decided upon until both disks have been carefully tested. The difficulties which the glass-maker has to encounter in obtaining so large a disk of crown-glass have been found to be much greater than with the flint, and fifteen or twenty moulds are said to have been ruined in the attempt to get them into the required disk-form. It is hoped that the glass-maker will succeed in accomplishing his task during the present season; and, in that event, the great telescope can readily be completed in 1887. Mr. Lick's trustees will then transfer the establishment to the University of California, and the observatory will subsequently

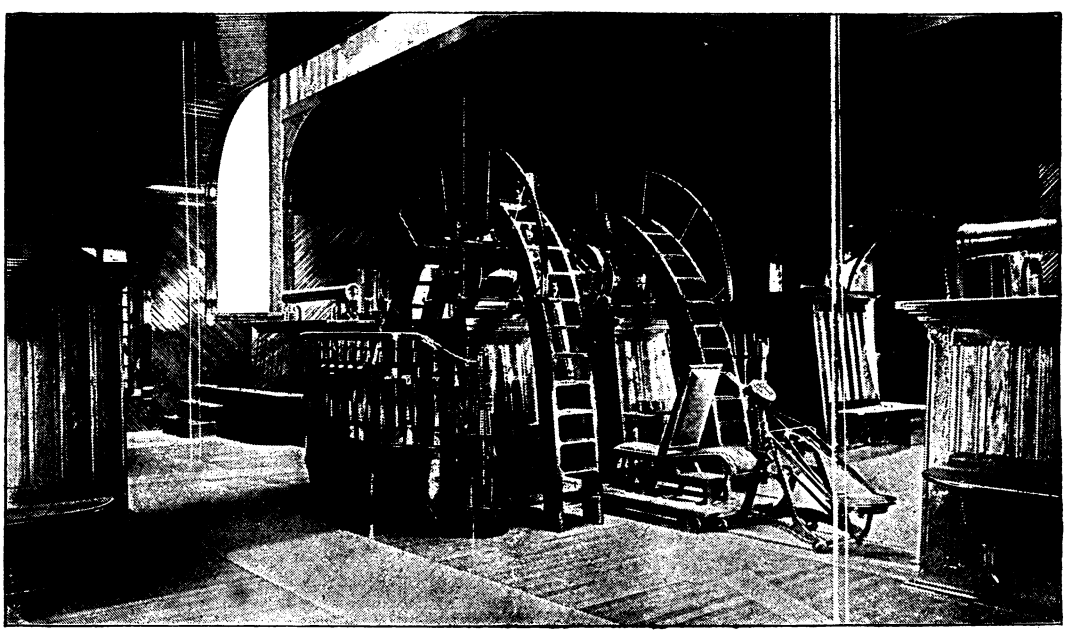

FIG. 4. — THE LICK OBSERVATORY. INTERIOR OF THE MERIDIAN-CIRCLE HOUSE.

be conducted under the control of the regents of that institution.

An inquiry often made, and a very natural and proper one, relates to the prospective capabilities of this enormous instrument, when mounted in so favorable an atmosphere, and directed to the moon. Every astronomer who has observed the heavenly bodies from Mount Hamilton knows that the extraordinary steadiness of the atmosphere enables him to regularly employ eye-pieces on his telescope which magnify two or three times as much as those he habitually uses for the same kinds of work at home. It is thus not unreasonable to expect that a few nights in the course of each observing-year may be found when the maximum magnifying-power — about thirty-five hundred diameters — may be advantageously employed on the great telescope. The theoretical distance of the moon would then become about sixty miles, but the corresponding ideal conditions of perfect vision can never be attained. Making due allowance for the unavoidable effects of the earth's atmosphere and other unfavorable conditions, the observer might expect to see the moon much the same as he would without the telescope if it were only a hundred miles away. If, at the same time, the moon happened to be at its least distance from the eye of the observer, — about 220,000 miles, — and if the object on the moon were suitably illumined by the sun's light, it is possible that details of its nature might be satisfactorily made out, even although they were no larger than some of the larger edifices on the earth.

THE GROWTH OF THE FRENCH ACADEMY. 1635–1885.

IT is interesting to trace the influences by which the French institute, *l'Institut de France*, as we know it in these days, has been developed from the French academy, *l'Académie*

française, of the days of Richelieu. The original society entered with enthusiasm upon a course marked out for it by the regulations of the founder. There was no precedent to be followed, no example to be imitated. The local academies in Italy may have suggested some of the statutes. The preparation of a standard dictionary, for example, may have been in imitation of the dictionary Della Crusca; but at that period, as now, the French liked to work in accordance with their own ideas of good method. Richelieu remained protector of the academy from 1635 until his death in 1642; and then, not Cardinal Mazarin, nor the prince of Condé, both of whom were thought of, but Séguier, already a member of the academy, and the chancellor of France, succeeded to the honor. When he died, the academy, which had grown up to the dignity projected for it by its illustrious founder, invited the king himself to become its patron; and the grand monarch did not hesitate to add this new jewel to his crown. He gratified the academicians by many tokens of royal favor, — for example, invitations to court entertainments, and a present of forty *fauteuils*, — and they flattered him with frequent acts of literary obsequiousness. To Louis XIV. as protector succeeded Louis XV. and Louis XVI.; and, when the monarchy fell in the revolution, the academy fell with it as if it were a royal council. When afterwards revived, it was in a humiliated form.

Two other academies were instituted in France soon after the French academy, — the Academy of inscriptions and belles-lettres, and the Academy of sciences; the first-named in 1663, and the other in 1666. There was also an Academy of painting founded in 1648; but it did not take rank with the others, and was subsequently reorganized as the Academy of fine arts. In the provinces also, — at Arles, Nismes, Soissons, Metz, and elsewhere, — local academies, based upon the model of the capital, grew up, and were (in many cases, if not in all) affiliated with one of the academies in Paris.

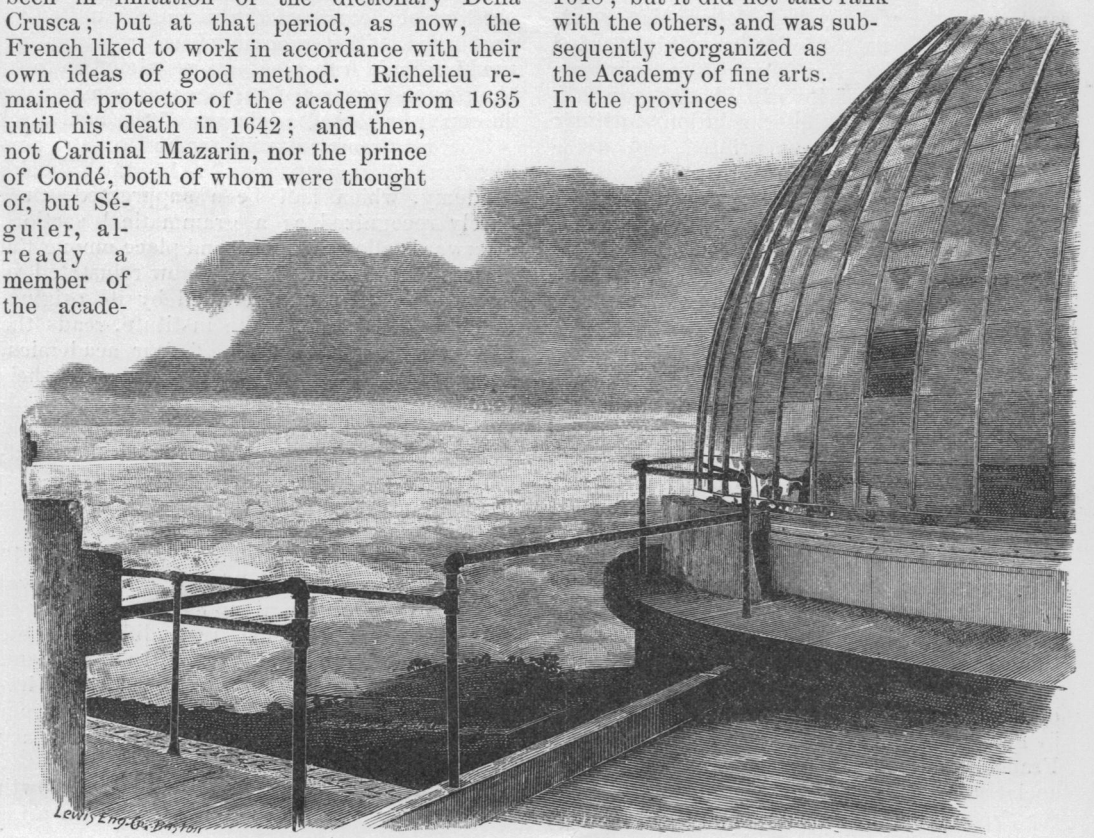

FIG. 5. — THE LICK OBSERVATORY. VIEW TO THE NORTH-WEST, "ABOVE THE CLOUDS."

The Academy of inscriptions and belles-lettres was at first only a section or committee of the French academy, —four of the members having been selected by the king to decide upon the proper forms to be observed in the legends which should be cut on medals, and in the inscriptions which should be put upon the monuments designed to perpetuate his honor. He fitly called it 'his little academy.'

Such atrocious pomposity can hardly be conceived of in our day as characterized the egoism of Louis XIV. Nevertheless, better things than he projected came from the association which he evoked for the purpose of devising inscriptions, mottoes, and medals, and for making suggestions in respect to royal *fêtes*, tapestries, and operas. The simple organization of 1663 was revised in 1701; and then, for a long period, associated and co-operative learning, of a very high order, distinguished the Academy of inscriptions. The first volume of its memoirs appeared in 1717; and before the revolution forty-six quarto volumes had been printed, embodying important historical and classical memoirs.

The Academy of sciences was founded in 1666, and reorganized in 1699. It has a history of its own so distinct from that of the French academy, and so illustrious, that we shall not attempt to give it in any subordinate paragraph.

The tragic days of the revolution swept good things as well as bad into the vortex. In August, 1793, the convention decreed that all academies and literary societies authorized (*patentées*) by the nation be suppressed. When the reign of terror was over, a reaction naturally came. The leaders of public opinion were ready to recognize the value of organized efforts for the promotion of knowledge; and the convention, two years after its abolition of the academies, established an *Institut national* for promoting discoveries, and for advancing the arts and sciences. This was in October, 1795. The new foundation was to be composed of a hundred and forty-four members resident in Paris, and a like number in other parts of France, together with twenty-four foreign associates. Three 'classes' were established, — the *first*, of mathematical and physical science, with ten sections, each of which had six Parisian and six departmental members; the *second*, of moral and political sciences, with six sections of the same number of members; and the *third*, of literature and the fine arts, divided into eight sections, each of six Parisian and six departmental members. The directory was to nominate forty-eight members from Paris; they were to select ninety-six more; and this company of one hundred and forty-four were to choose an equal number of colleagues from the departments. Subsequent legislation matured the regulations of the institute; but in 1803, Napoleon, then first consul, gave them a thorough overhauling. For three classes, he substituted four. That of moral and political sciences, to which he seemed to owe a grudge, was abolished. The old French academy, which had almost disappeared in the 'section of grammar,' now reappeared as the second class of the new institute, and the academy of sciences became the first class. History and ancient literature, representing the old academy of inscriptions, gave the name to the third class, and the fourth was that of the fine arts. Here substantially were the four academies of the monarchy united in one bond. The second class, representing the *Académie française*, was restricted to forty chairs; and twelve of the occupants might be chosen from the other classes of the institute.

The reaction went still farther, on the restoration of royalty. In 1816 the French academy, which had been suppressed, then barely recognized as a grammatical section, afterwards allowed the second place among the classes of the institute, was now reinstated in its true position, and recalled by its original and honored name. The institute, reads the new decree, shall consist of four academies, named as follows, and in the order of their foundation, — the French academy, the academy royal of inscriptions and belles-lettres, the academy royal of sciences, and the academy royal of fine arts. Members of any academy are eligible to the three others. The French academy resumes its former statutes. It was not until sixteen years later, in 1832, that the academy of moral and political sciences was reinstated under the ministry of Guizot. The second empire modified in some details the regulations of the Institut; and the new republic in 1872 removed these imperial modifications, and restored the former statutes, under which the institute of France is now organized with its five academies.

We have thus traced in outline the growth of the French academy during two centuries and a half. A private club employs such excellent methods of associated criticism, that it is recognized by the state, and made an important public agency for the promotion of letters. Kindred associations are formed upon its model. It grows so steadily in importance, that at length three kings successively assume its protection. When the crown falls in the days of anarchy, the academy and its sisters are suppressed. As order is restored to the state, the institute of France rises from the ashes, hiding in its organization the faint remembrance of the academy. Presently the old organization is distinctly recognized, but without its name and without the precedence which is its birthright. The next step is to re-establish it, with its earliest designation, as

first in the group of five academies, by which, under the name of the *Institut*, the people of France provide for the preservation and improvement of their language, for the promotion of history, for the advancement of science, for the encouragement of art, and for the establishment of just ideas in morals and politics.

THE SOCIETY FOR THE PROMOTION OF AGRICULTURAL SCIENCE.

THE sixth annual meeting of this society at Ann Arbor, Aug. 25, may fairly be said to have been the best of the number, whether as regards the attendance of members and others, the number and character of the papers read, or the general interest and profit of the discussions.

The meeting was opened on Tuesday morning by a paper from Mr. J. J. Thomas of New York, upon 'The influence of locality upon varieties of fruit,' in which the author opposed the opinion which has been advanced by eminent pomologists, that varieties of fruit raised on our own soil and in our own localities are, on that account, better suited to this country. As regards pears, fully half our varieties are of foreign origin; and very many of these are among our most esteemed varieties, notably the Bartlett, and can hardly be equalled by the same number of native varieties. In the case of the apple, while many good varieties are of foreign origin, this fruit has been so extensively and successfully cultivated in America that our best varieties have come to be those of native origin. At the same time, most of the esteemed western and southern varieties are of eastern origin. The apple is very susceptible to influences of locality during the growth and ripening of the fruit; and this fact, rather than any differences due to origin, accounts for the preference shown for different varieties in different regions.

In the discussion following the paper, attention was called by Dr. E. L. Sturtevant to what appears to be the fact, that well-ripened specimens of any fruit are of the highest flavor in the most northern localities, while the size and appearance usually improve as one goes southward; and he suggested as a possible explanation the influence of actinism. During the growing season, plants receive more hours of sunlight in northern than in southern localities; and it is possible that this has something to do with their higher flavor. The subject is an important one for investigation. He also described a simple and inexpensive apparatus for automatically recording the number of hours of sunlight daily, without reference to intensity. This apparatus is now in use at the N. Y. experiment station; and the U. S. signal service is considering its introduction at a number of stations, in the hope that a record of the hours of sunlight may at least show whether it is desirable to attack the much more difficult problem of measuring its actinic intensity.

Prof. W. J. Beal confirmed Dr. Sturtevant's statement as to the flavor of fruit from northern and southern localities as regards Michigan fruits. Mr. Crozier instanced an experiment in which flowers from the same seed grown in Paris and in Upsala were much brighter colored in the more northern locality. Prof. I. P. Roberts called attention to the fact, that the soil has also much to do with the flavor of apples, stating that about Ithaca, N.Y., the best apples were grown on a clay soil and in elevated localities.

Following Mr. Thomas's paper were two by Dr. E. L. Sturtevant of New York, upon the 'dandelion' and 'lettuce.' These papers were in support of the hypothesis that the form-species of cultivated plants are not originated by culture, but are really selections from wild types. Thus in Vilmorin, Andrieux et Cie's seed-catalogue, three distinct varieties of dandelion are figured. Upon the grounds of the N. Y. experiment station, there are to be found growing wild, under conditions which seemingly preclude the possibility of their being escapes from cultivation, dandelions corresponding very closely to these three varieties. Moreover, two of these three varieties are figured respectively by Anton Pinaeus in 1561, and by Dodonaeus in 1616.

If it be granted, upon this evidence, that the cultivated varieties of dandelion are simply selections from wild types, "it may be legitimately questioned whether other of our cultivated form-species in other plants are not likewise of natural origin. A careful investigation into the history of the origin of our cultivated varieties, fully justifies the statement that I have as yet secured no data which justify the belief that form-species in culture are other than of natural origin; and I have secured much evidence in favor of the view that form-species are introductions from natural variations."

The paper upon lettuce is in further confirmation of this hypothesis. It should be said, however, that the author expressly recognizes the fact that much further study is necessary before so radical a belief can receive countenance.

In the ensuing discussion, Professor Bailey called attention to the fact that variable wild plants are those most likely to be selected for improvement, as to a certain extent sustaining the hypothesis advanced in the papers.

The afternoon session was opened by a paper upon 'The demands made by agriculture upon the science of botany,' by Prof. C. E. Bessey of Nebraska. The paper was devoted to the subject of the teaching of botany in colleges; and the writer made an earnest plea for the more extensive and thorough study of this science, classifying the demands made upon it by agriculture under three heads: First, a nomenclature and classification of the plants of the farm, cultivated as well as wild. Second, a better knowledge of the physiology of plants, including such subjects as growth and nutrition, fertilization, heredity, and the physiology of cultivation and improvement. Third, a better knowledge of the pathology of plants, particularly of that ill-defined state known as 'lowered vitality.'