JOHN SCOTT RUSSELL.

The decease of this eminent engineer was recently announced in the SCIENTIFIC AMERICAN. We now give a portrait from the *Illustrated London News.* He died in June last, at Ventnor, in the Isle of Wight, in the seventy-fifth year of his age. He was born in the Vale of Clyde in the year 1808. On the death of Sir John Leslie, Professor of Natural Philosophy in Edinburgh, in 1832, Scott Russell, though then only twenty-four years of age, was elected to fill the vacancy temporarily. About this time he commenced his famous researches into the nature of waves, with the view to improving the forms of vessels. His first paper on this subject was read before the British Association in 1835. He discovered during these researches the existence of the wave of translation, and developed the wave line system of construction of ships, in connection with which his name is now so widely known.

The first vessel on the wave system was called the Wave, and was built in 1835. He succeeded in having his system employed in the construction of the new fleet of the West India Royal Mail Company, and four of the largest and fastest of these vessels—viz., the Teviot, the Tay, the Clyde, and the Tweed—were built and designed by himself.

Mr. Russell was for many years known as a shipbuilder on the Thames. The most important work he ever constructed was the Great Eastern steamship, which he contracted to build for a company of which the late Mr. Brunel was the engineer. The Great Eastern, whatever may have been her commercial failings, was undoubtedly a triumph of technical skill. She was built on the wave line system of shape, and was constructed on the longitudinal double skin principle, which also was invented by Mr. Russell. It is not necessary now to refer to this ship in any detail. In spite of the recent advances made in the size of vessels, the Great Eastern, which was built more than a quarter of a century ago, remains much the largest ship in existence, as also one of the strongest and lightest built in proportion to tonnage. The paddle engines and boilers of this vessel were also made and designed by Mr. Russell. He was one of the earliest and most active advocates of ironclad men-of-war.

In early life he took a great interest in steam locomotion on ordinary roads, and while at Greenock he constructed a steam coach which ran for some time successfully between Greenock and Paisley. The springs of this steam carriage, and the manner in which the machinery adapted itself to the inequalities of the road, were triumphs of ingenuity.

His greatest engineering work was without doubt the vast dome of the Vienna Exhibition of 1873. This dome is, among roofs, what the Great Eastern is to ships, its clear span of 360 feet being by far the largest in the world. It will be probably the most enduring monument of its designer's fame and ability.

JOHN SCOTT RUSSELL.

MICROSCOPICAL EXAMINATION OF ICE.

BY EPHRAIM CUTTER, NEW YORK, MEMBER PHILOSOPHICAL SOCIETY GREAT BRITAIN, ETC., ETC.

PRELUDE.

This paper is a report of an examination of the forms found in the water derived from the melting of ice used in domestic consumption. The subject is one that is interesting, because ice is an article of commerce, and is extensively consumed in this country.

Again, it is interesting as the notion prevails that water is purified by freezing, and hence can be used freely, even though it may come from ponds or lakes whose waters are impure. How far this notion is sustained by chemical examination is seen in the following extract:

"The notion that ice purifies itself by the process of freezing is not based upon trustworthy scientific observation. On the contrary, it is utterly wrong in principle to take the ice for consumption, from any pond the water of which is so fouled as to be unfit for drinking purposes."*

Again, how far the notion of ice purifying itself by freezing is sustained by a morphological (*morphos*, form, *logos*, account) examination may be gathered somewhat from what follows. I say "somewhat" advisedly, since the report simply relates to the specimens examined, and may be modified by subsequent examinations. So far as the results are positive, they are final as to the specimens examined, but not as to specimens not examined. Those must be judged by themselves. The examinations reported here are microscopical, and relate to objects not recognized by the unaided vision, which for distinction is now termed *macroscopic* (*macros*, large, and *scopein*, to view); this includes ordinary vision. Should any doubt, it is easy to test the statements by taking domestic ice sufficient to fill an ordinary ice pitcher which is clean. Melt and filter the water resulting through a bag made of fine twilled cotton, say three inches by one and one-half, and when the water is filtered down to the capacity of the bag, inverting the bag into a clean tumbler or goblet, then sopping it in the water in the goblet, and finally twisting the bag longitudinally.

The filtrate thus obtained will give to the naked eye an idea of the amount of dirt found; and if the quantity of dirt is like that obtained in the preparations for the following observations, some surprise will be excited and evidence afforded to sustain those who are accustomed to filter drinking water into jars or bottles, and to cool it indirectly by placing said jars of water into a refrigerator. Indeed, Dr. Cuzner, the artist, will testify that ice enough to fill a goblet has, when melted, produced foreign substances in quantities incontestably evident before the microscopical examination. Still, as will be seen in ice examined at Amherst, Mass, I found hardly any sediment. Hence, all ice is not to be pronounced impure, but rather the ground is to be taken that if some ice is quite free from dirt, the great ice companies should take pains to furnish only such ice for drinking purposes.*

There is no doubt that ice exposed to the air after it has been taken from the water, especially in summer time, attracts dirt. This is seen in the refrigerating apparatus of Mr. A. J. Chace, of Boston, who cools and purifies air by ice aspiration. Last summer the writer placed at Weehawken, N. J., near 42d Street pier ferry, a simple apparatus made of a common wooden water pail, with four half-inch holes bored in sides, two inches above the bottom; one inch higher was a shelf of oil cloth loosely fitted; on this was placed ice. The top was loosely covered with oil cloth. The rationale was that the ice as it melted cooled the air, which was displaced through the side holes; then warm air would enter the crevices at the top, and thus a current would be formed, which, carrying with it the bodies found in the air, would then lodge on the ice by its stickiness during melting.

In an exposure from 8 P.M. to 7 A.M. next day, the mass of ice nearly melted, and what was left was covered black with dirt; and the water from the melting was so loaded with sand and dirt, that I was unable to obtain the object of the aspiration, to wit, the detection of the so-called ague plants of the district. So it seems that ice conveyed in open carts on highways must attract more or less dirt that floats in the atmosphere, and may explain the superabundance of dirt in urban as compared with suburban ice.

It will be my aim to show what forms may have come from the water, and what from the air. When large cakes of ice are black with interstitial dirt frozen into its substance (as seen this summer on 8th Avenue), it needs no expert to point out presence. This report is intended to show something of the field for exploration that here is open to the student of food stuffs. It is not intended for alarm, nor for discredit of ice companies, for there is no doubt they use care and judgment in their business. Nor does it aim to exclude ice from use. It would simply try to regulate use by knowledge, so that exposure to filth may be avoided as much as possible.

FIRST EXAMINATION.

Ice said to be from Maine, from a New York ice company. It was soft, cloudy, spongy, light, opaque. Mode of examination: A clean bag, one half inch by four inches, made of cotton cloth, was tied to the escape pipe of a refrigerator—zinc lined, shelf at top—that had been washed and cleansed with filtered water. The filtrate of from thirty to forty pounds of ice was collected by inverting the detached bag into a clean goblet, then sopping the inverted bag in the filtrate, and wringing the bag also. Power of microscope, one-fifth inch objective. Eye piece, one inch and half inch, 350 diameters.

Fig. 1, drawn by Mr. Hotchkiss, from specimens: 1, Yeast; 2, bacteria; 3, pelomyxa; 4, difflugia; 5, yeast vegetating filaments; 6, mycelial filaments of red water fungus; 7, dark red organic unknown body; 8, trachelomonas; 9, astrionella formosa; 10, bast fibers; 11, ascus; 12, wool; 13, spherotheca fungus; 14, decaying leaf; 15, difflugia unusual; 16, monad; 17, silica; 18, carbon; 19, feather barb; 20, difflugia globosa; 21, epithelia; 22, starch of corn, wheat, and potato; 23, egg of bryozoa; 24, dirt, debris, etc.; 25, abundant mycelial filaments; 26, actinophrys sol; 27, aneurœa monostylus; 28, bacillaria diatom.; 29, chitin; 30, closterium; 31, cotton fiber; 32, diatoma vulgaris; 33, other diatomaceæ; 34, dinobryina sertularia; 35, eggs of entomostraca; 36, epidermis of wheat; 37, euglenia viridis; 38, gemiasma verdans; 39, hair of plants; 40, leaves of moss; 41, liber fibers; 42, lyngbya; 43, oscillatoria; 44, pediastrum boryanum; 45, other pelomyxas; 46, peridinium cinctum; 47, pitted ducts; 48, potato starch; 49, protococcus; 50, rotifer; 51, scenedesmus quad.; 52, skeleton of leaves; 53, silk; 54, spiral tissues of leaf; 55, transverse woody fiber. Thirty-three of these objects belong to fresh water, and twenty-two to air as a medium of communication. At my request, Dr. G. B. Harriman, of Boston, examined this filtrate, and found about two-thirds of the forms found in Boston ice by him, and reported farther on.

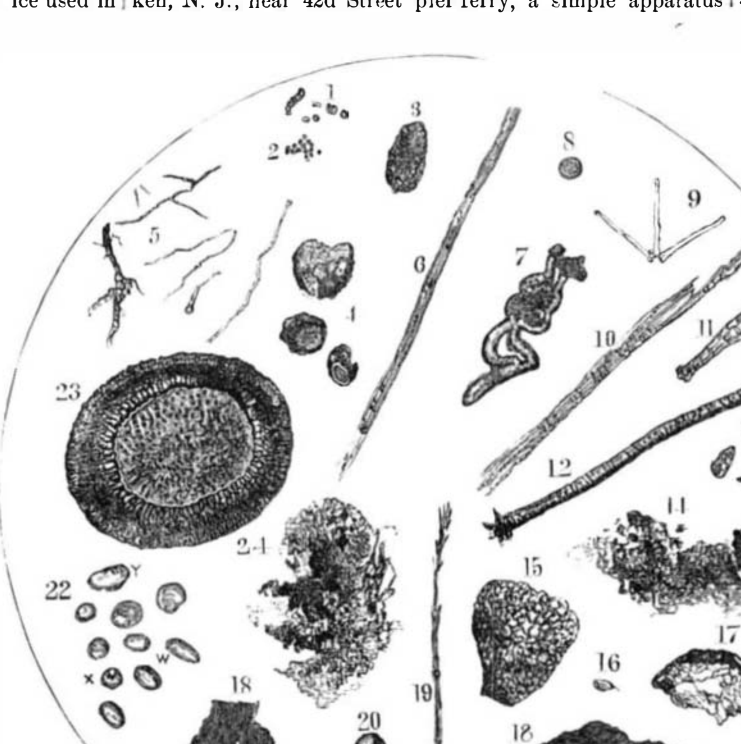

Fig. 1.—MICROSCOPICAL EXAMINATION OF ICE.

DESCRIPTION OF CUT. (FIG. 1.)

1. Yeast. This is the alcohol yeast of the yeast pot, torula cerevisiæ, the spores of which are everywhere present, ready to germinate if they have the opportunity. Its presence in ice is interesting.

2. Bacteria. These are minute self-moving protoplasmic bodies. Some regard them as ultimate forms of life; others that they are but the embryonal forms, seeds, or babies (as it were) of a vegetation, yet capable of immense reproduction by division, arranging themselves into masses, chains, etc., at will. In order to know what plants they belong to, culture is necessary. It is possible that those in the cut may be the spores or seeds of the yeast plants, but it cannot be said with certainty.

3. Pelomyxa. This means "mud mucus." It is an animal classed with the rhizopod or root-footed protoplasmic animals. They are very greedy, and eat much mud or dirt. The color in this case is dark amber, and may be mistaken for decaying vegetable matter. The writer regards them with suspicion, as contributing when dead and decaying to cause the "cucumber" and fish oil taste that sometimes occurs in hydrant drinking waters, notably the Cochituate.

4. These are portions of difflugia (Latin, *diffluo*, to flow); these are like number 3, only they have the property of building over themselves a covering made of particles of sand glued together so as to protect their structural proto

* Seventh annual report, Massachusetts State Board of Health, 1876. Prof. A. H. Nichols, chemist, Massachusetts Institute Technology, Boston.

* Another very practical way to get information of this character is to inspect the bottom of an ice pitcher inside, after it has been used freely for drink.

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plasmic bodies. Lately, the writer saw a difflugia cratera, whose shell had been broken on one side. The cilia that were usually seen at the natural opening were seen to be active at the artificial opening. The contour of the hole changed under view from circular to a narrower one, forming a segment of the first; showing an action of repair; suddenly there was a gush of protoplasmic jelly, and the animal was dead, dying in its efforts of reconstruction!

5. Yeast filaments, such as are seen in fluids where air has access.

6. Mycelial filaments of a red fungus, found commonly in Horn Pond, Woburn, Mass.; also at Cambridge. Name not known to writer.

7. Is a curious dark red tubular body, fragments of which I have often seen in hydrant drinking waters. Its fracture is glassy. It is an animal substance probably, and this is the best specimen I have seen.

8. Trachelomonas. These are by Ehrenberg claimed as infusoria. They are very abundant in hydrant waters at all seasons of the year. The specimen here is dead, but the living individual moves its curious long flagelliform filaments, by means of which it gracefully propels itself in any direction at will.

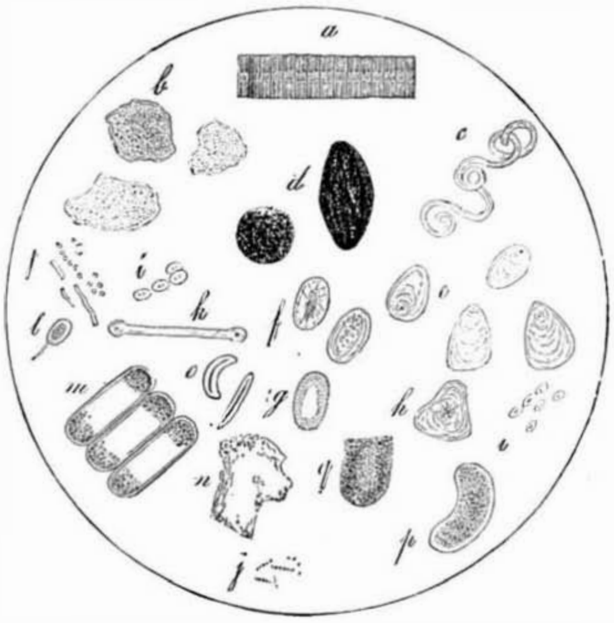

Fig. 2.

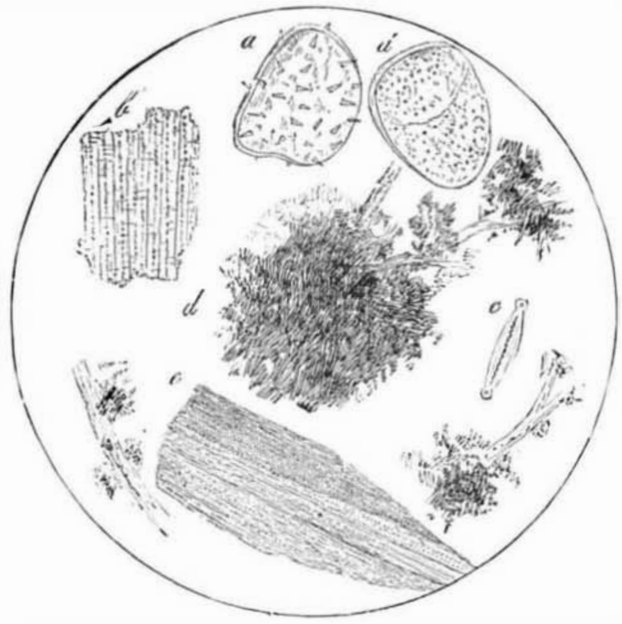

Fig. 3.—One inch objective.

9. Astrionella formosa. A beautiful, very common diatom, that arranges itself into forms like the spokes of a wheel. Three spokes only are here given; usually, twelve. This power of self-symmetrical arrangement is surprising and mysterious.

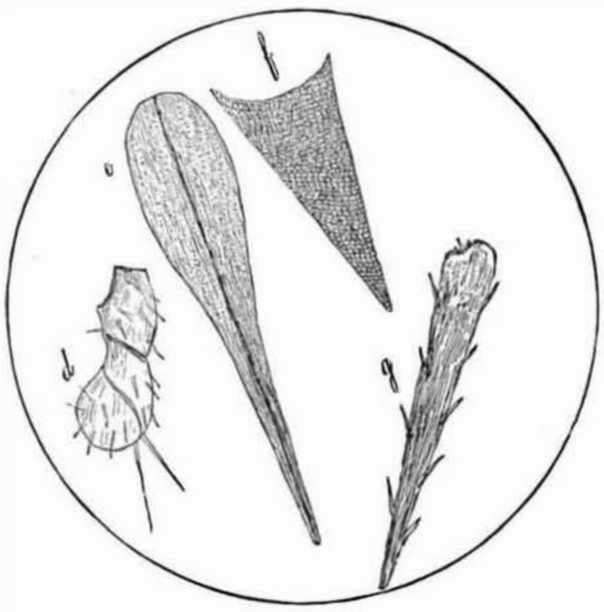

Fig. 4.

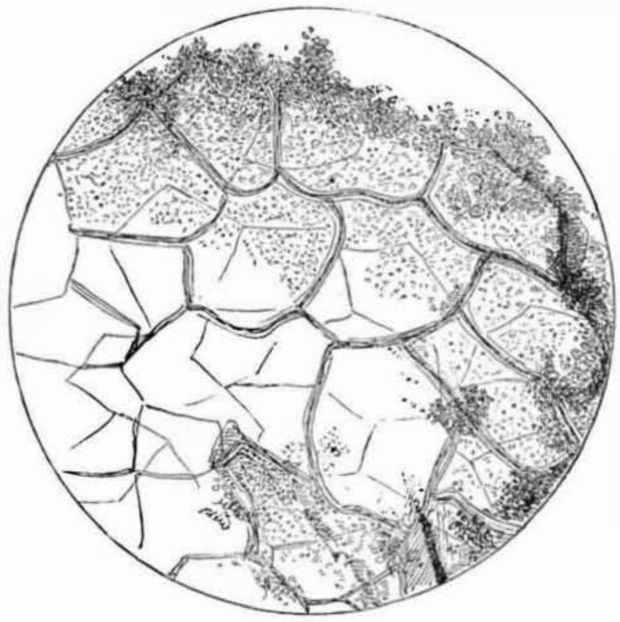

Fig. 5

Fig. 6

10. Bast or linen fiber. This probably came from some table cloth, towel, or clothing.

11. This may be an ascus or theca of a fungus, which is a part of a fructification of the fungus, and also found in lichens. It is strikingly well developed.

12. Wool fiber. Note the maceration at one end.

13. This is found in mildews.

14. Decaying leaf.

15. Probably a large difflugia.

16. An isolated infusoria; very common in hydrant water.

17. Piece of difflugia.

18. Charcoal, probably.

19. Feather barb.

20. A very small difflugia globosa.

21. Epithelia; probably animal. These are suspicious organisms. See New York *Medical Record*, April 8, 1882. They are parts of the investing covering of all portions of the human body, inside and out.

22. Starch grains: X, corn or maize; Y, potato; W, wheat.

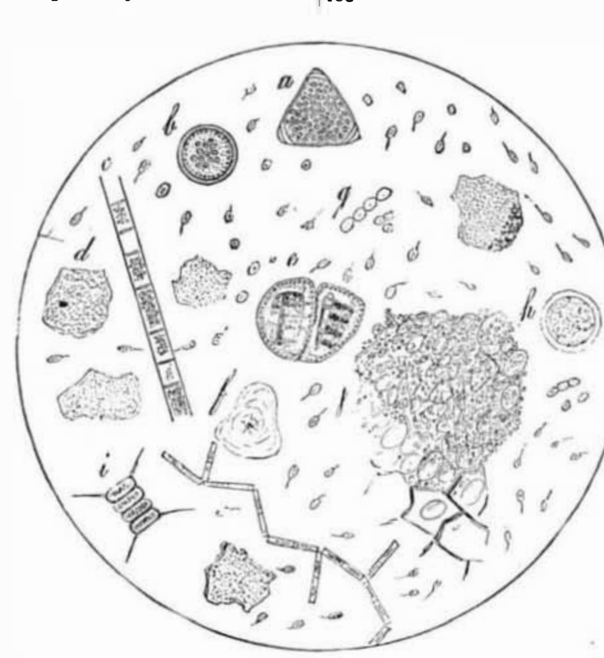

Fig. 7

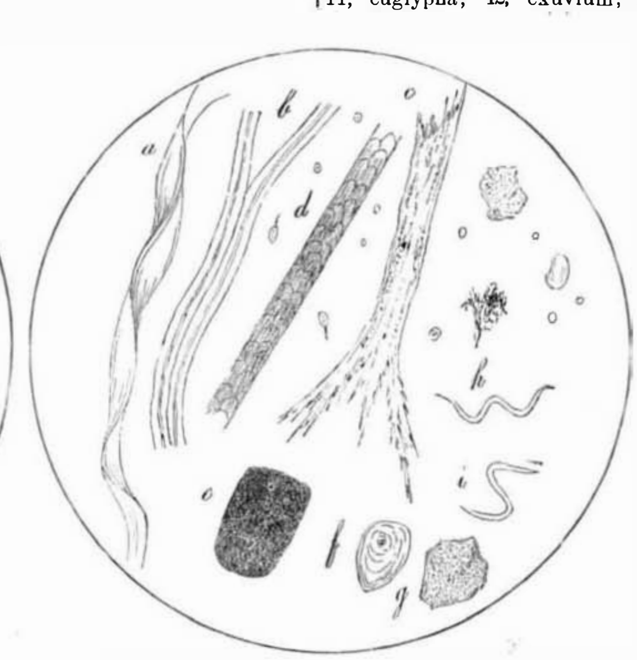

Fig. 8.

23. This is the egg of a bryozoa or polyzoa, found not unfrequently in the drinking waters of our cities and towns. It corresponds to the "winter egg" of entomostraca. It forms one of the four modes of reproduction which Smith distinguishes: First, eggs from spermatozoa; second, from internal development (*this very one*); third, external buds; fourth, brown bodies in empty eggs. This particular egg is seen to have an oval opening, whence the contents have been hatched or destroyed. It has been traced to a single polyp. Usually, the animals live in a colony, and are met with in fresh water on stones, sticks, sides of flumes, and free. I have seen colonies of these bryozoa in masses as big as a bushel basket, hanging on and covering the perpendicular boards of a flume. In the present case, the egg is nearly as large as the animal in a state of rest. Its detection shows decidedly the presence of animal life in ice

24. *Dirt.* This is hard to picture, but should have a place in this report, though it has been defined as "matter out of place."

Of the remaining thirty-one things named, six are animal or animal substances, the rest are vegetable or vegetable substances. They do not include the whole of objects found, as some could not be classified or named by the writer. It may be of interest to add that the melted filtered water from this specimen was quite black and dirty looking to the naked eye, and that the examination of this specimen shows impurities, both from bodies that float in, or are blown through the intervention of, the air; and, also, those found in the water of the ponds and lakes, and that are used for drinking purposes. So far as it goes, the examination favors the cooling of drinking water by indirect contact with ice as a cooling agent, or by setting the filtered water in a refrigerator. How far the things named are injurious has not yet been settled. It is a problem that may well attract the attention of those interested in the department of public medicine, though there is no doubt that drinking water is more potable without them.

SECOND EXAMINATION.

Ice from a New York Company. A common silver ice pitcher, porcelain lined, was cleaned with filtered Croton water and filled with broken ice, source unknown, clear, compact, solid, diaphanous, and pure looking. This was allowed to melt. One quart of water resulted, and was filtered as before, and examined with following results:

1, Bacteria; 2, bast fiber; 3, broken down tegument and substance of leaves; 4, coal; 5, closterium lunare, dead; 6, collection of liber fibers; 7, collection of mycelial filaments; 8, dirt abundant; 9, a desmid, penium; 10, difflugia globosa; 11, euglypha; 12, exuvium; 13, egg of the fresh water polyzoa above named, unhatched; 14, euglypha cristata; 15, foot stocks of vorticells, twenty-five in number; 16, fiber of wool, colored blue; 17, fungus filament; 18, gluten cells, wheat; 19, gromia, dead; 20, humus; 21, large paramecia; 22, leptothrix; 23, long vegetable hair; 24, linen fiber embedded in a mass of decaying vegetable substance; 25, large double body, probably eggs, but possibly vegetable; 26, nostoc; 27, membrum disjectum of a large entomostraca; 28, pelomyxa; 29, potato starch; 30, portion of a leaf with chlorophyl attached, color unchanged; 31, silica; 32, shell of a cyprus; 33, supposed egg of an entomostraca; 34, vorticell, dead; 35, vegetable hairs; 36, worm; 37, wheat starch; 38, yeast. Twenty of these objects are aquatic, the rest come by means of air.

THIRD EXAMINATION.

Same as preceding, with more ice of like kind. 1, Amœba; 2, bacteria; 3, corn starch; 4, cotton fiber; 5, chitin; 6, claw

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of water spider; 7, dirt; 8, daphne claws; 9, epithelium, animal and vegetable; 10, gromia; 11, gemiasma; 12, humus; 13, linen fiber; 14, potato starch; 15, pelomyxa; 16, parenchyma of leaf; 17, portion of a red water fungus; 18, piece of a red cranberry skin; 19, protococcus, probably gemiasma; 20, silica; 21, silk fiber; 22, vegetable hair; 23, wheat starch; 24, wheat gluten cells; 25, yeast. Ten of these objects come from water.

FOURTH EXAMINATION.

G. B. Harriman, D.D.S., of Boston, Mass., my associate, reports as found in the melted water of one cake of ice, Boston Highlands: 1, acanthodinium, with clusters of twelve spiral cells separated in all directions; 2, botridium cells; 3, closterium; 4, chlorococcus; 5, cotton fiber; 6, cryptomonas lenticularis; 7, claws of insects; 8, decaying leaves; 9, dust and excrementitious matters; 10, difflugia, dead, several varieties; 11, daphne claws; 12, epithelial scales, human; 13, fish scales, 14, fungi and spores; 15, humus; 16, hairs of various animals; 17, linen fiber; 18, large masses of decaying vegetable substances; 19, navicula; 20, nebalia; 21, peridinium cinctum; 22, peredinium spiniferum; 23, starch; 24, vorticella, two joined together; 25, wood fiber of various kinds; 26, yeast.

FIFTH EXAMINATION.

Ice from Amherst, Mass., furnished by Mr. C. H. Kellogg. Specimen taken from his cream cooler, and thoroughly washed. This showed but little morphological impurity beyond epithelia, animal and vegetable. From statements made by Mr. Kellogg, this ice was probably chemically contaminated by a paper mill.

SIXTH EXAMINATION.

Ice from Horn Pond, Woburn, Mass. This presented considerable lightish colored deposit, in which a few animal and vegetable forms were found, but was mainly made up of epithelia and amorphous dirt. The result was unexpected, as unfiltered Horn Pond water is rich in forms of life.

SEVENTH EXAMINATION.

Ice from New Haven, Conn. This specimen was quite free from forms of life.

EIGHTH EXAMINATION.

Ice from a provision store, July 13. 1, Amœba, alive; 2, bacteria; 3, cœlastrum sphericum; 4, chlorococcus; 5, diatoma vulgaris; 6, epithelia; 7, linen fiber; 8, monads; 9, monostylus aneurœa; 10, mass of carbon; 11, nostoc; 12, one gonidia of cœlastrum sphericum; 13, protococcus; 14, scenedesmus obliquus; 15, scenedesmus quadricauda; 16, starch grain; 17, staurastrum; 18, tabellaria; 19, tetrospore; 20, trachelomonas; 21, vegetable epithelium collection; 22, young closterium.

FIGURE 2.

Forms found in ice used in New York. Drawn by Dr. A. T. Cuzner, Peekskill.

a. Tabellaria.—A diatom found commonly in all surface drinking water. They have the power to arrange in rows, and the specimen in the cut has fifteen individuals in one aggregation, which is a small one. Diatoms are regarded as plants by the majority of observers. A good deal of difficulty arises from trying to measure things with the lines and plummets of past time, when the things in question were absolutely unknown, and hence could not be properly named at the date when the word "plant" was invented. As knowledge increases names must be changed. The diatoms are generally regarded as innocent, though some observers take the opposite ground.

b. Epithelia. These are probably human, washed into the water and frozen into the ice. They are constantly thrown off in washing, sputa, and the excretions of the body. They are also found on all other vertebrate animals and on vegetables.

c. Is spiral tissue from some leaf, probably.

d. Is a gromia—a rhizopod—animal.

e. Is potato starch more highly magnified than in Fig. 1. It is somewhat remarkable how long a time starch will exist unchanged in shape and form in pond waters.

f. Wheat starch cooked.

g. Wheat starch uncooked.

h. corn starch.

i. Yeast.

j. Bacilli, vibriones, bacteria.

k. Astrionella formosa.

l. Monad.

m. Three algæ ranged side by side, green chlorophyl collected at extremities.

n. Chitin.

o. Sporangia fungus.

p and *q.* Pelomyxas.

FIGURE 3.—(CUZNER).

Forms found in ice water, New York.

a, a'. Carapaces of entomostraca.

b. Tegument of wheat.

c. Synhedra, a diatom.

d. Mass of dirt, *débris*, etc.

e. Leaf of moss.

The other objects are portions of decayed leaves.

FIGURE 4.—(CUZNER).

One inch objective. Ice water forms.

d. Portion of limb from a water spider.

e. A sphagnum leaf entire.

f. Portion of another sphagnum (moss), leaf with reticulation shown.

g. Spined vegetable tissue.

FIGURE 5.

Portion of tree leaf with parenchymatous chlorophyl. This was drawn from a solar projection by Dr. Cuzner. It shows how the process of decay was averted by freezing.

FIGURE 6.—(CUZNER).

Mycelial filaments of a vinegar yeast found in connection with melting ice. At the bottom are the embryonal spores of the yeast.

This shows what happens when ice water is allowed to stand exposed to the action of the air. A long, dirty, grayish, gelatinous ribbon, half an inch wide and about one-eighth inch thick, appeared to be a mass of what is called "the mother of vinegar." The cut gives the appearances under the microscope. The significance shows what is the full development of some of the embryonal forms of life found in ice water when subjected to conditions that are present in refrigerators.

FIGURE 7.—(CUZNER).

Forms from Boston ice. (Not from Dr. Harriman's specimen.)

a. Epilobium montanum—pollen.

b. Diatom.

c. Melosira.

d. Pavement epithelia. Five specimens.

e. Diatom vulgare.

f. Starch.

g. Alcohol yeast

h. Protococcus.

i. Scenedesmus quadricauda.

j. Parenchyma of wheat.

The numerous objects in this field are monads that developed in large numbers in the specimen kept for a few days, as might be expected.

FIGURE 8.—(CUZNER).

Objects found in ice water.

a. Cotton fiber.

b. Silk fibers.

c. Bast fiber frayed by maceration.

d. Wool.

e. Pelomyxa.

f. Starch. (This is common.)

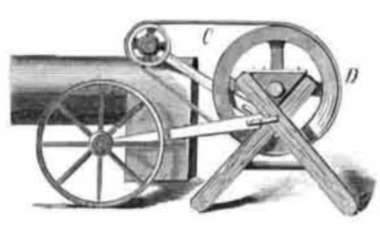
g. Epithelia pavement.

h, i. Curious algæ, sometimes crooked like an oxhorn, allied to ankistrodesmus falcatus.

MECHANICAL INVENTIONS.

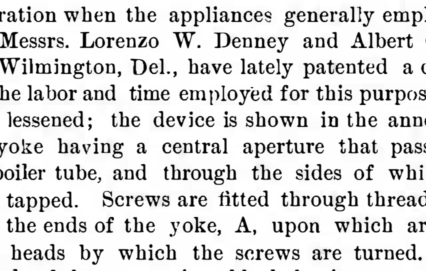
Motor and Thrasher Connection.

We give an engraving of a novel device for connecting motors and thrashers, which consists of a jack, tumbling rod, and belt, so arranged that the motor may be placed at any desired distance from the thrasher and a short belt may be used. C is a jack formed of two X-shaped side frames connected by rounds, and having bearings secured in their upper angles in which the journals of the wheel, D, revolve. Around this wheel passes a belt which also passes around the band wheel of the engine. The jack is supported against the pull of the belt by two braces, the ends of which rest in the side angles of the frame. The outer end of one of the braces rests against the bearings of the band wheel, and the outer end of the other rests against the rear wheel of the engine. These braces form all the support that the jack needs. One of the journals of the wheel, D, projects toward and is squared to fit into the square socket of a tumbling rod, that is connected at its other end to the journal of a thrashing cylinder. This device has been patented by Mr. Cyrus Stine, of McVeytown, Pa.



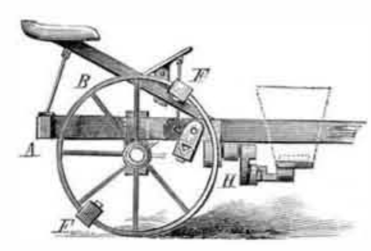
Apparatus for Drawing and Replacing Boiler Tubes.

The removal of a defective flue from a boiler is a laborious operation when the appliances generally employed are used. Messrs. Lorenzo W. Denney and Albert C. Johnson, of Wilmington, Del., have lately patented a device by which the labor and time employed for this purpose are materially lessened; the device is shown in the annexed cut. A is a yoke having a central aperture that passes freely over a boiler tube, and through the sides of which a set screw is tapped. Screws are fitted through threaded apertures in the ends of the yoke, A, upon which are formed squared heads by which the screws are turned. At the lower ends of the screws is a block having a central aperture corresponding to the aperture in yoke, A, and is formed with steps for receiving the ends of the screws. A starting plug that enters the tubes and has a shoulder to take against their ends, also has a hole at its smaller end for connecting a chain that will pass through the tube and be secured to the yoke, A. In use the block at the end of the screws is placed against the boiler head, with its aperture over the tube to be drawn, a chain from the yoke, A, is passed through the tube and secured to the starting plug, and the screws being turned, the tube is started, and when it is drawn far enough to receive the yoke, A, the chain and plug are removed and the yoke clamped to the tube by the set screw, and the screws operated as before. This operation is reversed to replace a tube.



Seed Planter.

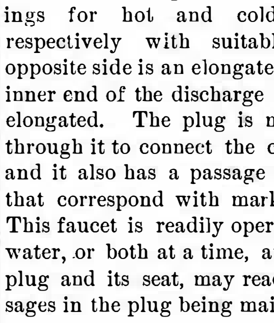
Mr. John W. Bunch, of Commercial Point, O., has patented a simple and effective mechanism for operating the seed dropping slide of a planter from the transporting wheels, and also to hold the wheels from revolving when turning and when adjusting the machine to bring the cross rows in line. In the accompanying cut, A is the frame of an ordinary seed planter, and B the transporting wheels, which are rigidly secured to the axle of the planter, the wheels carrying the axle in their revolution. The axle revolves in bearings in blocks adjustably secured to the side bars of the frame, A, by bolts. To the rim of each wheel are firmly attached directly opposite to each other, blocks, F, that are designed to mark the hills and operate the seed dropping mechanism. The inner end of one block of each wheel is rounded and secured to the wheels in such positions that when the block with a rounded end of one wheel is in contact with the ground the corresponding block of the other wheel will be at its top. To the lower side of a cross bar of the frame, A, is pivoted a bar, on the ends of which are cranks, H. The rear arms of the cranks are in such positions that they will be struck successively by the rounded ends of the blocks, F. The forward ends of the cranks are connected in such a manner to the seed dropping slide by this construction that when they are struck successively by the rounded blocks, F, the dropping slide will be moved so that seed will be dropped at each half revolution of the wheels. By a lever under the control of the driver, the wheels are prevented from revolving when turning around at the ends of the rows.



MISCELLANEOUS INVENTIONS.

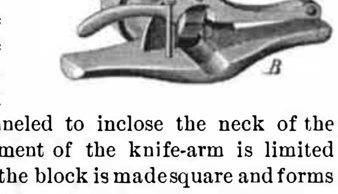
Hot and Cold Water Faucet.

Mr. John H. Seabury, of Hempstead, N. Y., has recently patented a simple and efficient water faucet, from which hot or cold water may be drawn separately, or both may be drawn at the same time. The barrel of the faucet is made tapering, to form a seat for the plug, which is held in the ordinary way. The plug has the usual handle, and has also a dial on the plug for indicating the character of the water discharged, that is, hot, cold, hot and cold, and for indicating when the faucet is closed. The barrel is provided at one side with inlet openings for hot and cold water, that are connected respectively with suitable supply pipes, and at the opposite side is an elongated general delivery passage to the inner end of the discharge nozzle, which is correspondingly elongated. The plug is made with a transverse passage through it to connect the cold water inlet with the nozzle, and it also has a passage having three terminal openings that correspond with marks on the dial for the hot water. This faucet is readily operated to deliver either hot or cold water, or both at a time, and with the taper form of the plug and its seat, may readily be kept tight, and the passages in the plug being mainly transverse are easily made.



Billiard Cue Cutter.

Mr. Patrick Ryan, of New York city, has patented a new device for making a true cut on the ends of billiard cues. In the accompanying engraving A, is a sleeve provided with a clamping screw, and it also has a flange on its forward end. B is a stock that is swiveled to the sleeve and carries a hinged knife, and a recess in front of the opening in the sleeve, A, forms a continuous passage through the shell to the outer edge of the stock. D is a knife-arm secured upon the stock and channeled to inclose the neck of the shell. The upward movement of the knife-arm is limited by a stop, and the face of the block is made square and forms an abutment and guide, so that the knife will always move in a plane exactly at right angles to the sleeve, A, in which the cue is placed and securely held for trimming.



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