

making the brook from 30 to 40 feet wide instead of 20 as at first.

The quantity of water thus rushing down for twelve hours from the commencement would be fully 600,000 tons. The water in one direction over a surface of 160 acres was lowered one foot in the space of three hours. Shortly after this water commenced to rush below it made its way through a weak portion of a barrier wall into a rock salt mine that was being worked. This mine, extending over fifteen acres, and having a worked-out depth of eighteen feet, was completely filled and all the tools, materials, waggons, tramways, &c., entirely lost. It will be quite impossible ever to pump out the water. Besides this mine, all the old abandoned mines were filled, and the brine, which stood at 100 yards from the surface on the Sunday, stood at 24 yards on Monday night. The water being fresh, great damage was expected by the solution of the salt. This soon occurred, for an old mine that fell in forty-two years ago, and the cavity of which had been filled with water, gave way, and suddenly the whole land over a circle of about 500 feet in diameter sank, and a large portion of water escaped into neighbouring pits. The ground cracked and rifted and subsided, and a length of road of 160 yards was destroyed, as also pipes conveying brine to the salt works. A large reservoir holding brine was split across and all the brine let out; the rending of the earth passed through two kilns of bricks, dropping one-half of the kilns at least 2 feet. On the Monday afternoon a tall chimney 90 feet in height became affected, and in a few hours fell with a great crash. The air that had filled the cavities below was forced out by the inrush of water, and caused all the pits and brooks near to bubble and boil violently, whilst in some of the rifts where water occurred miniature mud geysirs were formed, throwing up mud 10 or 12 feet high. These appearances extended over a district between two brooks for the space of 2000 feet. On Wednesday night a large hole 30 yards in diameter and 30 yards deep fell in, and more subsidences are daily expected, as the fresh water will eat away the pillars supporting the roofs of the abandoned mines.

The cavity formed on Monday is full of water, and the brook now runs through it. Some idea may be formed of it when I mention that it is crater-like, and of about 200 feet in diameter. On sounding it on Wednesday I found a depth of 78 feet of water in the centre, and various depths from 70 to 60, 50, and so on to about 12 feet at the margin. On Sunday, on the spot which is now 78 feet, there was a sandbank with its surface above the water.

Serious injury has been done to one set of salt works, and five sets are stopped for want of brine, the pipes being broken and the road destroyed.

As the salt trade increases these enormous sinkings keep increasing, and become more alarming in their character.

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THOS. WARD

The Geology of East-Central Africa and the Subterranean Forest in Bombay

IN Mr. J. Thomson's very interesting "Notes on the Geology of East-Central Africa" (*NATURE*, vol. xxiii. p. 104) he remarks that doubtless the immense development of volcanic rocks described by myself (and I may add by several previous explorers) in Abyssinia is of the same age as the volcanic rocks at the Cape of Good Hope, assigned to the Trias.

Mr. Thomson has, I think, overlooked the circumstance that whatever may be the age of the Cape volcanic rocks, the teaks of Abyssinia cannot be older than Jurassic. As I have shown (*Quart. Jour. Geol. Soc.*, 1869, pp. 403, &c., and "Geology and Zoology of Abyssinia," pp. 184, &c.), there are in the Abyssinian highlands two groups of bedded dolerites and trachytes, the upper of which rests unconformably on the lower, while the latter overlies limestone with Jurassic (Middle Jurassic) fossils.

I trust that Mr. Thomson will pardon my suggesting the possibility of the Tanganyika sandstones being river valley deposits, like the Gondwana series of India, rather than lacustrine. I may be mistaken, but the description appears to me to indicate beds coarser than those usually deposited in an extensive lake basin.

In the same number of *NATURE*, p. 105, is a brief notice of a "Subterranean Forest in India." As I understand the account given, the forest should perhaps rather be termed submarine than subterranean. My object in calling attention to this notice however is to point out that a previous description of the same formation was published in the *Records* of the Geological Survey

of India for 1878, vol. xi. p. 302. This account is by Mr. G. E. Orniston, Resident Engineer, and agrees in all essential particulars with the note in *NATURE*. I appended a few remarks on the geological bearing of the discovery. The "forest" has clearly been depressed, whilst neighbouring tracts in Bombay island appear to have been elevated in comparatively recent times.

W. T. BLANFORD

Dr. Siemens's Gas-Grate

HAVING endeavoured for some years past to heat my study by gas appliances, and having utterly failed in obtaining a comfortable temperature of 60°, as a last effort to accomplish my object I had fitted into an ordinary grate Dr. Siemens's arrangement of copper and iron, the construction of which was communicated to the public in the pages of *NATURE*, vol. xxiii. p. 25. Before giving the results of the trial of Dr. Siemens's gas-grate I may mention in what way my former gas-stoves failed. My first gas-fire consisted of gas and asbestos, but this gave out fumes which were quite intolerable; my second trial was with a gas-stove reflecting heat from a copper lining; this not only failed to warm the room, but was a cheerless and grim apology for a fire, and to obtain even a moderate degree of temperature a constant and expensive consumption of gas was necessary. With Dr. Siemens's gas-grate all that is required to produce a good cheerful fire radiating heat to all parts of the room, and maintaining a temperature from 60° to 62°, is to turn on the gas full for about twenty minutes, and as soon as the lower stratum of coke becomes incandescent, the gas may be quite turned off, the fuel, whether coke or anthracite, continuing to burn for five or six hours without any further expenditure of either gas or fuel.

If the fire is required for a longer time, or if at any time a more rapid combustion is wanted, it is only necessary to turn on the gas again for a few minutes and add more fuel. This is my experience of Dr. Siemens's gas-grate, and I consider it a great boon to householders who desire well-warmed rooms combined with economy. After the lucid description of the gas-grate given by Dr. Siemens in *NATURE*, it would be presumption in me to discuss the scientific explanation of its action; I shall only, in conclusion, venture to claim for it the following advantages which I believe it to possess over every other kind of gas-stove yet invented:—

1. It gives a clear, smokeless, cheerful fire.
2. It is most economical, and very soon pays the cost of the construction.
3. Being absolutely smokeless, contributes nothing to that constituent of our London fogs which renders them injurious in so many ways.

This last advantage, if multiplied by every householder at an outlay of 25s., adopting a cheaper modification than the copper and iron gas-grate, we should before very long observe a marked change for the better in our London atmosphere; and the darkness, dirt, and destruction of property with which we Londoners are annually afflicted, would be things of the past.

December 13

R. DOUGLAS HALE

Geological Climates

I HAVE just read Mr. A. R. Wallace's letter in *NATURE*, vol. xxiii. p. 124, but as I have not yet seen his book, "Island Life, although my bookseller had promised it, I shall defer my reply in *NATURE* until I shall have made myself master of his ideas.

For the present I shall only say:—1. That Mr. Wallace's proposal would benefit the Polar regions but not Bournemouth. 2. Mr. Wallace omits all mention of the *return cold currents* which the admission of two new Gulf Streams into the Arctic regions would produce. These currents would seriously lower the temperature of China and Japan; and also of the Ural Mountains and east of Europe.

SAMUEL HAUGHTON

Trinity College, Dublin, December 10

SOME weeks since the Rev. Prof. Haughton took exception to a brief letter of mine, in which I suggested that as a bamboo flourishes in Cooper's Hill College garden, in a northern aspect winter after winter, it could be used effectually in an argument relating to geological climates. The bamboo being found in torrid India now, that at Cooper's Hill, if found in a future period, would, according to some geologists, indicate that the valley of the Thames was tropical formerly. My letter was