the spectroscope unequivocal evidence of the presence of aqueous vapor."

The idea that water exists on Mars is supported by the fact that white patches are seen on the poles, and that these vary in size with variations of inclination of the axis toward the sun. The white area is now well seen at this observatory on one of the poles. So rapid has been the advance in celestial photography, and in spectroscopy, and also in the size of telescopic objectives during the last 15 years, that without doubt much additional knowledge of Mars will be gained in August.

Knox College Observatory, Galesburg, Ill., July 1.

CROSS-FERTILIZING AND HYBRIDIZING.

THE following excellent suggestions are from the eminent horticulturist, Professor T. J. Burrill, of the Illinois experiment station. The subject is one calling for the co-operation of farmers and fruit growers everywhere with the experiment stations, for where nature has laid the foundation for improvement by giving us such a wild seedling as the Concord grape, that should be made the basis for further work.

Cross-fertilizing and hybridizing have been carried on to some extent, both for the effects of crossing and for the purpose of producing, if possible, new varieties of value. A number of crosses have been made in the apple, as for instance, between Ben Davis and Grimes, Ben Davis and Minkler, or Ben Davis and Duchess, with a view of getting something that will bear like the Ben Davis, but have the better quality of Grimes or Minkler, having the keeping quality of Ben Davis and the hardiness of tree of the Duchess. Different varieties of strawberries have been crossed, and plants are growing from the crossed seed. Blackberry varieties have been crossed, seeds planted, and plants are growing. Raspberries have been crossed — black varieties together, red varieties together, black with red, and blackberries with raspberries. We have now ready for planting more than a quart of seed from crossed raspberry and blackberry, or from selected varieties.

Results are problematical, but there is certainly great room for improvement in our blackberries and raspberries. There is entirely too much seed for the amount of flesh. When we consider that our apples originated from a crab in no way superior to many of our own native wild crabs, and the excellence that has been developed by cultivation and selection, what may we not expect from our raspberries and blackberries, which are so much better naturally? We have only begun with the raspberry and blackberry group of plants. I believe none of the blackberries or dewberries now cultivated are the result of growing plants from seed, but that all are the result of propagating natural seedlings, and it is not at all certain that we have yet the best of the wild varieties. Most of our raspberries are the result of chance.

During the past three seasons some work has been done in the line of crossing and selecting corn. The results seem to indicate that corn grown from crossing two distinct varieties will be larger than the average of the kinds crossed, or where the parents are nearly equal in value. To be sure, nothing has yet been reported in that line, though there would seem to have been abundant time for seedlings to have been grown. If the results of our crosses in corn are to serve as an index, we might expect to find in a second or third generation fruit of the Vinifera type on vines of the Labrusca. There is a great difference in the susceptibility of fruits to the influence of man. Our grapes have had more time spent on them, extending over a longer period, than have our strawberries; yet the results from grapes are hardly to be compared with the results from strawberries.

A small start has been made in the growth of nuts. The attempts at improvement heretofore have been confined almost exclusively to the pecan and chestnut. Attempts at improvement by growing seedlings from the best native trees have usually been a disappointment, because the seedlings have been inferior to the tree from which seed was taken, just as 999 of every 1,000 seedlings grown from the Concord grape have been so inferior to the parent as to be unworthy of general distribution. But it must be remembered that while there are comparatively few chances for improvement by growing seedlings there are none from simply budding or grafting.

The filbert and walnut of Europe are too tender for our climate. Why may not our hazel-nut and walnut be improved so as to take their places, and be made valuable crops for the rough lands along our streams?

NOTES AND NEWS.

AN interesting feature has been added to the first United States Food Exhibition, to be held at Madison Square Garden, New York, in October next, in the way of a national exhibit of dairy products. This department will be in charge of Professor James Cheesman, who represented the dairy interests of the United States at the late Paris Exposition. Professor Cheesman has a wide reputation as a dairy expert and as an authority on all matters pertaining to the dairy interests. This part of the exposition promises to be one of its most popular features.

— The *Journal de Colmar* of June 19 says: The president of the committee entrusted with the erection of a monument to Hirn has received a letter from the maire of Strasburg, in which he makes the following statement: "I have the pleasure of announcing that, upon the receipt of your letter of the 23d, relative to the participation of the city of Strasburg in the erection of a monument to M. G. A. Hirn, the municipal council has determined to contribute to this work the sum of 800 marks. I have ordered this amount to be credited to you, and it may be obtained from the municipal collector, who will transfer it to the treasurer of the committee, M. Baer. I trust that the example of Strasburg will find many imitators."

— Cornell University closed the college year 1891–2 on June 16, conferring above 300 degrees, of which about one-half were in scientific and technical courses, and a large number of which were the higher degrees. The graduating class was the largest in the history of the University, and is said to have been the strongest. The year terminates the connection of a number of the members of the faculty with the university, and this fact and the anticipated growth for the coming year will render it necessary to appoint a still larger number of new professors and instructors. The indications, judging from the numbers entering at the June examinations, are said to point to an entering class in September of not far from 500, and of probably fifteen or twenty per cent more in the upper classes and as graduate students, making a probable total of about 1,600 in all departments and classes. Sibley College, with its special and graduate schools and departments in mechanical engineering, will prepare for a total of 625 students, a hundred more than in 1891–2. In addition to new appointments already made, it is expected that professorships will be filled in geology, chemistry, and possibly one or two other subjects; also a number of assistant professorships and many instructorships in all departments, including physics, engineering, and mechanic arts. The appointments in scientific departments are usually such as demand familiarity with laboratory instruction, especially in electricity and mechanics.

— A Geographical Exhibition, we learn from the Proceedings of the Royal Geographical Society, will be opened this summer at Moscow, in connection with the two International Congresses of Prehistoric Archæology and Anthropology, which are to be held in the ancient Russian capital. The General Staff will exhibit a collection of all the maps, descriptions, and surveys made by Russian travellers in Central Asia, China, and Korea, which are deposited in the Topographical Department of the General Staff and the Scientific Military Committee. They will show also the recently-published maps, based upon surveys in the Empire and adjacent countries. A catalogue of these works is now in preparation.

— The degree of M.A. was conferred, *honoris causa*, upon Professor Edward Sylvester Morse at the recent Harvard commencement. Professor Morse was born in Portland, Me., in 1838. When but thirteen years of age he began to form a collection of minerals and shells. His first occupation was as a mechanical draughtsman at the Portland locomotive works. Afterward he made drawings on wood for a Boston concern. In 1852 he began a course of study under Agassiz at the Museum of Comparative Zoology in Cambridge. In 1866 he founded the *American Naturalist*, now published in Philadelphia. In 1868 he was made a fellow of the American Academy of Arts and Sciences. In 1871 Bowdoin College gave him the degree of doctor of philosophy. In 1874 Harvard elected him to a university lectureship, and he was also chosen vice-president of the American Association for the Advancement of Science, of which association he afterward became president. While studying marine zoology in Japan he accepted a professorship in the Imperial University at Tokio. He made several other visits to Japan, and formed a collection which was recently sold to the Boston Museum of Fine Arts. Professor Morse is also the inventor of numerous ingenious appliances for both scientific and domestic uses.

— The British consul in Hainan, in his last report, says, according to *Nature*, that during the past year he has made two journeys in that island, one to certain prominent hills near Hoihow, known as the "Hummocks," which lie fifteen miles to the west, on the road to Ch'eng-mai, the other a gunboat cruise to Hansui Bay. The people at both these places, and presumably all along the north-west coast, though believing themselves Chinese, speak a language which is not only not Chinese, but has a large percentage of the words exactly similar to Siamese, Shan, Laos, or Muong. The type of the people, too, is decidedly Shan, without the typical Chinese almond eye. At one time (1,000 years ago) the Ai-lau or Nan-chau Empire of the Thai race extended from Yun-nan to the sea, and the modern Muongs of Tonquin, like the Shans of the Kwangsi province, the ancestors of both of which tribes belonged to that empire, probably sent colonies over to Hainan; or the Chinese generals may have sent prisoners of war over. It is certain that some, at least, of the unlettered, but by no means uncivilized, tribes in the central parts of Hainan speak a type of language which is totally different from that spoken by the Shan-speaking tribes of the north-west coast. Yet the Chinese indiscriminately call all the non-Chinese Hainan dialects the Li language. The subject, Mr. Parker says, is one of great interest, well worth the attention of travellers. It was his intention to pursue the inquiry when making a commercial tour of inspection round the island, but his transfer to another post compels him to abandon his scheme.

— The latest researches of the Finnish expedition to the Kola Peninsula will modify, as we learn from *Nature*, the position of the line which now represents on our maps the northern limits of tree-vegetation in that part of Northern Europe. The northern limit of coniferous forests follows a sinuous line which crosses the peninsula from the north-west to the south east. But it now appears that birch penetrates much farther north than the coniferous trees, and that birch forests or groves may be considered as constituting a separate outer zone which fringes the former. The northern limits of birch groves are represented by a very broken line, as they penetrate most of the valleys, almost down to the sea-shore; so that the tundras not only occupy but a narrow space along the sea-coast, but they are also broken by the extensions of birch forests down the valleys. As to the tundras which have been shown of late in the interior of the peninsula, and have been marked on Drude's map in Berghaus's atlas, the Finnish explorers remark that the treeless spaces on the Ponoi are not tundras but extensive marshes, the vegetation of which belongs to the forest region. The Arctic or tundra vegetation is thus limited to a narrow and irregular zone along the coast, and to a few elevated points in the interior of the peninsula, like the Khibin tundras, or the Luyavrurt (1,120 metres high). The conifer forests, whose northern limit offers much fewer sinuosities than the northern limit of birch-growths, consist of fir and Scotch fir; sometimes the former and sometimes the latter extending up to the northern border of the coniferous zone.

— A sealed bottle containing a paper requesting the finder to report the place and date of discovery was thrown into the sea at Coatham Pier, Redcar, by Mr. T. M. Follow, on Oct. 8, 1891. On April 12, 1892, according to the Proceedings of the Royal Geographical Society, the bottle was picked up by a fisherman off the island of Hjelmesö, in the extreme north of Norway. The bottle had been immersed for six months, and the shortest distance between the two points is 1,400 miles. This observation confirms the general set of the currents from the east coast of Britain, at first south-easterly and then northerly along the continental coast, as shown in Mohn's map of surface drift in the North Sea and Norwegian Sea in Petermann's "Ergänzungsheft," No. 79, for 1885.

— The Russian *Official Messenger* (April 22) announces that the Ministry of Domains has decided to make, next summer, the following explorations in Caucasia: (1) The exploration of the mineral springs of the Eastern Caucasus having now been completed, to carry out a similar work in Central and West Transcaucasia; namely, the mineral waters of Khvedur, Uravel, Tsikuban, Platen, and others, in the governments of Tiflis and Kutais, and in the Chernomorsk District; (2) to continue the systematic geological exploration of the government of Tiflis, especially of the valleys of the Yora and the Alazan in Kahetia, and their mineral resources, in view of the projected construction of a railway in Kahetia; and (3) as the detailed study of the Apsheron naphtha region was terminated last year, and the map of the region is ready, to complete the exploration of the Caspian coast naphtha region, and to explore the nickel ores of Daghestan. The geologist, Simonovich, and the mining officers, Konshin, Barbot-de-Marny, and Gavriloff, are commissioned for this purpose, while M. Rughevich is commissioned to explore the naphtha region along the new Petrovsk branch of the Vladikavkaz Railway, which yielded last year 15,000 tons of naphtha, and promises to become an important centre of naphtha industry.

— Professor Elihu Thomson, the inventor of the Thomson-Houston Electric Company, contributes an entertaining, scientific, and thoughtful paper on "Future Electrical Development," to the July *New England Magazine*. He explains the possibilities of electricity, in all the public and private conveniences of life, and gives practical examples of its application to manufactures, rapid transit, and domestic offices, such as cooking, ironing, heating, gardening, raising fruit and vegetables, etc.

— Macmillan & Co. announce the issue of a new and extensively revised edition of Mr. Bryce's "American Commonwealth." It is to be expected that this new edition will take notice of the many important changes which have occurred since the work was first issued. It is to be copyrighted in America. The same publishers have already issued more than half of Stephen's "Dictionary of Biography," one volume of which is published quarterly. Thirty out of a total of fifty volumes have appeared so far, and the enterprise is so well in hand that there will be no break in the publication of the remaining parts. The work when completed will contain at least thirty thousand articles by writers of acknowledged eminence in their several departments. The memoirs are the result of personal research, and much information has been obtained from sources that have not before been utilized. It has been the aim of the editors to omit nothing of importance and to supply full, accurate, and concise biographies, excluding, of course, those of persons still living.