grape. It is so, however, only so far as the seeds remain immature. The seeds are formed, yet, from some cause, they are not perfected. This failing may, perhaps, in some measure account for the smallness of the berry. The peculiarity may possibly be due to defective setting.—A. F. BARRON, in *The Journal of the Royal Horticultural Society*.

STRAWBERRY—THE PHENOMENON.—A singular strawberry under this name has appeared in Belgium. On the one stem there are always two strawberries, so that the old expression of "two bites to a berry" is not a choice but an actual necessity, irrespective of size; and yet it is not a small berry or "berries," for it or "they" is, each half, two inches long by one wide.

STRAWBERRY—PROF. ED. PYNAERT.—This strawberry is said to be an "enormous fruit." It is figured four inches across, which is about twelve inches in circumference; but as it is one of the Cockscorn kinds, cross measurement is deceptive. How much will a dozen weigh? This is the true strawberry test.

GRAPE CULTURE UNDER GLASS.

By JOHN DON, Foreman to PETER HENDERSON, Jersey City Heights, N. J.

FURTHER discussing the above subject, I earnestly desire to assist those who have started to cultivate the grape vine under glass, in order that they may more successfully cope with the rigorous changes our climate is subject to, viz.: *extreme cold, heat and drouth*. The following remarks are intended more directly to apply to the treatment of a cold grapy, where the vines are planted in a prepared border outside. The roots require to be protected with a covering of leaves or rough stable manure to the depth of fifteen inches, otherwise roots near the surface—where it is all important they should be—will get destroyed. When a top-dressing can be given, equal parts of sods chopped fine and well-rotted manure will be an additional advantage before covering up. Covering should be done early in December; uncovering about middle of March.

Pruning should be done when the leaves have dropped. If any insects are concealed between the loose outer bark and inner, the former requires to be stripped, being careful not to injure the eyes on the spurs. A thorough washing with the engine dislodges and destroys all insects out of every crevice. The method is more simple and effective than painting the rods with the usual compounds. In this way I cleaned a large grapy infested with mealy bugs, and kept it so for three seasons. Before severe weather sets in, the vine rods require to be protected, otherwise the frost will injure or kill them outright. A good way is to lay them together along the front of the house in shape of a ridge, then cover with earth to the depth of four inches, leveling the earth back to its place when severe weather is past. For *extreme heat*, which would be the case in a span-roofed grapy, where both sides are exposed to the sun's rays, and the glass indicating 90° in the shade, my practice is to shade with a thin coating of whitewash outside, made by dissolving equal parts of lime and salt. It can be put on thin, not to darken the house much. The salt and lime crystallize on the glass, and are not easily washed off with rain. From the second week in June till the middle of August is the period it should be kept on. The past season it had to be renewed but once, and by the latter date it was nearly or all washed off. The method of giving air is important, especially in the early part of the season; ventilators should open all along the house at the highest point. Whenever the temperature inside indicates 85° to 90°, raise the ventilators slightly, increasing as the temperature rises. The temperature should be kept as even as possible, rising and falling with the temperature outside. It is not safe to use bottom ventilators, when they admit a current of cold air through the house. When the thermometer indicates 75° at night, a little air should be left on the top. To counteract *extreme drouth*, it is greatly to the advantage of the grape vine to mulch the border during the Summer months. A covering of salt hay or stable manure is well suited for this purpose. We used it the past season with best results. The border was top-dressed last fall as recommended; now the border is a complete network of feeding roots within an inch of the surface, where they get the full benefit of air and moisture. A good plan is to plug up the leaders, and put stops in the gutters; let the water run over on the border. The gutter breaks the force, and the mulching material will keep from washing, providing the fall is slight on the border.

A liberal use of water on the floor inside is of great advantage. A covering of sand to the depth of four inches is needed, as it absorbs and evaporates freely. Although it is customary to keep the floor dry during the period of blooming and coloring, yet this season we kept the floors thoroughly watered from the time of starting the grapy till the crop was ripened, and better colored or larger berries are not often seen than we had from this practice, the vines clean and healthy, and with well-ripened wood.—*The Gardener's Monthly*.

CALIFORNIA OAKS.

TWELVE species of the oaks are recognized by botanists as belonging to this State. The most of these are very beautiful and several of the species are large and picturesque trees; but one or two are of any value for use as lumber, the wood being soft and brittle. The oak here does not grow tall, with a straight grain and tough fibers, as in most other countries; consequently it is not a serviceable timber, except for the purpose of ship knees and the like, though every variety burns well. The live-oak, which grows often in clusters, has a very hard wood, rendering it fit for certain mechanical uses. One species of the white oak has also a fine grain and tough fiber, rendering it suitable for farming utensils. What are known as the poison oak and the huckleberry oak are mere shrubs, growing only a few feet high. The white or long-acorned oak, very common in California, has wide-spreading branches; its diameter being often greater than its height, which seldom exceeds sixty feet. The wood is crooked and bushy, but the acorn it grows is very large, being sometimes over two inches long. When roasted it tastes not unlike the chestnut, though slightly bitter and astringent.

The burr oak has the longest trunk and is the most common of all the oaks of California, though its habitation is confined to large valleys, never being found in the mountains. It is a graceful and noble tree, being the oak that gives the country such a park-like appearance. The pale oak, which much resembles in its external form the above species, is likewise a very picturesque tree, being the kind that a little way off looks so much like an old apple orchard. The chestnut oak, which grows only along the central portion of

the Coast Range in the vicinity of or among the redwoods, though it affords a worthless wood, is very valuable for the bark, which is extensively used for tanning leather. The drooping live-oak, generally diffused, but not very abundant, is another very beautiful tree, having long, slender, depending branches.

FRUITS OF OREGON.

WESTERN OREGON excels as a fruit country. No finer fruit, of the kinds raised there, is produced in any quarter of the globe. Fruit trees will grow from six to eight feet the first year, bear fruit the second, third, and fourth years, according to variety. They thrive in the valleys, as well as on the foot-hills, and up to a considerable height in the mountains, but especially in sheltered, dry soil. At one of the last State fairs, yearling prune, peach, and plum trees, eight feet four inches high, and yearling cherry trees seven feet high, were exhibited.

Apples, pears, plums, and cherries grow in such abundance that trees have to be invariably propped up to prevent them from breaking under the weight of fruit. The crops have never failed in the Willamette Valley, though naturally the quantity raised varies in different years. The apple-worm and the curculio are unknown, and so is the pear-blight. The fruits named all attain an unusual size, and fine color and flavor. Finer plums and cherries and prunes are not grown in France. Of apples, the leading varieties are yellow Newtown pippins, bright red pippins, Russets, Spitzenberg, Winesap, Baldwin, white Parmain, blue Parmain, Virginia greening, and Northern Spy.

A BOYS TRIP TO THE DIAMOND FIELDS OF SOUTH AFRICA.

Written by a pupil in the Wicker Park School, Chicago.

I LEFT Chicago April 26, 1872; sailed from New York on the steamship *Abyssinia* for England; made a very nice voyage of eleven days. We passed Queenstown, Ireland, where we stopped about half an hour. We arrived at Liverpool, took the cars for London, which we reached the same afternoon. I must tell you about the cars; they are not like ours. The car is divided into apartments which contain two seats; each of these apartments has two doors, one on each side. There are three classes of cars; they are the first, second, and third class. The first class have very nice cushions on the seats and backs. The second class have leather cushions. The third class, in which workmen and emigrants ride, have only a bench. Each door is locked by a man whom they call the guard; at every station he comes around and looks in to see if any one wishes to get out.

We had had very nice weather so far. Every farm we passed was green with vegetables for the market. In London it rained all the time we were there; though we went to the Castle and were going to the Museum, but it happened it was not open. We went on the underground railway; it was very dark except at places where it was open to let out the smoke. We bought our ticket here for Cape Town, "South Africa." We went to Southampton, where we took the steamship *Europe* for Cape Town. When we passed through the Bay of Biscay it was nearly as calm as a mill-pond, though very rough at most times. The steamship we took was an old one, and during the voyage we had to stop twenty-four times on account of our engines. Once we had to stop a whole night.

It took us thirty-seven days to make the voyage. We stopped at Madeira two days to lay in a supply of coal. We went on shore and then horse-back riding to see a cathedral which is built on the mountain side. The path is very steep, so steep that we had to hold fast to the horse's mane, the guide hanging on the horse's tail. We could not ride the horses down, but came down in a sled; the path is laid with cobble stones, which were worn smooth; the sled ran down by itself, with a guide to hold it back and steer it.

Madeira is a beautiful island with all kinds of tropical plants and fruits, fine houses, and nice grounds, but it is full of beggars who live in cellars and other unhealthy places. There is not a wheeled conveyance on the island, because one of the saints was crushed with a wheel. They have sleds with tops on like a cab; if any of the ladies wish to go out, their servants carry them in hammocks, which are attached to a pole, each end of which is carried on the shoulder of a servant. We left Madeira and continued our voyage; passed the Cape Verde Islands, and saw the Peak of Teneriffe in the distance; we also saw a whale spout water, and a shoal of porpoise alongside of our ship. In the night the water seemed on fire. We lowered a pail and brought some of this fiery-looking liquid up; it looked like rolls of white jelly about two inches long, with two little holes, one in each end.

We arrived at St. Helena and stayed there a day. We went to visit Napoleon's grave and house; his house stands on a high hill, his grave is in the valley. We saw the trees which he planted with his own hands. At his house we saw the place where his bed stood when he died. We also saw the house which was in erection at the time of his death. It was built of stone. As we descended we took the shortest way to the grave down the hill-side, which was covered with geraniums of all the different kinds and colors. After ten days of sailing we entered Cape Town Harbor. Cape Town is quite a city, situated at the edge and between the Table Mountain and the Table Bay. Table Bay is a beautiful horse-shoe-like harbor. Cape Town is a shipping port for wool, hides, ivory, and some wine, coffee, and rice, also large quantities of ostrich feathers. Cape Town has a very fine museum, one of the finest in the world for its size; also large botanical gardens, containing rare tropical fruits and flowers of a great variety. The inhabitants of Cape Town are of nearly all nationalities; the majority are English, Scotch, and Hollanders, with a few Americans. The servants are Caffirs, Hottentots, and Brahmas. The houses are mostly built of stone and brick; there are some fine residences with beautiful grounds.

After two days' rest here, we started for the Diamond Fields, a distance of eight hundred and seventy-five miles by land, with only sixty by railway, to Wellington, which is a middling sized town, situated at the foot of the Drachenberg mountains, in a beautiful valley two miles wide. Between this place and Cape Town we passed many fine vineyards. Here we take the transport wagon for the Fields; we cross the Drachenberg mountains, which are very high, from which we have a very fine view of the fruit orchards in full bloom in the valley below, while we are surrounded by snow-storms. The next place we come to is Darlington; here we crossed the river and went on toward Woster, a town of about two thousand inhabitants. The land is a high rolling plain noted for grazing and an abundance of sheep and goats. Wool and fruits are the

main products. Then we pass Constable and on toward Buffort, which is half way to the Fields. This place is a great trading port for ivory, robes, hides, and ostrich feathers. Next we come to Victoria, which is in a valley surrounded by mountains. Next we come to Hope Town, which is on the Orange river, a beautiful town of white houses, and along the streets are many orange trees for shade trees. Orange river is crossed by ferry. Next was Jacobsdall, a small town. These are the main towns, though we passed many others. There are also stopping places at farm houses. We arrived at the Diamond Fields, where we found about forty thousand miners from all countries. This is a regular mining town; the houses are galvanized iron or canvas. Here the mines are called dry diggings; the soil is dug up, sifted, and sorted to find the diamonds. But at the Vaal river the ground or gravel is washed before it is sorted. The river diggings are about twelve miles from Du Toits Pan. Some diamonds when found are clear like rock crystal, and others upon the surface have the appearance of ground glass, and are found from the top to the depth of two hundred feet. Diamond digging is very exciting, because every minute you expect a diamond to roll out.—*The Educational Weekly*.

THE LIMITS OF NATURAL KNOWLEDGE.

IN the SCIENTIFIC AMERICAN of Dec. 22, 1877, there is a synopsis of the interesting address delivered at the Munich Meeting of the German Association, by Professor C. von Nageli, on "The Limits of Natural Knowledge."

This address is the presentation of the views of one human mind, based of course upon the particular idiosyncrasy of the individual. All men are endowed with the same general attributes and the same number and kind of senses, and the same nature offers itself to their observation and reflection; and all modern students have the advantage of the accumulated experience and various views of preceding observers as guides or aids; yet upon the very same statement of premises we sometimes find coherent chains of reasoning which lead to very different conclusions.

The lecturer says:

"We can only know what our senses acquaint us with, and this is limited in time and space to an infinitesimal domain."

Of course the general proposition that infinity, either of matter or space, cannot be grasped by any intellect (if that is what the lecturer meant) is incontrovertible.

Is it true, however, that our senses "are indeed only organized for the requirements of our bodily existence, but not to satisfy our intellectual cravings?" Not unless all the functions of our senses be regarded as thus limited, which experience tells us they are not. It may be true that "we cannot rely [merely] upon our sensual perceptions acquainting us with all the phenomena of Nature." That is, if we do not allow ratiocination of the mind as part of our sensual perceptions. The very next statement, however, goes further, saying: "By conclusions from facts which were recognized by the senses, we arrive at facts equally certain which can no longer be perceived by the senses." Here is an obvious reference to reasoning out, as it were, facts which were not recognized by the senses; but also an obvious limitation to the power of the senses; apparently separating the senses, the sensual from the action of the intellect. The remark, "We cannot rely upon our sensual perceptions acquainting us with all the phenomena of Nature," partly implies the same thing.

The succeeding remark, that "The hope of conquering the entire domain of Nature by the reason can, however, never be realized," must of course be true in one sense, if infinity be an attribute of Nature. This, followed by the other remark, that "The confined capacity of the intellect therefore allows us only a fragmentary knowledge of the universe," gives us the lecturer's idea of the "condition and capacity of the intellect," which is his first premise.

Admitting that matter and space are infinite, and that the phenomena of Nature are infinite, we also know that the ratiocinations of the human mind are unlimited and illimitable, however few may be the facts brought to the immediate perception of the "senses." The boundary to merely sensual perceptions is ever in view, although their horizon is continually enlarging, as we ascend to higher points of observation; and there is nothing yet known to science which can assign a limit to its extension, much less a limit to the reasoning resulting or which may result therefrom.

In regard to the second question, "The condition and accessibility of Nature," the idea presented by the lecturer is that "the endlessness," "the uninvestigable eternity bids the investigation categorically to stop."

Another quite different view is that investigators must go on, since there is not the least reason to fear that they will ever be stopped for want of new material facts in the universe to study, or by any restriction as to the extent or kind of ratiocinations such study may induce. The simile of "Icarus" is faulty, because Icarus was placed in a limited vale, with fixed boundaries, while the proposition of the lecturer is that we are in a boundless universe. Science does not hope to reach the non-existent, but to forever gather flowers as it advances along its endless path.

The third question of the lecture, "The demands which we make of knowledge," admits of more than one view. "The conceptions which we form of Nature" must of course result from, or, more correctly, must follow sensual perceptions; but our knowledge can and does go further "than to compare the phenomena we have observed, and judge them with reference to one another." Hypothesis, and even theory, would be ever moving with clipped wings if this were not so. They could not soar away, as they do, to the fairy regions of fancy, or even to the more sober atmosphere of invention.

Gravity is invisible; and the discovery of the law of gravity, the power which governs all matter, was the result of reasoning which went far beyond a new comparison of phenomena. Human reason is probably but a part of the universal mind; and it is certainly not confined, nor are its deductions always "mathematical." The deductions of reason, to be sound, must of necessity always have the support of facts in Nature; but the deductions have sometimes been made before the facts were known. We may and do reason from the known to the unknown. The scientific mind and the inventive mind acquire and discover knowledge by reasoning, as it were, beyond existing known facts. Otherwise, we should be compelled to regard all knowledge as the result of accident or blind chance; whereas the mind-labor of these members of society, i. e., scientists and inventors, in the direction of the discovery of new facts, is indeed wonderful; and yet great as have been their discoveries during the last half century, they but serve to show us that the horizon of limitation is a myth, which will never be reached.

Science has not yet advanced far enough along its bound-