

this want. It is exceedingly well supported. Would you object to adding your name to the list of shareholders? . . . There never was a better opportunity for establishing a healthy weekly scientific organ." But Herschel declined to pledge himself. With his best wishes he added: "I wish it could be accomplished to write the best matter which crops up, not being in the form of memoirs presented to the great scientific bodies of the country but into one really good monthly or bi-monthly journal of science, but that, I fear, is hopeless"¹⁵. Past experience augured ill for the fate of any such enterprise, but by November things looked brighter; in the end, about thirty-five shares were sold and the Young Guard was strong enough to bid £2,000 for the paper and to have working capital besides. Mr Huth agreed to invest £500 on condition that it be maintained an "organ of free opinion", and Hughes held a meeting to settle questions of policy. Octavius Smith, a philosophical correspondent of Spencer and proprietor of one of the largest distilleries in England, bought several. Henry Huth took five; James Campbell, another friend, took two; Huxley, Francis Galton, John Cairns, Sir Frederick Pollock and Spencer each took one. Bence Jones of the Royal Institution bought another and William Spottiswoode was proposed as printer. "The paper is not yet quite paying its expenses," Spencer wrote to Mill, "but it can scarcely be doubted that with the concentration of faculty now about to be engaged upon it, it will soon do so, and may not improbably become a good investment." By December, Mill had promised his support and Darwin and Lubbock soon followed¹⁶.

On November 3, 1864, the reconstituted journal was discussed at the first meeting of the X-Club. The nine members—Huxley, Tyndall, Spottiswoode, Hooker, Lubbock, Busk, Spencer, Hirst and Frankland—were among the most influential scientists in the country. There was still some question about a general editor. On November 22, Thomas Hughes expressed to Huxley his strongest belief that "Lockyer can do the general editing and will be the best man for us. He knows the machinery, having been there from the first, has been in constant relations with such men as Ludlow, etc. . . . has the science already in the right grooves and is not above taking advice, is a real good worker and above all has his heart in the business. . . . He will do the work too gladly at a lower figure than any other competent man, a consideration to be regarded at the present until we get more capital and know where we are"¹⁷. John Dennis, a noted literary scholar and critic, was apparently appointed. But in the end Sir Frederick Pollock (whose brother, Walter Herrie, edited the *Saturday Review* was literary editor-in-chief. Pollock's father, George Frederick, was a Trinity mathematician and a close friend of Faraday. The Pollock family, in turn, was close to Tyndall and his neighbours in Hindhead. Tyndall and Huxley agreed to edit science, Huxley specializing in physiology and Tyndall in physics. John Llewellyn-Davis did theology and Galton travel, ethnology and natural history. Lockyer assisted in astronomy, Spottiswoode in physics, and John Cairns in political economy. G. H. Lewes did fiction and poetry, and Spencer did philosophy and psychology.

A programme advertising the new *Reader* was drawn up, listing 75 men of science, and, on February 4, 1865, a new prospectus was issued. One passage in the new prospectus¹⁸ was especially significant:

The very inadequate manner in which THE PROGRESS OF SCIENCE AND THE LABOURS AND OPINIONS OF OUR SCIENTIFIC MEN are

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The Veined Structure of Glaciers

I THINK there is no one point in connection with glaciers more interesting than their veined structure, or one upon which so much has been written that remains equally unsettled. The difference of opinion about it between the authors who have published most upon the subject are not less remarkable than the phenomenon itself: no two are agreed, except in considering it as a constitutional feature.

Professor Agassiz maintains (*Atlantic Monthly*, Dec. 1863) that the horizontal layers of pure ice which are formed between the beds of snow from which a glacier is born, constitute many of the identical veins or plates of pure ice which pervade the glacier when it is in full life and activity; and attributes the inclination which they make, in the latter case, to their former horizontal position, to the contortion, bending, or folding, to which they have been subjected on their downward course; but, at the same time, he distinguishes between these veins—the result of stratification, and others which he terms bands of infiltration, and which he believes to have been formed by the infiltration and freezing of water.

The late Principal J. D. Forbes maintained ("Occasional Papers on the Theory of Glaciers," 13th letter) that the veins of stratification were annihilated at a certain point, and that at precisely the same time other veins, approximately at right angles to the former ones, were formed. These effects he referred to intense pressure.

Professor Tyndall ("Glaciers of the Alps," pp. 380, 425-6), agrees with Professor Forbes "in ascribing to the structure a different origin from stratification," and, if I understand him rightly, does not believe that *any* portion of the (approximately) vertical veins have such an origin. He divides the veins into marginal, transverse, and longitudinal structure, and asserts that all are produced by pressure, which causes partial liquefaction of the ice, and that the water is refrozen when the pressure is relieved.

If any one cause produced the whole of the veins of pure ice that are found in the imperfect ice of glaciers (which all are agreed are a constitutional feature of those bodies), it is obvious that that cause would have to be equally generally distributed. It is indisputable that all the veins are not veins of stratification, because examples have been frequently observed crossing (cutting) the strata lines at a larger or smaller angle. But although such observations prove conclusively that all the veins must not be attributed to stratification, they do not prove any more. I believe, with Professor Agassiz, for reasons advanced elsewhere,* it can be demonstrated, equally conclusively, that many of the veins which are seen in the lower courses of glaciers in the Alps are veins originally produced by stratification, and dissent entirely from the "annihilation" of Principal Forbes. But as it is proved that some have a different origin, we must look to other causes for an explanation. It is probable that the theories quoted above offer a practical solution of the difficulty, although they are unfortified by direct proofs. But I have seen examples which it was difficult to explain by either one or the other.

There is one means by which the veins might be produced, which, if not overlooked, is at least not generally advanced. All glaciers have crevasses; a glacier is known by its crevasses. The sides of all crevasses become more or less weathered and coated with a glaze of pure ice. When they close up again, when the sides join by virtue of regelation, does this leave no trace? Can it be annihilated? Or, do the two coalesced films leave their mark as a vein of pure ice throughout the generally whitish mass of the glacier? I consider a large number of the veins of pure ice which constitute the "veined structure" of glaciers as nothing more than the scars of healed crevasses.

It is not easy to say whether this was the meaning of the following passage, taken from p. 201 of Forbes's "Occasional Papers:—" "Most evidently, also, the icy structure is first induced near the sides of the glacier where the pressure and working of the interior of the ice, accompanied with intense friction, comes into play, and the multitudinous incipient fissures occasioned by the intense strain are reunited by the simple effects of time and cohesion." Judged by his preceding pages, it is not, and I am unaware that it has been, advanced in any other place. Some of your readers may perhaps be able to throw some light upon the subject.

Dec. 13, 1869

EDWARD WHYMPER