DEEP SEA DREDGING.

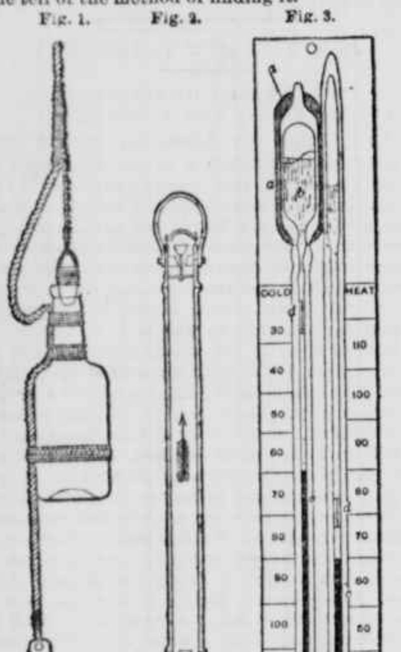
THE HARVEST OF THE OCEAN BED.

PREREQUISITES FOR A GOOD HAUL—RAKING AND SWEEPING THE SEA BOTTOM COMPARED WITH SCRAPING—A PARTY OF NATURALISTS AT THEIR DEVOTIONS—MUD TREATED SCIENTIFICALLY—NAMES WHICH ARE PROPER BUT NOT COMMON.

[FROM THE SPECIAL CORRESPONDENT OF THE TRIBUNE.]

PORTLAND, Me., Sept. 3.—Fisherman's luck is proverbially uncertain, and dredging for marine animals shares this characteristic. Almost anywhere on the coast in this vicinity you may bring up with the first haul of the dredge what New-York market people would designate as a "small measure" of sea urchins, sea-weed, five-fingered Jacks, and the commoner kinds of sea anemones, with a few crabs, clams, or mussels and plenty of mud. But a good day's work, which shall include the larger and the rarer specimens among the captures of dredge and trawl, is only an occasional event. Viewed in this light, the dredging excursion of the American Association for the Advancement of Science on the U. S. steamer McCulloch, last Friday, was not a success, although it was in other respects a very enjoyable affair. Where the comfort of so many pleasure-seekers is to be looked after, scientific dredging is scarcely practicable, since it is not often the case that there is smooth water over the most fertile sea bottoms. Nor was I much more fortunate in this respect, the same day, in casting my lot with a smaller party on the Blue Light, though the presence of the Secretary of the Navy made a very agreeable addition to a pleasant company. But on a subsequent day a still smaller party on the Blue Light started out exclusively with a view to business. There were no pleasure-seekers aboard. Neither was there any intention to make up a fishing party and seek the grounds of the cod and the haddock. Nobody but naturalists, your correspondent, and the crew were on the boat: and when one of the naturalists found that the swell of the sea affected him, the boat returned to the wharf, he was put ashore, and we started again. And on this trip our virtue brought its reward. But before mentioning what we found let me tell of the method of finding it.

Fig. 1. Fig. 2. Fig. 3.



WATER-BOTTLES AND THERMOMETER.

Fig. 1—German water-bottle. Fig. 2—Water-bottle in use on the Blue Light. Fig. 3—The Deep Sea Thermometer. a. Outside tube, with alcohol. b. Inside tube, with creosote and water. c c. Column of mercury. d d. Steel indexes movable within the tube.

The science of dredging is so far advanced that the presence or absence of marine life on a given bottom may be determined beforehand to a great extent. Without such knowledge, hours and days might be spent in dredging unproductive grounds, and the useless wear and tear of apparatus and tempers would be something frightful to contemplate. To ascertain this point there are three tentative instruments in use, and the record they procure also subserves many other purposes. First, we have the lead; second, the water-bottle; third, the deep-sea thermometer. The depth of soundings and the general character of the bottom—whether muddy, gravelly, or rocky—is learned from the lead, which has some tallow in a receptacle at its lower end, to which some evidences of the character of the bottom usually adhere. Of course the first thing done on reaching the proposed ground is to "heave the lead." The depth and the description of bottom are at once recorded, along with the place, day, and hour.

The water-bottle is a contrivance to obtain samples of the sea water at given depths. The simplest form of water-bottle is the one used by the German explorers. The bottle goes down empty, corked; with a short line attached to the cork and a longer one to the weight. The long line passes outside of the neck of the bottle, and is lashed to the bottle below the cork, leaving considerable slack between its two points of attachment to the sounding line above and to the bottle below. It results that when the apparatus is pulled up the short line takes the pull first and draws the cork, allowing the sea water, such as it may be at that depth, to rush in and fill the bottle. The apparatus is usually raised so rapidly that there is very little mixture of the water thus obtained with other sea water. The results are on the whole pretty satisfactory. The apparatus is cheap and easily constructed on shipboard. A modification of this has been recently suggested, but not yet attempted, which may make its results yet more trustworthy. This is to affix to the cork another cork, attached by a wire, inside the bottle, so that after the first cork is pulled out and the sea water rushes in, the second cork will be pulled into the place of the first; and thus the ascending bottle will be corked so as to keep out the water through which it passes. So far as the experience of our naturalists goes, the German water-bottle proves, however, hardly serviceable at depths exceeding 50 fathoms.

The water-bottle in use on the Blue Light is similarly constructed to that employed on the Challenger, consisting of a tube with two valves in it, both opening upward. As the tube descends the water continually rushes upward through it, and it is thus filled at any moment while descending, with the sea water of the depth to which it is sunk. But when it is drawn up the valves close, being pressed down by their own weight and that of the sea above them. It is evident that this apparatus must be dragged up rapidly to keep the valves closed, and it is found in practice that if a slip occurs, or a momentary check in reeling in, the valves open, and the water caught in the tube at the lower depth becomes mixed with more or less of that which is nearer the surface. Before the water thus brought up is regarded as authentically representing that of the depth from which it is supposed to be taken, it is submitted to an immediate test—that of the thermometer; if its temperature is found higher than that simultaneously ascertained for that depth by the deep sea thermometer, it is regarded as contaminated, and the water-bottle is lowered again.

THE THERMOMETER FOR OCEAN DEPTHS.

At the risk of being a little tedious, I must here describe the deep sea thermometer. The instrument in use is an English invention, designated as the Miller-Casella modification of Six's self-registering thermometer. It consists primarily of a thermometer bent in the shape of a U, having a large bulb at one end, and a long, slender bulb at the other. The large bulb contains a mixture of creasote and water; in the bend of the tube there is a column of mercury; in the small bulb, and between it and the mercury, there is a little creasote and water, and a space of air highly compressed, but carrying of course some of the vapor of the last-named liquids. It is confusing at first sight to perceive by the scale that the mercury, which rises naturally enough by heat on the small bulb side, falls at the same time on the large bulb side. Thus, on the other hand, when the whole thermometer was plunged in a bucket of ice-water, the mercury rose on the side marked "cold" to the freezing point, while it fell on the side marked "heat" to the bottom of the scale. But the conception of the instrument is at once simplified by regarding it simply as one thermometer, and supposing the U to be straightened out. It is then a tube containing at bottom, in a bulb, creosote and water, above this mercury, and above this little else than air. It is now evident that as the liquid in the large bulb expands with heat, it will, as it rises in the tube, force the column of mercury upward, and both the lower and the upper end of the column of mercury will indicate by their position the amount of expansion. When the liquid in the bulb contracts with cold, the column of mercury will follow it toward the large bulb, and the amount of the contraction be indicated at both ends of the mercury by its position. On the mercury, at each end of it, in the tube, rests a small rod of steel, which serves as an index, around which a hair is twisted, which acts as a spring, and holds the steel rod or index in any position until the mercury pushes it out of place; and thus it keeps a record of the change of temperature. Let us suppose that on both sides this thermometer, hanging in the cabin of the steamboat, marked 65°; the indexes just touching the mercury. When the instrument has been plunged into ice-water, the "heat" index still marks 65°, the mercury having simply fallen away from it; but the index on the "cold" side has gone up to freezing point. Now if the thermometer is again hung in the cabin, the mercury on the "heat" side rises again to the 65° of the index, and falls on the "cold" side to 65°. But the index of the cold side still remains at freezing point, and tells the story of the submersion.

So far, this is "Six's self-registering thermometer." Great numbers of records of deep sea temperatures had been procured by its means, but it was found that the results were largely vitiated by the pressure of great depths of water. The glass of which the bulb was made was of different thickness and quality in different instruments, and no ratio of the variation with which the glass yielded to the pressure at different depths could be established. The difficulty was obviated by the "Miller-Casella modification." This consists in inclosing the large bulb in an outer shell partly filled with alcohol, which yields so that the bulb within is not sensibly compressed in the deepest waters. The present instrument is exceedingly trustworthy, and it has already demonstrated the great inaccuracy of previous records and shown that much of the work in old localities needs entire revision. It should be added that the scale of the instrument is made of enameled glass and the frame of hard rubber. An outside cylindrical case protects the whole from injury in case it should be dragged over a rocky bottom.

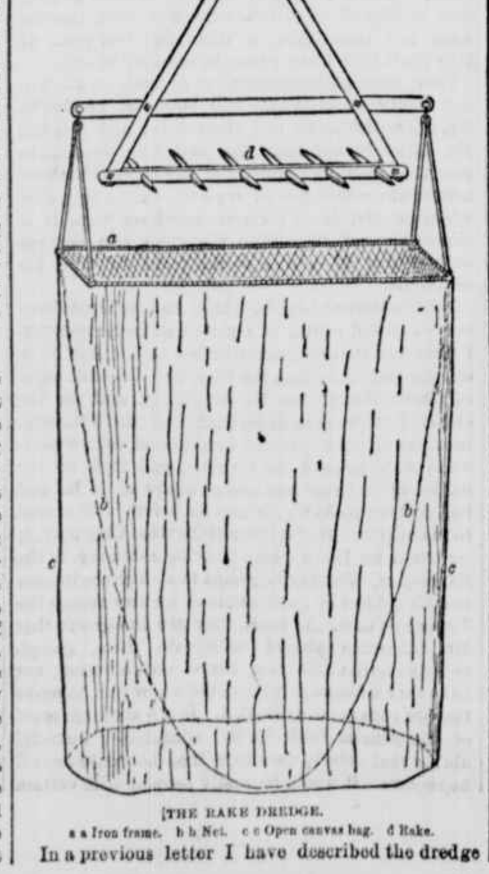
PECULIARITIES OF TEMPERATURE.

Soundings, specific gravity, and chemical constitution, and temperatures, though obtained by three different instruments, are nearly related in results, and it is not easy to say which of these classes of observations are most valuable. English authorities aver that the contents of the water-bottle themselves constitute an infallible index of the amount of animal life on sea bottoms. Dr. Carpenter says, respecting an expedition off the Irish coast, "the analyst ventured to predict whether the collection would be good or not, before the dredge came to the surface, drawing his inference from the results of his analyses of the gases of the bottom water. In each case his prediction was justified by the result." The determination of bottom temperatures is of still greater importance. The force, direction, and character of ocean currents such as those which led to the wreck of the Atlantic, are in large measure ascertained from thermometric observations. Our knowledge of the habits of marine animals, and of the best methods of increasing the supply of food from our fisheries, will be sadly defective without precise information as to the temperatures conducive to their well-being. A very cold "spell" occurring at low tide is said in one instance to have killed the tautog in such numbers that hundreds of tons were thrown ashore at Block Island and along the southern shores of Rhode Island and Massachusetts.

Before we can use the self-registering thermometer on the Blue Light the indexes must be set. If the instrument has been down at sea bottom the index on the cold side is probably left up near freezing point. If afterward the thermometer was hanging in the cabin, the index on the heat side is probably above the point where we shall want it to be, for we begin by recording the temperature of the surface water, keeping the thermometer in a bucket of it on deck, and renewing the water from time to time, especially when we change the locality of our investigations. The indexes are drawn down to the level of the mercury by means of a magnet. Rather too frequently an index is apt to stick so tightly in the place in the tube to which it has been lifted that the magnet ordinarily relied upon fails to move it, and then other and stronger magnets must be used to budge it. Occasionally an index seems to be permanently stuck, and refuses to acknowledge the magnetic persuasion entirely. This appears to me one of the most frequent troubles with what is otherwise a most serviceable instrument. The amount of coaxing which some of those indexes require is positively discouraging.

A chief point to ascertain and record is the difference between surface and bottom temperatures, as well as that between the atmosphere and the water. The depths of ocean are usually very cold, approximating freezing point. The temperature of surface water is intermediate between that of the bottom and the air, and in observations in this vicinity varies from 51° to 65°, averaging 10° below the temperature of the air, though in one instance 22° and in another 24° below. No close correspondence has yet been ascertained between air and surface temperatures. The records of bottom temperature indicate in general a fall of temperature with increasing depth until freezing point is approximated; but this rule is much modified by the influences of locality; sheltered sounds and bays being usually warmer for the same depth than the open ocean. The following are some of the records:

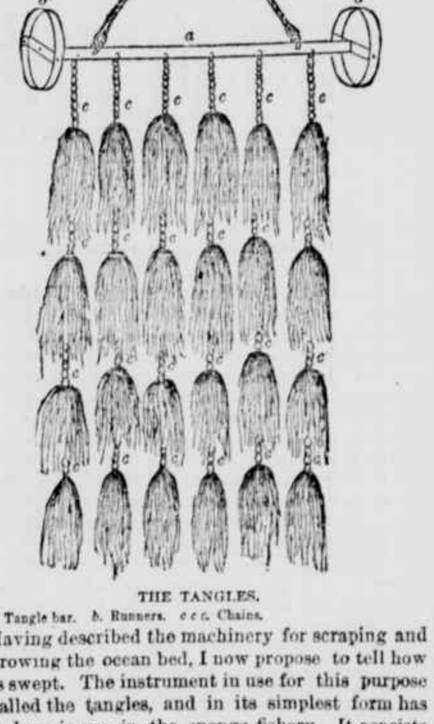
In Quohog Bay at 5 fathoms, and in the sounds of Casco Bay at 5—9 fathoms, the index showed 53° to 55½°; in one case being only 1½° below surface temperature. At 11 fathoms the thermometer stood at 47°; at 12, 51°; at 13 and 16, 49¼°; at 17 and 25, 47½°; at 31, 45½°; at 34, 48°. Outside of the shelter of projecting land, the temperature at 12 to 14 fathoms was generally 46° to 48½°, but in one case was 50½°, which was within less than 4° of that of the surface water; at 19 to 24 fathoms the records show 43½° to 46½°; at 33, 41½°; at 40, 38½°; at 48, 37½° to 39¼°; at 55, 68 and 75 fathoms, 38°; and at 64, 36°. There is a wide field for investigation to determine the varying causes which these records indicate. Our knowledge of the waters of our coast is yet in its infancy.



[THE RAKE DREDGE.

a a Iron frame. b b Net. c c Open canvas bag. d Rake.

In a previous letter I have described the dredge that is most frequently employed. A very simple improvement lately made has added to its usefulness. This consists in attaching along the lower end of the bag by lashing it at intervals, a stick parallel with the mouth of the dredge and with the ends coming out a little beyond the lower corners of the bag; that is, the stick is a little longer than the bag is wide. This dragging has the effect of keeping the bag stretched out and square. The bottom of the net is also attached to this stick, with a single lashing at about the middle of the stick; thus the net is also kept drawn out, in the most favorable position for receiving whatever the scraper of the dredge takes up. Of course the stick catches in the rocks and breaks occasionally, and has to be replaced; but if a stronger rod were substituted for it, when it catches the damage of breaking would be inflicted on the more costly parts of the dredge. But the character of the sea bottom, as indicated by lead and thermometer, may be such as to require an instrument more formidable in appearance at least than that already described. The rake dredge may be needed, whose mouth is preceded by an iron bar parallel with it, and bearing a set of sharp-pointed teeth capable of tearing up Neptune's stubbornest glebe. The "rake" is essentially a harrow; its especial use is in the case of bottoms of very tough mud or clay, where it is desirable to unearth the animals which are partly imbedded. Such bottoms are also frequently so serrated with the tough tubes of marine worms as to make the work of the ordinary dredge unsatisfactory: the rake dredge readily tears through these tubes. But the occasions for the use of the rake, as compared with the dredge first described, are certainly rare; it is a more expensive apparatus, and the chances of its entangling and damage, or in fact of its remaining overboard permanently, seem rather the greater. The two improvements named in this paragraph are both products of American brains, the rake dredge being one of Prof. Verrill's inventions, and the stick for the bottom of the dredge being due to one of the Blue Light's party. The mouth of the rake dredge differs from that of the ordinary dredge in being a frame of round iron, and not constructed as a scraper, and is about three feet long by ten inches wide. The weight of the frame and bar prove in most cases sufficient to keep the teeth at work on the bottom.

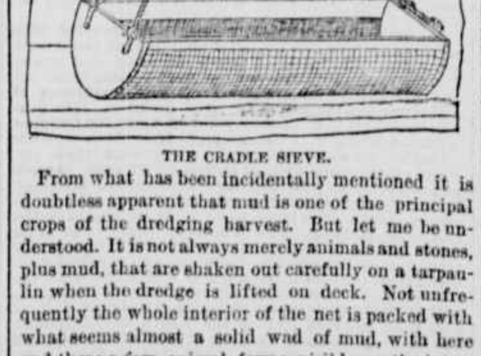


THE TANGLES.

a. Tangle bar. b. Runners. c c c. Chains.

Having described the machinery for scraping and harrowing the ocean bed, I now propose to tell how it is swept. The instrument in use for this purpose is called the tangles, and in its simplest form has long been in use in the sponge fishery. It consists of a bar 3½ feet long, supported on runners, and serving to drag after it a series of masses of hemp, each of which is a sort of mop. The fibers of the hemp entangle the smaller crustaceans and many of the more minute and delicate forms of marine life without breaking or injuring them as the dredge is apt to. The English explorers attach the tangles to the dredge, and bitterly complain that their specimens come to the surface much broken. Our naturalists use the tangles as a separate instrument, and are well satisfied with the results. Chains are wrapped in the hempen swabs which by their weight serve to keep the latter down to the work. Star fishes and sea urchins, being prickly, are most readily caught by the tangles; in frequent instances immense masses of them are thus swept up and brought to the surface. This consideration has moved Prof. Verrill to make a suggestion that may prove of the highest economic value. The oyster has no more predacious enemy than these star fish: wherever there is an oyster bed, star fishes are found feeding on the bivalves. Prof. Verrill thinks the oyster beds could be kept entirely clear of their enemies by frequent sweeping with the tangles, which would not interfere at all with the comfort of the oyster, while greatly improving the chances of his growth and increase. The experiment is well worth the trying. If it should be found that the oysters were caught by the tangles, this could be obviated by lightening the chains, and the few oysters lifted could be thrown back again. The chief liability of oysters to attacks from their foes seems to be in newly-planted beds. Many a proprietor who has been sorely perplexed at the failure of his young bivalves may have reason to ascribe his loss to the star fish, who have an epicurean preference for oysters not over one or two years old, and are apt to descend upon their beds in numbers sufficient to devour the entire plantation.

The Swedish naturalists, in the expeditions under Prof. Sars which have contributed so much to a knowledge of the character and conditions of animal life in the Scandinavian seas, have brought into use a very simple apparatus which is of great merit. An india-rubber hose, with the lower end suitably weighted and a suction pump applied to the upper end, constitutes the entire instrument; if the necessary weight is too heavy a strain on the hose, this may be relieved by the addition of a rope. The lower end of the hose is let down to the ocean bottom, and the water that enters pumped up. The specific gravity of the water and its constituent gases may be somewhat changed by the operation of pumping, but in general the apparatus performs the service of a water-bottle, while in addition it brings to hand uninjured the smaller and more fragile forms of life which escape the tangles and are mutilated by the dredge. These smaller animals, many of which are almost invisible to the unaided eye, constitute an important part of the food of fishes, with some kinds of fish being their chief sustenance, and for others serving to nourish the larger forms of marine life which their appetite prefers.



THE CRADLE SIEVE.

From what has been incidentally mentioned it is doubtless apparent that mud is one of the principal crops of the dredging harvest. But let me be understood. It is not always merely animals and stones, plus mud, that are shaken out carefully on a tarpaulin when the dredge is lifted on deck. Not unfrequently the whole interior of the net is packed with what seems almost a solid wad of mud, with here and there a few animal forms visible in the interstices. Following the method described by the English explorers, our naturalists used to pass this mass, after thinning it with sea water, through a series of tub sieves, with handles. These sieves were shaken up and down, and sidewise; the process was tedious and laborious, and the more delicate specimens were frequently injured or broken to pieces. Prof. Verrill's invention, the cradle sieve, obviates most of these defects. It is of a semi-cylindrical form, about three feet long, and one and a half wide. While the dredge is coming up this sieve is hung over the side of the vessel, and ultimately the dredge is lifted over and into the sieve. The lower end of the dredge net is then untied and opened, and the dredge lifted a little; and the entire contents slide out of the net, gently, into the sieve. If now there is no anxiety to secure without injury the very smallest and most delicate specimens, and there is some occasion for haste—perhaps to repeat the haul—the cradle sieve is covered with a tight-fitting lid, lowered overboard, and allowed to drag by a tow-line in the water till the mud is washed out. If, however, there is time enough, as there usually is, a stream of water from the pump (propelled by steam power) is passed through a few lengths of hose into the sieve, while it is hanging over the ship's side. The hose, in the hands of some one of the naturalists, is of course entirely under his control, and by moderating the force, volume, and direction of the stream, he can wash out of the mud his most delicate specimens, with as much personal care for their safety as he chooses to devote.

No one, however indifferent he may be to scientific pursuits, can escape the infectious ardor with which the naturalists crowd around the spread tarpaulin, as the contents of dredge, trawl, or tangles are brought to deck. The spiteful little reeling engine is spluttering at its work like a small person involved in a heavy undertaking. Right well, though, it accomplishes its task, performing the labor of a dozen men. By a mere touch it is stopped or reversed; and it is more than obedient, for though it puffs at its work, it neither grumbles nor tires. It is a neat, compact, upright machine, supplied with steam by a pipe from the boiler. This kind of engine is largely coming into use for minor purposes on steam-going vessels, and as a motor for steam launches. Well, it has pulled its load up to the davit, and the practiced crew lift the burden carefully and deposit it on the sailor's tablecloth, the tarpaulin. Down on their knees go the scientists around it; this is their homage to nature. Bottles with alcohol, jars with glycerine, dishes and bowls with sea water, pails, tubs, and all kinds of receptacles are brought into requisition. Perhaps one who has enjoyed the excellent hospitalities of the Blue Light should not mention a suspicion that some part of its culinary equipment occasionally furthered the interests of science by providing temporarily for the keeping of a strange worm, shell-fish, or anemone in seclusion and salt water. The naturalists, all but one, thrust their fingers into the muddy mass, pull out their plums after the fashion of Jack Horner, announce the name of their wriggling captives, and plump them into the pot, pail, or bottle —all but one, who sits with pencil in hand and records the names as they are called, omitting duplicates. Every few minutes, as a rarer specimen is brought to light, or one respecting whose characteristics there is some mooted question, the heads crowd together over the tarpaulin, and a discussion takes place which is in more than one sense Greek to the uninitiated. While I cannot give an idea of the wealth of strange forms with which the sea beds teem, I hope to be able to describe a few of them in another letter, and meanwhile append, as an instance of this fertility, the record of a single haul. Apologizing for the jaw-breaking tendency of the scientific names, I may mention that in general these animals have no specific popular designations. Surely it must be accepted as an excuse for a name, that the individual has no other.

CONTENTS OF A SINGLE HAUL OF THE DREDGE MADE AUG. 13, 1873, ON HARD BOTTOM, 33 FATHOMS DEPTH; LOCALITY, SIX MILES EAST OF SEGUIN ISLAND.

ARTICULATA.
Crustacea.

Hyas coarctatus.	Cerapus rubricornis.
Eupagurus Kroyeri.	Praniza cerina.
Pandalus annulicornis.	Monoculodes, sp.
Hippolyte pusiola.	Metopa, sp.
Hippolyte spina.	Nymphon, sp.
Unciola irrorata.	

Annelids.

Cistenides granulatus.	Phyllodoce catenula.
Amphorete gracilis.	Sabella, sp.
Amphorete, sp.	Lumbriconereis fragilis.
Vermilia serrula.	Amphitrite Grœnlandica.
Arenia, sp.	Anthostoma acutum.
Ninoë nigripes.	Gattiola, sp.
Melinna cristata.	Nereis pelagica.
Harmothoë imbricata.	Thelepus cincinnatus.
Nicomache lumbricalis.	Chone, sp.
Nothria conchilega.	Potamilla oculifera.
Scione lobata.	Spirorbis lucidus.

Sipunculoids.

Phascolosoma cæmentarium.	Phascolosoma tubicola.

Nemerteans.
Nemertes affinis.

MOLLUSCA.
Gastropods.

Astyris dissimilis.	Bela violacea.
Trichotropis borealis.	Lamellaria perspicua.
Margarita cinerea.	Lepeta cæca.
Neptunea decemcostata.	Calliostoma occidentale.
Neptunea pygmæa.	Lunatia grœnlandica.
Aporrhais occidentalis.	Turritella erosa.
Diadora noachina.	Hanleia mendicaria.
Buccinum undatum.	Entalis striolata.
Admete viridula.	Velutina haliotoidea.
Bela turricula.	Doris planulata.
Bela harpularia.	

Lamellibranchs.

Saxicava arctica.	Modiolaria lævigata.
Astarte undata.	Modiolaria corrugata.
Astarte elliptica.	Pecten Islandicus.
Astarte lens.	Leda tenuisculata.
Cyclocardia borealis.	Cyprina Islandica.
Cardium Islandicum.	Macoma sabulosa.
Cardium pinnulatum.	Nucula tenuis.
Crenella glandula.	Anomia aculeata.

Ascidians.

Ascidiopsis complanatus.	Lissoclinum, sp.
Amaræcium glabrum.	Leptoclinum albidum.
Glandula arenicola.	Leptoclinum luteolum.
Molgula pannosa.	

Brachiopods.
Terebratulina septentrionalis.

Bryozoans.

Tubulipora crates.	Gemellaria loricata.
Crisia eburnea.	Defrancia lucernaria.
Caberea Ellisii.	Idmonea pruinosa.
Cellepora scabra.	Flustra solida.
Cellepora ramulosa.	Cellularia ternata.

RADIATA.
Echinoderms.

Lophothuria Fabricii.	Asterias vulgaris.
Ophiocinda hispida.	Stephanasterias albula.
Amphipholis elegans.	Leptasterias, sp.
Ophiopholis aculeata.	Cribrella sanguinolenta.
Ophioglypha Sarsii.	Strongylocentrotus Dröbachiensis.
Ophioglypha robusta.	
Solaster endeca.	

Acalephs.

Sertularella polyzonias.	Sertularia argentea.
Eudendrium tenue.	Sertularia latiuscula.
Halecium, sp.	Lafoëa fruticosa.
Grammaria robusta.	Lafoëa dumosa.

Polyps.

Urticina crassicornis.	Halcyonoid, new genus and sp.

PROTOZOA.
Sponges.

Tethya hispida.	Grantia ciliata.
Halichondria conchita.	

Foraminifera.
Numerous species.

ALGÆ.

Laminaria longicruris.	Desmarestia aculeata.
Agarum Turneri.	

FOREIGN GOSSIP.

It may give readers some idea of what a little economy in saving paper material will amount to when they hear that the sales of waste paper from the various public departments in England amount to something like $80,000 a year. About half this waste is confidential paper, income tax returns, &c., all of which is sold direct to paper makers, who reduce it to pulp and remanufacture it. About 77 per cent of the waste paper sold is reduced to pulp. For some kinds from £17 to £25 a ton is obtained; for mill waste £10 a ton.

Suppose the Tichborne case should have to be tried over again, by reason of the death of a juror! One day last week one of this unfortunate jury who had been out for a lunch, was passing by a big tree near the entrance of Middlesex Session House. It was blowing a stiff gale, and the juror had barely cleared the spot when with a crash down came the tree with its heavy trunk and ponderous branches. However, the peril to the integrity of the panel is not yet over, for some member of it may yet die of old age before the proceedings are concluded. As for deaths by softening of the brain, all the jurymen are in equal danger of it.

A dentist in Paris (M. Sandre) lately took the law into his own hands and administered summary justice. Returning from a visit to a patient late at night, he heard a cry of distress, and, hastening to succor, was rushed at by the mourner with evident felonious intent. The assailant was at once knocked down with M. Sandre's forceps, and was then informed that he could not be released unless he allowed the victor to draw one of his teeth. Reluctantly the rascal consented. He was seated upon a stone, and then the dentist, selecting a beautiful molar, had it out in a twinkling. This spoil of war M. Sandre now wears for a charm, attached to his watch chain.

THE HAYDEN EXPEDITION.

IN THE ARKANSAS VALLEY.

A PHOTOGRAPHIC MISHAP—SUPPLIES GIVE OUT—ASCENT OF WHITEROCK—MAROON-COLORED MOUNTAINS—LEAD MINES OPENED—OFF TO THE MIDDLE PARK.

[FROM AN OCCASIONAL CORRESPONDENT OF THE TRIBUNE.]

CAMP, ARKANSAS VALLEY, Col. Terr., Aug. 18.—When I wrote last we were at the base of the White House, and on the point of retracing our steps for a few days' journey, coming back to the Arkansas Valley, and leaving it at the upper extremity, by the Tennessee pass. In pursuance of the plan, we are now encamped by the river, nearly opposite the rude village called Oro City, or off the mouth of the California Gulch, a few miles up which that place is built.

Our journey hither occupied two or three days longer than we had expected, owing to a mishap. As the photographic train was winding up, behind ours, the steep declivity that led out of our camp valley, the mule that carried the negatives already obtained lost footing and rolled a long way down, breaking some ten or a dozen of the large plates. Among them were some of those just taken in the vicinity, and, rather than lose the subjects, the train was left behind to repeat the work. Mr. Jackson, it may be added, has in the repetition surpassed his original efforts. All the other important losses are also to be made up, as the chiefs of the survey lay great stress on the absolutely accurate reproduction of the wonderful details of these mountain forms, for their topographic and geologic value. The more specifically picturesque beauties of the country, though the photographer's boxes are full of them, are held of secondary importance.

PROVISIONS GIVE OUT.

So the general camp waited, at a short day's march from its old camping ground, for the photographic party to come up. The new stopping place was in the beautiful and richly grassed valley of the East River, and directly under the frown of Gothic mountain, of which I think I have already spoken as an isolated butte of light gray eruptive rock, poured out over nearly horizontal dark shales of cretaceous age, and showing on its sides, even as seen from below, numerous points and lines of contact between the two so dissimilar formations. The mountain got its name from the numerous towers and pinnacles into which the gray rock has weathered; its color, its wondrous shape, and its isolation make it one of the most strikingly beautiful objects in the landscape here, as seen from whatever point. Our waiting was in spite not only of a general eagerness to be off to new fields, but also of an impatience that had a lower motive. Provisions were nearly gone, and the supply train, though working toward us, was still far away. Sugar, beans, flour, bacon gave out one after another; even pepper and salt were wanting. And, as is usually the case when most needed, game obstinately refused to come within reach. The last morning in that camp our 20 hard-working and ravenous men were fain to stay their appetites on a dish of hominy with a few remnants of pork in it, and so much broth as could be made out of one nursing ptarmigan of the rare white-tailed species. But at supper time, after a long day's march, the train met us beside a creek, the most northern affluent of Taylor's branch, which was immediately christened Relief Creek, and the next morning our hunter, who had been out over two nights, with matches in his pockets and a pair of blankets, joined us with a fat doe across his horse. This little temporary pinch of scarcity illustrates one of the ever-impending possibilities of exploration in new territory: with us it was but a piquant incident; in less well-appointed and well-quartermastered parties it is often a terrible trial and hinderance.

A REGION OF GRANITES.

The two days in this camp were very busily spent by the scientific members of the party in collection, and, especially, in the detailed study of some of the extremely interesting geological problems offered by the neighborhood. There is no point in all this gigantic range where the geologist seeking for illustration of the mountain-making forces and their results can strike amiss. And here were cases, more than one, of actual inversion of the sedimentary strata; immense beds of sandstone and conglomerates tilted up nearly vertical, spreading fan-like, falling over and lying wrong side up for miles together; and cretaceous strata doubled up by a horizontal thrust of the sandstones, and so on; I will not attempt to anticipate broken and imperfectly the statements and illustrations of the next Report, but would only call the attention thus in advance to the matters of rare interest which it will contain. It is the opinion of the Survey that there is no other region in our country where the great subject of granite—its varieties, its origin, its upheaval and outpouring, its effects on the overlying strata, its erosion and final forms—can be studied to so good advantage as in this range.

The camping-ground had been chosen because of its nearness to the side valley which leads to one of the great peaks of the chain—Whiterock Mountain—which had been already once ascended, on our way up, but on a rainy day, so that both the topographical and the artistic parties had failed to secure all they desired and needed to obtain at the locality, had, indeed, done little more than see that from its advantages of position it commanded a more splendid and a more instructive view of the whole range than was to be had from any other point, and this notwithstanding its inferior hight, not rising much above 13,000 feet. The former ascent had been made from the south, at the base of the Grand Teocalli. Now we skirted a creek which had cut its way down westward across the uplifted strata, showing fine sections of sedimentary beds, dikes, and outpourings of eruptive rock, and of which one branch came down from the very heart of the great amphitheater of the mountain itself; for, as has been before remarked, the amphitheatral formation is highly characteristic of these ranges: a narrow crest, with steep rugged walls of varying hight, surrounding, except at one end, a deep basin, in which the waters from all the melting snow-masses gather to pour out together into the lower valley beyond. We were able, then, here to ride clear to the base of the steep line of broken rock that led to the highest point of the wall. There were about 2,000 feet of it, and toward the top there were stretches where one had to go on all fours, with toes and fingers seeking aid from projections and crevices. This was too difficult a route for the photographic party, incumbered with their heavy instruments, to follow; they ascended instead a lower saddle of the crest, where the floor of the amphitheater chanced to rise some hundred feet higher at an angle practicable for the pack animals.

MAROON-COLORED MOUNTAINS.

The Whiterock Mountain is so named from a notable layer of very light-colored rock, disintegrating into a white sand, that breaks out close by the highest point, forming perhaps a dike in the midst of the other eruptive material, for the whole mass is part of the eruptive and granitic core of the range, which core can from it be seen stretching in its whole extent from north to south (its continuity broken only at one point) in a connected series of peaks, ridges and amphitheaters, ending northward in the immense masses of the White House and Capitol. Around these stand the peaks and pinnacles of sandstone, in most striking, even fantastic, forms. They are of two colors—the bright brick red of ordinary sandstone, and a darker and richer hue, which can only be called maroon. The maroon summits are sharp and narrow-edged blades, as it were, of rock. The highest and most conspicuous of them has been named (as I have perhaps mentioned before) the Castle Peak, from the weird towers by which its central pyramid is flanked on either side. This summit is considerably over 14,000 feet high, and whether it can be ascended is as yet a matter of doubt. The topographical party to which the district belongs mean soon to test that. The next in hight and importance is known among us by the rather indistinctive name of Maroon Mountain; there are others which do not fall far short of it. Then there are simple pyramids, the chief of which is the uniquely beautiful Teocalli. All the sandstone peaks show their stratification very conspicuously, in steps along their edges and lines across their surfaces that can be traced even from the distant National range; and this adds much to the peculiarity and strangeness of the scene. Nearly the whole field of view is filled with these mountain forms belonging to the range itself: the peaks even of the National range make no great figure above them against the eastern sky. Only on the west and north-west, beyond the exquisite gray knobs of Granite Mountain and the Crested Butte, we can see that the country flattens down toward the horizon into broad valleys and extensive plateaus; from which, again, rise other dim ranges of blue, lined and spotted with white. To the north, the imposing masses of the two great mountains I mentioned before shut off the view of everything beyond; but we knew that they were the culminating points of the range in that direction; the whole front of the Capitol was turned toward us, but we caught only glimpses of the great snow-field of the White House.

THE PHOTOGRAPHER'S TRIALS.

I have attempted no description of this wonderful view, but only an enumeration of some of its features. The vocabulary of admiration would soon become exhausted in dwelling on its attractions. I wish I could say that an accurate and complete depiction of it was laid away in the photographer's boxes. But the day, which had begun dazzlingly bright, as usual, turned out a most unfavorable one for our operations. Ere we reached the top, we had endured a pelting shower of mingled hail and rain; the dark clouds that brought it rolled away over the Capitol, and formed a gloomy background that set off wonderfully the dark majesty of that rugged peak. Then, after an hour of mingled cloud and sunshine, the shower began again drippingly; we hid under the rocks from its force, but it grew thicker and thicker; and when at last the mist shut us closely in, we gave up hope and made our way down to our horses and back to camp, pursued all the way by a heavy rain, which had not ceased when, tired and wet, we crawled into our blankets. A day spoiled by such weather in this dry climate has been so rare that we feel a little abused as well as unfortunate when such a one comes, as if some one had treated us with injustice, frustrating our just and reasonable expectations. Mr. Jackson had been able to get but half the sweep of the horizon before his work was stopped; but this included some of the most characteristic parts of the scene, and forms an invaluable addition to his store of studies in mountain forms and combinations.

LEAD MINES JUST OPENED.

The time will perhaps come when this region will be visited, like the Yosemite and Yellowstone National Parks, for its picturesque beauty and intense scientific interest. But it must first become more accessible and inhabited; and for that it must become economically valuable. Perhaps that fate lies before it in no distant future. A new mining district is just opening in the neighborhood, at the head of East River, within ten miles of Gothic Mountain, which is attracting much attention, and holds out fair promise of successful working. The ore is argentiferous galena, of which a principal lode, 16 to 30 feet wide, has been traced for over half a mile; nor is it the only one. A successful body of mines would call into use the agricultural resources of the valleys, which are much above the average, and we shall see a permanent population scattered along the streams, as in the mountains further east. Then, for one result, all the peaks and gulches and creeks will get names, by a more natural process than that of baptism by a survey. Nomenclature is one of the trying duties of an exploring party. What, for example, shall this whole great group which we have just left be styled? The name of Elk Mountains, found on some of the maps, seems quite too trivial to retain, especially as the elk, to all appearance, have now taken up their residence elsewhere. We should like to call it the Chromatic range, from its wonderful hues; but that is an appellation of too learned a cast to become popular and win acceptance.

A BRIEF TASTE OF CIVILIZATION.

The bad weather which so baffled us on Whiterock pursued us for some days longer; two to six smart showers were the regular diurnal allowance, and once we had a downright foggy morning, ushering in an almost unmitigated wet day. That was the day we recrossed the Red Mountain Pass, and the photographer got some fine cloud and mist and mountain effects from near its summit on the way over. The view of the National range, as we came out from the defiles into the valley of Taylor River, seemed still more grand than when we saw it last. We camped one night amid the intricate moraines at the western base of the pass; we admired the unrivaled glacial scorings and polishings all down the valley of Lake Creek; we enjoyed anew the beauty of the Twin Lakes, set in the edge of the mountains and reflecting their lofty summits, and, it must be added, we sat down with immense satisfaction on chairs at the Lake House, for the first time in three weeks, and satiated ourselves on milk and cream and the products of women's cookery. Here, only a few miles up the valley, we are directly opposite two of the greatest peaks of the range, both exceeding 14,000 feet. One was named Mt. Elbert, last month, after the present Governor of the Territory, by a party of miners appreciative of his services "in procuring the revocation of the San Juan order," (they left a plate to that effect on the summit); the other we have known as Massive Mount or Grand Mount, from the peculiar grandeur of its outlines and immensity of its proportions. North of the latter, the range falls off in hight, not showing for a dozen miles any summit of more than 11,000 or 12,000 feet; then it rises again into the Mount of the Holy Cross, which we are next to visit.

Near us, the valley shows remarkable river terraces, as well as the moraines which distinguish its whole course. Close by us is the remnant plateau of an immense one, some three or four hundred feet above the present river bed, and as smooth and regular as a table. The valley bottom is richly grassy, and there are occasional ranches upon it. The river is turbid with the mud washed into it from the placer mines in the gulches. Yet the region is not what it once was, as regards the prosperity of its mining interests. After quitting this valley, we cross the Blue River range, and traverse the Middle Park, toward Long's Peak, and shall probably be for many days out of all reach of mails.

GENERAL NOTES.

A householder at Lampasas, Texas, wishing to render the entrance of his house as lovely and impressive as possible, decorated the door with a white knob. It was the only one in the place, and the citizens hastened to utilize it. They constituted it a target, and began rifle and revolver practice immediately. The unfortunate householder retired to the cellar for safety, until, under the influence of a steady shower of bullets, the new knob had entirely disappeared. That door now opens with a string, running through a bullet hole.

With a gravity which is well nigh preternatural, *The Geneseo* (Ill.) *Republic* makes the following startling statement: "But little doubt exists as to the fact of there being bad boys in this town." There is still greater solemnity in the assertion which follows: "What will become of them remains to be seen." The occasion of these remarks was the plunder of several graperies in Geneseo, by juvenile admirers of fruit. Poor boys! all that will happen to them doesn't "remain to be seen." Several of them ere this have doubtless writhed under the earthly retribution of a colic.

A New-Jersey justice of the peace is not to be with impunity disobeyed. A J. P., named J. R. Bruster, walking the other day through the streets of Lambertville, called upon a policeman to arrest a number of disorderly boys. The officer disrespectfully declined. The squire swore at the officer, to the extent of a constructive assault and battery. The officer collared the squire, and walked him off to jail. Procuring bail, out rushed the squire as fresh as paint, collared the officer, and walked him off to jail, where he now languishes. The administration of justice in New-Jersey must be rather mixed.

First rate, honest, untiring and capable public servants are not so common as they should be in a country requiring so much and such various public service as ours does. A man who has well and truly done his duty to his fellow citizens in an official capacity for twenty years, whether in a high or low station, should have newspaper mention if only to encourage the others. Mr. Marshall S. Rice, who has just resigned the place, has been Town Clerk of Newton, Mass., for 28 years. During this period he has been at different times a member of the Great and General Court, and a Railway director. Yet even these positions have not corrupted his morals. Newton may well mourn the loss of such a clerk.