

excessive variations of temperature observed at Jakoutzk and other places in Eastern Siberia, during the course of a solar year, induce us to admit that the surface of the earth is there endowed with a radiating and absorbing power much superior to that of Europe.\*

Idem. Sept. 1838.

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*Rapid Mode of Reproducing One's Thoughts.*

Doctor Desrivieres points out the following process. Take a thin sheet of lead, or other ductile metal, place it on a smooth hard table, and write upon it with a fine style, with a smooth blunt point, so as to raise the letters in good relief on the under side. A paste of any kind, or plaster diluted with water, is then used to fill the hollows formed by the style. When the paste, or plaster, is hard, the plate is turned over on a hard plane surface, an inked roller is passed over the raised letters, moist paper is then laid on it, and in defect of a little press, it may be struck with a fine brush.

Rec. Soc. Polyt., July 1838.

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*The Artesian Well at the Abattoirs of Grenelle, Paris.*

This well has now a depth of 418 metres, (= 1371 feet.) The sound, or borer, weighs 20 thousand; its height is treble that of the dome of the Invalides, and it requires two machines of immense power to put it in motion. The instrument is still in the chalk bed, the hardness of which is comparable to flint. M. Mulot, the director, states that the sound advances a foot per day.

Idem

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*Examination of Sea Water Collected during the Voyage of the Bonite, with Apparatus Invented by M. Biot. By M. DARONDEAU.*

Five specimens of sea water, obtained at different places and depths, were brought in bottles with ground stoppers. They were only two-thirds full, because the bottles were of a greater capacity than the receiver of the apparatus. Five other specimens, taken from the surface and enclosed in like manner, filled the whole capacity of the bottles. One of these was broken on its way from Brest to Paris.

All the water taken at the surface was perfectly limpid; but that which came from beyond a certain depth contained a whitish flocculent matter held in suspension.

The experiments were all made in the laboratory of the College of France, under the eye and direction of M. Fremy. The density of the water was determined by a specific gravity bottle, comparing the weight of the sea water with an equal volume of distilled water at ascertained temperatures. The quantity of gas held in solution was made known by boiling a flask entirely full of the water, and receiving the gas over mercury. The carbonic acid was determined by potash, and the oxygen by phosphorus.

To ascertain the quantity of saline matter, Gay Lussac's process was followed by evaporating to dryness a given weight of water in a mattress of known weight, inclined at an angle of 45° to prevent loss by projection. The residuum, heated to dull redness, gives the saline matter, minus the chlorohydric acid arising from the decomposition of chloride of magnesium by the heat; but this was accounted for by determining the magnesia in the

\* Journ. Frank. Inst., vol. xxii., p.p. 118, 286.

residuum and replacing its oxygen by an equivalent of chlorine. The following are the results:

Time and Place of taking Water.	Latitude.	Longitude.	Depth.	Density at 80° & 10° Cent.	Saline Residue in 100 Wat.	Gas in 100 parts Water.*	Composition of 100 parts Gas.		
							Oxygen.	Azote.	Carbonic Acid.
30th August, 1836. Pacific Ocean,	{ 11° 8' N.	108° 30' W. }	Surface, 70 fath.	1.02594 1.02702	3.429 3.328	2.09 2.23	6.16 10.09	83.33 71.05	10.51 8.06
19th March, 1837. Gulf of Bengal,	{ 11 45 N.	87 18 E. }	Surface, 200 fath.	1.02345 1.02663	3.218 3.491	1.98 3.01	5.53 3.29	80.50 38. 5	13.97 68.15
10th May, 1837. Gulf of Bengal,	{ 18 0 N.	85 32 E. }	Surface, 300 fath.	1.02611 1.02583	3.378 3.484	1.91 2.45	6.34 5.72	80.34 64.15	13.32 30.13
31st July, 1837. Indian Ocean,	{ 24 5 S.	52 0 E. }	Surface, 450 fath.	1.02577 1.02739	3.669 3.518	1.85 2.75	9.84 9.85	77.70 53.23	12.46 34.92
24th August, 1837. S. Atlantic Ocean,	{ 30 40 S.	11 47 E. }	400 fath.	1.02708	3.575	2.04	4.17	67.01	28.82

\* Temp. 0° Cent. Pressure 760mm.

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The table shows that generally the density at the surface is less than at a certain depth; in one case only, the water, at 300 fathoms, in the Bay of Bengal, had less density than the surface water, the difference being  $\frac{3}{10000}$ .

Generally the saltness was greater below than at the surface; in one case, however, it was less. These results seem not to be inadmissible, for there is a great difference between the temperature of the water at the surface and that at 800 or 400 fathoms.

The table shows that the surface water contained, in all cases, less air than that at a certain depth, and that the difference may amount to  $\frac{1}{100}$  part of the volume of water.

Deep water also contains more carbonic acid than that at the surface. Does this gas exist ready formed in the water, or did it arise from the decomposition of the flocculent matters found in all the bottles of water from a great depth? This could only be determined by analysis made on the spot. We shall be always led by the use of Biot's apparatus, to confirm, perhaps, one of these two facts, equally remarkable: 1st, That sea water, at a certain depth, holds in solution a greater quantity of carbonic acid than that at the surface; or 2d, That at this depth it includes transparent animalcules, or at least an organic transparent substance, not found at the surface, and which is decomposed by degrees, depriving the air, held in solution by the water, of oxygen to form carbonic acid.

In the latter case, the proportion of oxygen in the acid from deep water, must be more considerable than that at the surface, for its free oxygen, added to that of its carbonic acid, forms, with the azote, a more oxygenated air than that of the atmosphere; whilst, in the former case, the free oxygen, and that of the acid, forms, with the azote, an air differing very little in composition from atmospheric air.

In our experiment made on board the Bonite, water from 380 fathoms, contained 1.62 of gas to 100 of water; and in two other experiments, water from 300 fathoms contained 2.20 and 3.89 of air to 100 parts of water. The air was not analysed.

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### *Improved Mode of Magnetizing.*

Captain Scoresby, in a letter to M. Arago, informs the latter that he had constructed a magnetic bar composed of 196 plates of steel tempered to the greatest degree of hardness, and 15 inches long. It had six times more energy than the bars he had previously formed of steel tempered in the usual manner. With this compound bar he had magnetized, by influence, or induction, at the distance of 11 inches, a polished soft iron nail, weighing 500 grains, so that this nail in its turn supported another weighing 389 grains. This bar would support, through a slab of marble,  $\frac{7}{8}$ ths of an inch thick, a nail weighing 194 grains.

To bring the magnetic agency to its highest degree of power, Captain Scoresby uses steel of the greatest possible hardness, which allows the force to accumulate almost indefinitely. The following rules are laid down by this very skilful magnetician in his letter to Arago:

1st. A single bar, or plate, is stronger, *in proportion*, than two bars together, of the same dimensions, temper, quality and mass.

2d. A combination of bars, or magnetic plates, is always more energetic than a simple bar of the same steel, temper, form, or mass.

3d. The absolute increase of magnetic power in compound needles, diminishes gradually in proportion to the number of bars.