straight stem, thus elevating the fruit from the ground into the cool moist touches of the fogs, at times; while letting the vines run caused them to spread out flat on the ground, and the grapes lying immediately upon the warm earth, and in contact with it, are thus sheltered from the adverse influences operating higher above, and were thus fully developed and ripened.

Citric Acid Again.

It never rains but it pours, seems specially true of inventions and discoveries. Several inventors will produce the same instrument simultaneously, each ignorant of what the other has done. Three or four chemists discovered chloroform independently of each other nearly half a century ago. This seems to be the year for citric acid. In a recent number we described the synthesis of citric acid by Grimaux and Adam, from dichlorhydrine. On the 15th of August Kekulé presented a paper to the Berlin Chemical Society, in which he described a totally different synthesis of the same acid. He set out from malic acid, the acid of unripe apples, but one that has been made artificially too. In 1834, Wislicenus had converted it into acetyl-malic acid by treating diethyl-malate with acetyl chloride. The following formulæ will explain this:

Malic acid.	Diethyl-malate.	Acetyl-malic ether.
$COOH$	$COO(C_2H_5)$	$COO(C_2H_5)$
CH_2	CH_2	CH_2
$CHOH$	$CHOH$	$CHO(C_2H_3O)$
$COOH$	$COO(C_2H_5)$	$COO(C_2H_5)$

The last named ether was dissolved in ordinary ether, and, treated with metallic sodium and monobromo-acetic acid, was allowed to act upon the product. Of course the bromide in the latter combined with the sodium in the former to form bromide of sodium, which separated because it was not soluble in ether. The other product was boiled with alcoholic potash, an operation known as saponification. This formed a potash salt insoluble in ether. From this he made the lead salt, and then set the acid free by passing sulphydric acid into its solution. At the time of his making this communication he had not purified the acid, but its reactions with lime salts were such as to satisfy him that it was in reality citric acid which he had obtained.

Andreoni, an Italian, has also given notice that he is trying to make citric acid from the triethylic ether of malic acid by means of sodium and bromo-acetic ether; a method quite similar to that of Kekulé.

It is somewhat interesting to know that Germany, Italy, and France have each solved this problem together, yet independently. England and America must look to their laurels.

Farming in Japan.

Milton S. Vail, a missionary in Japan, gives, in the *Methodist*, the following account of Japanese farming:

"The farmers in Japan seem to operate on a small scale. All the land belongs to government, and all have to pay a ground rent. Wheat, barley, rye, and buckwheat are grown in rows, the weeds being kept out by hoeing. It seems strange to see all their grain growing in rows, but no doubt good crops are thus produced. Rice is the chief product of Japan. The earth nearly everywhere is black, and the black soil of the valleys, when well cultivated and made to hold the water from the neighboring hills, makes good rice fields. The soil is broken by manual labor. Men go in to the mud up to their knees, and with a long-bladed hoe turn the earth over. Horses are used to harrow it down, and when ready, the rice plants are set out by hand. The rice of Japan is very fine, and the Japanese know how to cook it. With them it is the principal article of food—a little rice, with pickles and tea, often constitutes the meal. The people do not know how to make bread, but seem to be very fond of it when they can get it of foreigners. They have flour which they use in various ways in the simplest kind of cookery. I noticed in coming to this place (Hakone, a mountain town forty-five miles from Yokohama) that at some of the inns, instead of tea, they gave us a drink made of pounded wheat. Potatoes, sweet potatoes, egg plants, corn, melons, cabbages, onions, and turnips are also grown, and other vegetables, the names of which I do not know, and never saw in America. I think all the vegetables grown in New York can be cultivated here. Of fruits, we have peaches, plums, oranges, strawberries, pears, and persimmons, also figs."

The Inventor of the Bell Rope on Trains.

Captain Ayres, whose death at a great age was noted recently, was the inventor of the present bell rope system on railroads. When he commenced running on the New York and Erie Railroad the locomotive had no cab for the engineer—nothing but a framework. There was no way to go over the cars nor for the engineer to communicate with the conductor when the train was in motion. In those days, instead of the conductor running the train, as at present, the engineer had entire charge, and the conductor was a mere collector of fares and tickets. In 1842 Ayres inaugurated a system of signals by a cord running over the cars to the engine, where it was attached to a stick of wood. Ayres' engineer, a Dutchman named Hamill, resented the innovation, cut the stick loose, and the conductor and engineer had a fight at Turner's over the matter, Ayres whipping his engineer badly, and thereafter conductors, and not engineers, have had charge of trains. Soon after the bell rope and gong went into general use.—*Paterson (N. J.) Press.*

THE FAN AS AN OBJECT OF HYGIENE.

Says a French exchange—the *Journal d'Hygiène*—the fan, which is used by women of all countries as an ornamental as well as useful article, has also its utility from a hygienic point of view. This can best be shown by giving a brief *résumé* of the history of fans from remote ages up to the present time. We shall find that, dating from most ancient times, the most diverse nations and races have used them; and that the caprices of fashion, while varying their forms and materials, have never succeeded at any period in throwing them out of universal use.

The papyrus, whose large leaves so long served as a writing material, was one of the first plants from which fans were made. It was in Egypt especially that its leaves were used for this purpose. It is said that the daughter of Pharaoh, who saved Moses from the waters of the Nile, held in her hand, during her walk along the banks of the river, a fan made of this very sedge. We find that in ancient Greece the first fans used were made of branches of myrtle, acacia, and plane tree. On the bass-reliefs and ancient monuments of this country we frequently see processions of bacchants bearing thyrses surrounded with ivy and vine leaves, and which, in addition to their ceremonial character, were designed to fan and shade from the sun the heated votaries of the god Bacchus. It was not till the fifth century before Christ that the peacock was known in Greece. From this epoch dates the use among Grecian ladies of the peacock's tail as a new and elegant kind of fan imported from the shores of Asia Minor, and especially from Phrygia. Euripides, in one of his tragedies, recounts how a Phrygian eunuch cooled, according to the custom of his country, the tresses and cheeks of Helen, with a peacock's tail with all its feathers outspread. Dating from that epoch, whenever mention is made of the attire of women, in Greek or Roman authors, fans or peacocks' tails are spoken of. As the art of the fan makers arose the use of feathers alone came to be discarded, as they were found to be too pliable; and hence the artist conceived the happy idea of placing between each feather a thin strip of wood, which not only gave the fans a greater amount of resistance, but also made them more durable.

We frequently find in ancient pictures and on antique vases representations of this very sort of fans; and they are also mentioned in the writings of Ovid and Propertius. The female slaves who were specially employed to carry parasols and fans to shade and drive away the flies from ladies of antiquity when they appeared in public are called by Plautus *flabelliferæ*. In this respect our own modern ladies are much more modest, since they carry their own parasols and suspend their fans by a chain at their side. Fans made of peacock's feathers remained in fashion through the middle ages and up to the seventeenth century, not only in Italy, but also in England and France; but they were rather bouquets of feathers than the fans of our day, although they subserved the same end. In those times, then, peacock's feathers must have been an important article of commerce. In fact, Alexandria and other maritime ports of the Levant shipped to Venice, as well as to other commercial cities of Italy, large quantities of peacock and ostrich feathers, which were prepared in the most ingenious manner and in all possible styles. Soon, however, ostrich feathers came more in favor in fan manufacture, to the exclusion of those of the peacock. Fans of this kind, in all styles, such as were used by Italian ladies of the twelfth, thirteenth, and fourteenth centuries, are to be seen in the pictures of Titian and his brother. Toward the fourteenth or fifteenth century ladies began to wear girdles in the form of golden chains, from which were suspended their keys and other objects. From this arose the fashion still in vogue at the present day, of suspending fans from the belt by means of a small chain. This explains the object of the large ring at the end of the fan handle, which has been handed down from the past. There is a fan in the Museum of the Louvre which once belonged to Catharine de Medicis, that has one of these large rings in the handle.

The inhabitants of Africa and the savages of the shores of the Atlantic make their fans from the leaves of palm trees. In the Dutch possessions of Oceanica, the Malay women make use of the leaves of cocoa palm, pisong, and reeds, instead of fans. In the Indies fans are, as in many other Oriental lands, suspended over the bed, and moved to and fro by means of a cord, by slaves, during the repose of the master or mistress. It is from the East that come those fans made of odoriferous woods, which are calculated to render the air of an apartment oppressive and give one the headache, rather than to make the atmosphere refreshing.

Nowhere has the art of the fan maker been brought to such perfection as at Paris, where the most elegant paintings on tissues of the utmost delicacy give these objects an enormous value, such value being often further enhanced by golden ornaments and settings of precious stones. The present style of folding fan, which is such an improvement over the ancient stiff outspread fan, arose in France.

From what has been said, it will appear that if the fan—even such as it was before modern improvements were made on it—had not been a true article of hygiene it could not have resisted the everchanging caprices of fashion for so many centuries.

ENGINEERING INVENTIONS.

Mr. Burpee R. Starratt, of Truro, Nova Scotia, has patented an improved railroad frog. The absence of the ordinary heavy plates, which compose part of the frogs in common use, gives this frog great advantage, both in weight and cost, and makes it more elastic.

An improvement in high and low water indicators for boilers has been patented by Mr. Florent Ladry, of Brussels, Belgium. The invention consists in a float having only one small pipe extending close to the bottom of float and boiler, to allow the air and steam to circulate freely between the float and boiler, in order to maintain the same pressure on the inside and outside of the float.

Mr. Henry A. Ridley, of Jacksonport, Ark., has patented a spark arrester, which consists of a cone of wire gauze projecting into the smokestack and supported so as to leave an annular space between it and the stack for the escape of cinders, which are received by a cylindrical jacket surrounding the upper end of the stack.

An improvement in paddle-wheels has been patented by Mr. Theodore G. Stritter, of Batesville, Ark. The object of this invention is to lessen the time, labor, and cost in constructing and repairing paddle-wheels, while producing stronger and better wheels. The invention consists in securing the circle braces to the arms of a paddle-wheel by placing metal sockets upon the ends of the braces and attaching the sockets to the arms of the wheel.

Dr. Edward Seguin.

Probably no man ever did so much to put the work of elementary education upon a reasonable and thoroughly scientific basis as Dr. Edward Seguin, who died in this city October 27, in the sixty-ninth year of his age. This, however, without directly attacking the traditional methods of teaching.

Dr. Seguin was educated at the colleges of Auxerre and St. Louis, Paris, and early turned his attention to the education of idiots by physiological training. He established in 1838 the first school for this sort of work, achieving by his marvelous skill and patience results which won him a place in the front rank of the world's benefactors. His school became a model after which seventy-five similar institutions have organized in various countries. The French Revolution of 1848 obliged Dr. Seguin to take refuge in this country, where he spent the next ten years practicing medicine in Ohio. Subsequently he revisited France and then returned to this city. Among his more important works are "Hygiène et Education des Idiots" (1843); "Images Graduées à l'Usage des Enfants Arrières et Idiots;" "Traitement Moral Hygiène et Education des Idiots et des autres Enfants Arrières" (1846); "J. R. Pereire, Primier Instituteur des Sourds et Muets en France" (1847); "Historical Notice of the Origin and Progress of the Treatment of Idiots," translated by Dr. J. S. Newberry (1852); "Idiocy and its Treatment by the Physiological Method" (1866); "New Facts and Remarks Concerning Idiocy" (1870); "Medical Thermometry" (1871); "Prescription and Clinic Records" (1865–77); "Mathematical Tables of Vital Signs" (1865–77); "Thermomètres Physiologiques, Manual of Thermometry for Mothers, Nurses, Teachers, etc." (1873); "Official Report on Education at the Vienna Exhibition of 1873," published in 1875. Among his later essays, "The Physiological Training of the Idiot Hand" is perhaps the most valuable.

Captain R. F. Loper.

Captain R. F. Loper, for many years a prominent inventor and shipbuilder, died recently in Brooklyn. After a long and successful career as a seafarer, Captain Loper settled in Philadelphia and turned his attention to shipbuilding. Between 1847 and 1866 he constructed about four hundred vessels, among the largest being the steamship Lewis, for the Boston and Liverpool Steamship Company; the Star of the South, ten steamships for the Parker Vein Company, and the California, for the Newfoundland Telegraph Company. He also designed and constructed some fast yachts. Captain Loper was the owner of several patent rights, including the Loper propeller engine, propeller boiler, and a patent for constructing a ship so as to prevent decay of her timbers for a long period of time. During the Mexican War Captain Loper built in thirty days 150 surf boats, in which the American troops were landed at Vera Cruz. The naval officials estimated that it would take ninety days to build these boats, but on Captain Loper being consulted he agreed to furnish them in thirty days. Had the time for constructing them been as long as ninety days, General Scott would, in all probability, have been obliged to postpone his expedition against Vera Cruz until the following year. During the late war Captain Loper's services as Assistant Agent of the War Department were of signal value, and were characterized by the well-directed energy and practical success which marked his whole career.

Col. E. L. Drake.

Col. E. L. Drake, the first to sink a well in Pennsylvania for oil, and the pioneer in the petroleum business in that State, died at his home in New Bethlehem, Pa., November 7. The first well was bored in July and August, 1859. Having lost the fortune made by his earlier ventures, Col. Drake was granted in 1864 an annual pension of $1,500 by the State he had done so much to enrich. A statue to his memory is about to be erected in Titusville.

Philadelphia's Elevated Railways.

Reporting the progress of the work on the Pennsylvania Elevated Railway, the Philadelphia *Public Ledger* says that from Sixteenth street west to Twentieth, along Filbert street, the twelve arches in each square, as well as those over the cross streets, have been finished and are ready for the rails, while from Twentieth to Shoch street, to the abutment half way between the former and Twenty-first street, there are eight arches also ready for tracks. From Shoch street west nearly to Twenty-fourth street, nothing has been done yet beyond building the foundation for the iron columns intended to support the trestle work along the middle of Filbert street, but it will not be long before the superstructure is in place, as it has been completed eastward nearly half way to Twenty-third street. At this point workmen are now engaged, by means of an immense traveling derrick running upon a portable railway on each side of the street, in hoisting the columns into place, when they are screwed at the bottoms to iron bed plates, and afterward connected with the upper work forming the roadway by rods and stays. From the made ground or embankment forming the approach to the bridge over Thirtieth street, west of the Schuylkill, and over the bridge across the river, continuing east nearly to Twenty-third street, the iron roadway has been built, and it will not be long before it will be carried eastward to the abutment of the solid roadway on the company's property between Twentieth and Twenty-first streets. The delay so far in the progress of the work is said to have been caused by difficulty in obtaining the iron for the trestle work.

The buildings on the square bounded by Merrick, Filbert, Market, and Fifteenth streets, have all been demolished except two on Merrick street and those along Market street, and on the vacant portion preparations have been made for building the new general passenger station of the company, with restaurant, waiting rooms, offices, etc. The foundations are now being laid along Filbert and Fifteenth streets, and from their substantial character the solidity of the building may be inferred. That portion of the depot between Fifteenth and Sixteenth streets is up one story, at which height the tracks are supported by heavy iron girders resting upon thick iron columns throughout the building, and by the walls of the structure on its eastern and western fronts. It is said a new depot is to be erected at Powelton avenue to accommodate the citizens of West Philadelphia, when the general passenger business, now done at Thirty-second and Market streets, will be transferred to the Fifteenth street depot.

The company are building a large semicircular engine house for passenger locomotives on the west side of their property below Spring Garden street bridge, an immense mass of solid masonry forming the back walls of the building and the retaining wall of the street to the rear. At the sides of the proposed site blasting is going on to remove the rocks which obstruct the progress of the work in those directions. The building will have nineteen tracks, and be capable of housing that number of engines, whose movements will be facilitated by a large turn-table in the center, already in its place in the well built for it. The time for the full operation of the elevated road is set down as the beginning of April.

A Novel Method of Masking Prints.

At the last meeting of the Photographic Society of Toulouse M. Pelegry brought forward a proof representing the Pic du Midi, of Ottau, and the negative which produced this proof.

In the negative the mountain in the background is completely solarized, and by ordinary printing can only produce a proof in which the foreground will be perfectly black if the slightest trace of the mountain is to be obtained. Nevertheless, in the proof shown the mountain is well brought out without the foreground being black, and the negative is untouched.

This result may be obtained by the following process: A rough paper cutting is made of that part of the negative which is to be protected, leaving uncovered the sky, the mountain, and, in fact, all those parts whose development is to be aided. This paper is fixed upon a transparent plate—for instance, the glass of a printing frame. The plate thus partly covered is placed on a chair facing the sun; on another chair, with its back to the sun, is placed the printing frame containing the negative and the sensitive paper. The sunlight reflected from the uncovered part of the glass is made to coincide with those parts of the negative which require to be favored. A much stronger light thus falls upon them than on the rest of the negative, which only receives a diffused light. It will be necessary from time to time to regulate the position of the frame containing the negative, so that the reflected light may continue to fall on the desired spot. To avoid the necessity of constant change the frame may be put slightly in advance of the exact point, and left until it is a little behind it.

If a certain distance—say two yards—be left between the chairs, the transition from that part lightened by the reflected light and that which is not will be perfectly gradual, leaving no hard line on the proof. The chairs may be brought nearer or separated according as a greater or less softening is desired. When the parts lightened by the sunlight have almost reached the required intensity the whole may be brought into ordinary light, or to the sun, to finish the proof.

If the light were reflected by a plated glass the transition from the shadow to the reflected light would be sharper, yet without being too hard, since the light would be refracted by the thickness of the glass, besides being reflected by the two surfaces. The more delicate operations might be carried out in this way.—*Le Moniteur.*

[Science.]

The Comets.

There are now four comets visible with a good telescope, but none of them can be seen with the naked eye. They are all growing fainter, and after a few weeks they will become invisible, even in the most powerful telescopes.

The first is the one discovered by Mr. Schærbele at Ann Arbor, Michigan. This is in the morning sky, and its position for November 4 will be:

A. R. = 5h. 18·9m. Decl. South = 7° 33′.

The second is the one discovered by Mr. Hartwig, at Strasburg, Germany; and also, independently, on the next night by Professor Harrington, of Ann Arbor, Michigan. The position of this comet on November 2 will be:

A. R. = 18h. 21·7m. Decl. North = 9° 59′.

It is thought by Professor Winnecke that this comet is a return of the one of 1506.

The third is the comet discovered by Mr. Lewis Swift, at Rochester, New York, on October 10. This is a faint object, and its position on November 2 will be nearly as follows:

A. R. = 22h. 0·0m. Decl. North=34° 15′.

No orbit of this comet has been computed.

The fourth comet is the one with a period of seven and a third years, and known as Faye's, having been discovered by M. Faye, of Paris, in 1843. The orbit of this comet has been investigated in an admirable manner by Professor Axel Moeller, of Lund, Sweden, and its motion is nearly as well known as that of a planet. The ephemeris furnished by Professor Moeller for the present return is almost exactly correct. The position of this comet for November 2 will be:

A. R. = 22h. 53·5m. Decl. South = 6° 25′.

Since this comet is always at a great distance from the sun, it is a faint object, even on the most favorable occasions. It will soon be invisible except in the larger telescopes.

A. HALL.

Washington, October 28, 1880.

Amusing Mathematical Quid Nunc.

Let one who propounds and understands the problem tell a third person to write down any number, large or small (if a large number the problem will seem more remarkable), without letting him see or know what the number is; write this same number backward—*i. e.*, make the last figure the first, the next to the last the second, etc.; subtract the lesser from the greater, multiply the difference by any number whatever;* rub out any figure in the multiple, and (provided the figure is not 0) add together the remaining figures as if they were all units, and tell what is their sum, then the first person will be able to tell what was the figure rubbed out.

Explanation.—The difference between any number and the same written backward will always be a multiple of 9; of course multiplying this difference by any number whatever does not alter this condition. The sum obtained will still be a multiple of 9; for instance, if the sum so multiplied is 7 times 9 (or 63) and is multiplied by 12, it will be 84 times 9 (or 756). The figures expressing any multiple of 9, if added together as units, will always be 9 or some multiple of 9. If one be rubbed out, the sum of the remainder will be so much less than a multiple of 9, thus: if the sum of the remaining figures are 56 the figure rubbed out was 7, that being what is required to make 63, the next multiple of 9.

The reason for excluding 0 from the figures rubbed out is, that if 0 or 9 be erased the remainder will still be a certain number of 9s, and the person propounding the problem cannot tell whether 0 or 9 was rubbed out; but if 0 be excluded of course the figure rubbed out was 9 (for it must be 0 or 9). If the sum given, after rubbing out one of the figures, be 725, 7 and 2 and 5 are 14, and 4 is wanting to make it the next multiple of 9 (18), which was the figure rubbed out.

W. B. W.

Poisoning by Homeopathic Granules.

Dr. Gaspar Griswold, of New York city, gives in the *Medical Record* an account of a supposed case of paralysis which he was recently called upon to attend, but which turned out to be a case of poisoning from homeopathic granules of "nux," which the patient had taken for sick headache. When threatened with the latter complaint the young lady had been in the habit of prescribing these granules for herself. The dose had originally been five of the pellets, taken two or three times; but that morning feeling very badly, and fearing that the medicine might have lost its strength by having been kept for a year or so, she increased the dose to fourteen, and took it five times—seventy granules in all, in the course of an hour and a half. This occurred about an hour before the alarming symptoms exhibited themselves. She had for the time forgotten that she had taken the medicine, not dreaming that it was the cause of her sickness, and, indeed, considering that "homeopathic medicine was in any case harmless, since it affected merely the disease and not the patient." By the prompt application of such antidotes as are used in strychnine poisoning the patient's life was saved. Dr. Griswold was unable to ascertain the strength of the granules, but one of them which he allowed to dissolve in his mouth had a distinctly bitter taste; and the symptoms exhibited by the patient attested "the presence of a larger proportion of the original drug (nux vomica) than is sustained by any tenet which survives the visionary Hahnemann."

*Or the process may be increased by dividing by any exact factor of the last multiplier (thus making the result apparently more complicated). The explanation is that this multiplication and division is merely tantamount to multiplication by the other factor, and does not change the character of being a multiple of 9. Any other operation (before rubbing out a figure) that does not change that proportion may be added, for instance, subtracting or adding any multiple of 9.

Synthesis of Alcohol.

Writing to *La Nature*, M. E. Lapeyière says: In the porous vessel of a small size Bunsen cell, I replaced the nitric acid by a concentrated solution of very pure crystallizable acetic acid; the external compartment containing very dilute sulphuric acid. I then short-circuited the cell, and left it in action during a certain period (from April 29 to May 27). At the end of this period, the acetic acid had disappeared from the porous cell; being replaced by alcohol in sufficient quantity to allow of my obtaining a few grammes of this substance by distillation. As I had foreseen, the acetic acid assimilated the hydrogen necessary for the production of alcohol. M. Lapeyière found by a further experiment that the acetic acid was first converted into aldehyde, and afterward, by a further absorption of hydrogen, into alcohol, the successive changes being expressed by the following equations, in the equivalent notation:

1. $C_4H_4O_4 + 2\ H = C_4H_4O_2 + 2\ HO$;
2. $C_4H_4O_2 + 2\ H = C_4H_6O_2$.

Manufacture of Phosphoric Acid.

A new method of preparing phosphoric acid from natural phosphates has been devised by Albert Colson. It possesses a decided advantage over the old method where phosphates are employed which contain much iron and alumina. The natural mineral is dissolved in dilute hydrochloric acid. After standing twenty-four hours the clear liquid is drawn off, and the insoluble residue washed with water, which afterward serves to dilute the next portion of acid. The clear liquid is treated with sufficient sulphuric acid of 50° B. to precipitate all the lime in it. This liberates the phosphoric acid, so that the mixture now contains hydrochloric and dilute phosphoric acids and sulphate of lime. It is now subjected to pressure to separate the lime from the acid liquid. The latter is concentrated by boiling, the hydrochloric acid being condensed in coke towers.

The acid liquid thus obtained contains 400 to 500 grammes of anhydrous phosphoric acid per liter, and 40 to 100 grammes of hydrochloric acid.

The less lime the mineral contains the more advantageous, because less sulphuric acid is needed to precipitate it, and there is less loss of the other acid, too, for however much the lime is expressed it always retains a certain quantity of the acid liquid.

The phosphate can be dissolved in hydrochloric acid in wooden vats at ordinary temperatures. The silicious and argillaceous residue is easily washed and does not retain over 0·4 per cent of phosphoric acid. After the sulphuric acid is added it should be left quite a long time, because otherwise the precipitation is not complete. The concentration takes place in a retort built of refractory bricks covered with pulverized asbestos and water glass.

Preservation of Tomatoes.

The following description of the process of canning tomatoes occurs in a letter from Mr. Sharples, of Boston, Mass., published in the October number of the *Analyst*:

"The tomatoes are raised in the surrounding country here—chiefly in Arlington and Belmont, which lie about six or seven miles northwest of Boston. The kind preferred at present are known as the Boston Market; these are a smooth, compact tomato, weighing from 150 to 200 grammes; they are very solid, being well filled with meat and very few seeds. These are brought in daily and sold to the factories. At the factory they are emptied, a bushel at a time, into a wire basket, and then scalded by dipping into a tank of boiling water. They are then removed to a large table, when they are sorted into firsts and seconds only, the ripest being packed as firsts. They are then measured out into pails holding about a peck each, and passed on to the skinners, who carefully skin and core them. They are then ready for packing. The cans are filled by hand, the tomatoes being packed as closely as possible into the can. It is found at this stage of the operation that the juice is present in excess and a considerable portion of it is thrown away. No water is ever used, as the tomatoes furnish more than enough.* After the cans are filled to within an eighth of an inch of the top, the lid is placed upon them and soldered fast. A small hole is then punched in it, and the cans are placed in a hot bath until steam issues from the hole: they are then removed from the bath and allowed to cool slightly and sealed; they are then returned to another bath in which they are boiled from thirty to forty-five minutes; from this bath they are removed to a cooling room. Next morning, when cooled, they are stacked. At the end of the packing season the cans are examined, and those which have spoiled are rejected. The condition of a can can almost always be told from an examination of the outside. A can in good order has the ends concave. If, on the other hand, the ends are convex, it is almost certain that the can is spoiled."

* A perfectly ripe tomato, skinned and cored, weighed 127·5 grammes. On drying it left a residue weighing only 7 grammes, or 5·49 per cent of the original weight.