interior of the vessels F, F′, where cold water circulates. The boiling wort can be turned into the fermenting vats themselves, to which the cooling tubes alluded to have been added, besides covering over these vats with a tin cover by hydraulic pressure, or else the boiling wort will cool in a large apparatus F or F′, fitted with cooling tubes for the circulation of water; then, at the moment when fermentation begins, the wort is turned into the fermenting vats closed by their hydraulic covers. It is even possible to make the common refrigerators serve by enclosing them in a vessel full of carbonic acid gas, or of air deprived of germs, and even ordinary air, if the vessel is of small capacity.

"To recapitulate:—the main and altogether novel principle of my process consists in the employment of vats of tin or wood, into which the wort is run as hot as possible, and is cooled by a current of water outside, or outside and inside at once, without any evaporation, over which there is absolute control; so much is this the case that, according to the terms of my patent, nothing is more simple than to transport the wort without danger to the greatest distances. With regard to the action of the air, we can limit it at pleasure, in so far as it is noxious, for we can always annihilate the mischievous influence of the germs it contains. The brewer has, moreover, the control over the action of free oxygen gas, so far as it consumes the aromatic or other very delicate principles. Besides, my process allows the temperature to be kept steadily at any height for the purpose of fermentation. In short, its advantages are valuable for the fermentation of German beer, or for mild fermentation, for we can proceed to the employment of ice or any other powerful means of cooling during the process of fermentation. There, is, however, no distinction between strong and mild fermentation, except in so far as the greater or less specific differences of two yeasts, strong and mild, are concerned. The two yeasts can be kept equal; the fermentation will be accomplished in the cold vats.

"Ere long I shall indicate how we may obtain at pleasure, at all seasons, and in all places, the two yeasts in a state of purity, without having recourse to those of the brewer.

"The ferment which is deposited at the bottom of the vessels, F′, is of a brown colour, because it is mixed with the deposit characteristic of the wort during the cooling process. It will be easy to collect it almost white, and without mixture, either by scraping the surface of the cake which it forms at the bottom of the apparatus, or by introducing at the outset into the apparatus, at the moment when we place the cover on the boiling worts, circular plates, attached to a bar which passes through the cover. This upright bar should terminate in the quadrant of a circle, round the extremities of which it can be turned, and moved up or down. While the wort is cooling, the plate of each apparatus will have its plane in a vertical position, and thus it will remain during the first days of violent fermentation. Then, when the ferment begins to settle down, the plate should be gently lowered until it is horizontal. After the product has been drawn off, a cake of ferment will be found upon the plate."

M. Pasteur made still another addition to this process, which was added to his patent in January 1872. It is as follows:—

"When the yeast in one pan is spoiled from any cause, it is necessary to have recourse to yeast taken from another pan. It then becomes a matter of importance to be able to prepare for one's self in any kind of vessel whatever a yeast deprived of all deleterious germs. I have solved this problem by discovering that the *Mycoderma vini* can be made the nucleus of a mild yeast. It can be made to develop itself in the wort of beer sheltered from contact with the air. I have also discovered that the fermenting principle of the grape is a mild yeast. It is a source to which breweries established according to my process can resort."

This addition is, in my opinion, of great importance. M. Pasteur's researches will not probably end here. Every day brings with it a new idea. At all events, from this time the manufacture of beer has received such valuable improvements as will tend to its increased production and use. The process has not yet received the sanction of long experience, but it appears to have fulfilled all that was expected of it. Some have asserted that M. Pasteur's system involves an enormous expense. I do not believe it; experience will show these objections to be unfounded.

After all I know very well that M. Pasteur may yet be the victim of envy. It will be remembered what annoyance an enemy gave him in connection with his process for improving wines.

M. CHEVREUL

A VERY interesting episode took place at the *séance* of the French Academy of Sciences of September 2, on the occasion of what may be regarded as the academic jubilee of the Dean, the famous chemist, M. Chevreul. The fiftieth year of his membership does not strictly occur till 1876; but it is well known that he would have been elected in 1816, had he not urged the Academy to give the vacant place to M. Proust, his compatriot, and a celebrated chemist, who was old and infirm, and could not afford to wait. M. Faye, as president of the Academy, intimated that the members had resolved, as a token of their estimate of his works, and their regard for his personal character, to present the venerable Dean that day with a medal, without waiting for the arrival of the formal jubilee. The medal represents the features of the illustrious chemist, who bears the weight of his 86 years much more lightly than many of his fellows who are considerably younger than himself. M. Dumas, the celebrated chemist, and permanent secretary of the Academy, in an eloquent and gracefully-worded speech, recounted the many valuable services rendered by M. Chevreul, who modestly styles himself "le doyen des étudiants français," and at the same time bore warm testimony to the personal character of the man. After M. Elie de Beaumont, who had been a pupil of M. Chevreul, had added a few words of veneration and respect for his old master, the latter attempted to respond, but had simply to express his inability to do so. It was in 1806 that M. Chevreul published his first most important work. He was collaborator of Vanquelin: and he has just completed a volume, entitled "Mémoires de l'Académie," a most interesting work, which throws light upon many of the most scientific questions of the day. M. Chevreul is one of the most distinguished chemists of the age; and, besides being Dean of the Academy of Sciences, is Director of the Museum of Natural History at the Jardin des Plantes. He has chosen for his motto that beautiful maxim of Malebranche, which indeed affords a true key to his life, his works, and his discoveries, "*Chercher toujours l'infaillibilité, sans avoir la prétention de l'atteindre jamais.*"

NOTES

IT is stated, on the authority of a private telegram from Bombay of Tuesday last, that letters from Dr. Livingstone, dated July 2, 1872, have been received at Zanzibar. He was still at Unyamyembe, was well, and waiting the arrival of Stanley's second expedition.

THE fourth three-yearly meeting of the French Institute will take place on the 2nd of October, and the yearly public meeting on the 25th of October.