vibratory corpuscles, but neither did he nor the Italian Filippi, who studied them later, connect them distinctly with the disease. The corpuscles were first accurately described by Cornalia, whence they are spoken of as the corpuscles ’of Cornalia. The French Academy charged de Quatrefages, Decaisne and Péligot with the study of the disease, and they issued two elaborate reports—*Études sur les maladies actuelles des vers à soie* (1859) and *Nouvelles Recherches sur les maladies actuelles des vers à soie* (1860); but the suggestions they were able to offer had not the effect of stopping the march of the disease. In 1865 Pasteur under­took a Government commission for the investigation of the malady. Attention had been previously directed to the corpuscles of Cornalia, and it had been found, not only that they occurred in the blood, but that they gorged the whole tissues of the insect, and their presence in the eggs themselves could be microscopically demonstrated. Pasteur established (1) that the corpuscles are the special character­istic of the disease, and that these invariably manifest themselves, if not in earlier stages, then in the mature moths; (2) that the cor­puscles are parasites, and not only the sign but the cause of the disease; and (3) that the disease manifests itself by heredity, by contagion with diseased worms, and by the eating of leaves on which corpuscles are spread. In this connexion he established the very important practical conclusion that worms which contract the disease during their own life-cycle retain sufficient vitality to feed, develop and spin their cocoon, although the next generation is invariably infected and shows the disease in its most virulent and fatal form. But this fact enabled the cultivator to know with assurance whether the worms on which he bestowed his labour would yield him a harvest of silk. He had only to examine the bodies of the moths yielding his graine: if they were free from disease then a crop was sure; if they were infected the education would assuredly fail. Pasteur brought out the fact that the malady had existed from remote periods and in many unsuspected localities. He found corpuscles in Japanese cocoons and in many specimens which had been preserved for lengthened periods in public collections. Thus he came to the con­clusion that the malady had been inherent in many successive generations of the silkworm, and that the epidemic condition was only an exaggeration of a normal state brought about by the method of cultivation and production of graine pursued. The cure proposed by Pasteur was simply to take care that the stock whence graine was obtained should be healthy, and the offspring would then be healthy also. Small educations reared apart from the ordinary magnanerie, for the production of graine alone, were recommended. At intervals of five days after spinning their cocoons specimens were to be opened and the chrysalides examined microscopically for corpuscles. Should none have appeared till towards the period of transformation and escape of the moths, the eggs subsequently hatched out might be depended on to yield a fair crop of silk; should the moths prove perfectly free from corpuscles after depositing their eggs the next generation would certainly live well through the larval stage. For special treatment towards the regeneration of an infected race, the most robust worms were to be selected, and the moths issuing from the cocoons were to be coupled in numbered cells, where the female was to be confined till she deposited her eggs. The bodies of both male and female were to be examined for corpuscles, and the eggs of those found absolutely free from taint were preserved for similar “ cellular ” treatment in the following year. By this laborious and painstaking method it has been found possible to re-establish a healthy stock of valuable races from previously highly-infected breeds. The rearing of worms in small educations under special supervision has been found to be a most effective means of combating pebrine. In the same way the rearing of worms for graine in the open air, and under as far as possible natural conditions, has proved equally valuable towards the development of a hardy, vigorous and untainted stock. The open-air education was originally proposed by Chavannes of Laus­anne, and largely carried out in the canton of Vaud by Roland, who reared his worms on mulberry trees enclosed within "manchons" or cages of wire gauze and canvas. The insects appeared quickly to revert to natural conditions ; the moths brought out in open air were strongly marked, lively and active, and eggs left on the trees stood the severity of the winter well, and hatched out successfully in the following season. Roland’s experience demonstrated that not cold but heat is the agent which saps the constitution of the silkworm and makes it a ready prey to disease.

*Grasserie* is another form of disease incidental to the silkworm. It often appears before or after the first moult, but it is only after the fourth that it appears in a more developed form. The worm attacked presents the following symptoms: the skin is distended as if swollen, is rather thin and shiny, and the body of the worm seems to have increased, that is, it suffers from fatness, or is *engraissé,* hence its name. The disease is characterized by the decomposition of the blood; in fact it is really a form of dropsy. The blood loses its transparency and becomes milky, its volume increases so that the skin cannot hold it, and it escapes through the pores. This disease is more accidental than contagious and rarely takes very dangerous proportions. If the attack comes on a short time before maturity, the worms are able to spin a cocoon of a feeble character, but worms with this disease never change into chrysalides, but always die in the cocoon before transformation can take place. The causes which produce it are not well known, but it is generally attributable to currents of cold and damp air, to the use of wet leaves in feeding, and to sudden changes of temperature.

Another cause of serious loss to the rearers is occasioned by *Flacherie,* a disease well known from the earliest times. Pasteur showed that the origin of the disease proceeded from microscopic organisms called ferments and vîtrios. One has only to ferment a certain quantity of mulberry leaves, chop them up and squeeze them, and so obtain a liquid, to find in it millions of ferments and vitrios. It invariably happens during the most active period of feeding, three or four days after the fourth moult up to the rising, and generally appears after a meal of coarse leaves, obtained from mulberries pruned the same year and growing in damp soil. *Flacherie* is an intestinal disease of the cholera species and therefore contagious. The definite course is not occasioned so much from the ferments which exist in the leaves themselves, but from an arrest of the digestive process which allows the rapid multiplication of the former in the intestines. Good ventilation is indispensable to allow the worm to give out by transpiration the great quantity of water that it absorbs with the leaf. If this exhalation is stopped or lessened the digestion in its turn is also stopped, the leaf remains longer than usual in the intestines, the microbes multiply, invading the whole body, and this brings about the sudden death which surprises the rearers. The true remedies consist in the avoidance of the fermenta­tion of the leaves by. careless gathering, transport or packing, in proper hygienic care in ventilation and in maintaining a proper degree of dryness in the atmosphere in rainy weather, and in the use of quicklime placed in different parts of the nursery to facilitate the transpiration of the silk-worms.

*Wild* *Silks.—*The ravages of pebrîne and other diseases had the effect of attracting prominent attention to the numerous other insects, allies of the mulberry silkworm, which spin serviceable cocoons It had been previously pointed out by Captain Hutton, who devoted great attention to the silk ques­tion as it affects the East Indies, that at least six species of *Bombyx,* differing from *B, mori,* but also mulberry-feed­ing, are more or less domesticated in India. These include *B. textor,* the boropooloo of Bengal, a large species having one generation yearly and producing a soft flossy cocoon ; the Chinese monthly worm, *B. sinensis,* having several generations, and making a small cocoon; and the Madrasi worm of Bengal (B. *croesi),* the Dassee or Desi worm of Bengal (B. *fortunatus)* and *B. arracanensis,* the Burmese worm—all of which yield several