

haps take a large stone in each hand, and I have certainly found this useful in traversing rapid glacier streams when mid-thigh deep.  
Frenchay, near Bristol, August 18 F. F. TUCKETT

#### Fascination

Is it a fact that snakes can fascinate birds? With reference to the fascination of man, the ingenious explanation offered in NATURE, vol. xxii. p. 338, seems to me unsatisfactory, in that it supposes the individual fascinated to be self-conscious in a degree necessary for the consideration which of two courses to adopt to escape danger. This supposition implies an amount of self-consciousness which surely is absent in such cases as narrated? I have frequently experienced this fascination when standing on the railway platform as the engine was steaming in, and with myself at those times it was to be accounted for by the *absorption of attention by the external object, little being left for self*. That cries for assistance showed consciousness of danger, as in cases mentioned by Mr. Curran in NATURE, vol. xxii. p. 318, might be explained by the fact that these would follow on a much less attention to self than would be required for movement to carry the body out of danger. Indeed they would be the outcome of *feeling* rather than of *thought*. This view seems to be borne out by the very description of those fascinated, e.g., "have had their senses so engaged by a shell in its descent," "whose every gyration in the air he could count" (NATURE, vol. xxii. p. 318), and it is expressed definitely by Mr. Spencer ("Principles of Psychology," vol. ii. p. 438):—

"When the external object or act is an astounding one, the observer partially loses consciousness of himself. He is, as we say, *lost* in wonder, or has *forgotten* himself; and we describe him as afterwards *returning* to himself, *recollecting* himself. In this state, the related impressions received from the external object, joined with representations of the objective changes about to follow, monopolise consciousness, and keep out all those feelings and ideas which constitute self-consciousness. Hence what is called 'fascination;' and hence the stupefaction on witnessing a tremendous catastrophe. Persons so 'possessed' are sometimes killed from the inability to recover self-consciousness in time to avoid danger."

RICHARD HODGSON

Cambridge, August 17

#### "Hyper-Space"

If some one learned in many dimensions would throw some light on *rudimentary contour lines in hyper-space*, it would doubtless interest many readers of NATURE, and inconceivably yours,

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August 9

#### THE BRITISH ASSOCIATION

THE fiftieth Annual Meeting of the British Association was opened yesterday evening at Swansea, when Prof. Allman resigned the presidential chair to Prof. Ramsay, who gave his inaugural address.

At midday on Monday the reception rooms at the Agricultural Hall, St. Helen's Road, were formally opened for the transaction of the business of the Association, under the direction of Mr. Gordon, the permanent under-secretary of the general staff, and the local honorary secretaries, Dr. Wm. Morgan and Mr. James Strick, and their efficient local staff. The hall, our Swansea correspondent informs us, is admirably situated on the borderline that separates the business part of the town from the west end residential suburbs, and the conveniences of the place are augmented by a good line of tramway and a temporary cab-stand in front, and telegraph, telephone, and post-office within the building. The arrangements had been brought to a very creditable state of completion by Monday, and the visitors have been pouring into the town steadily since Saturday. The suburban watering-place of Oystermouth, or The Mumbles, and many others of the favourite summer resorts of Gower are full to overflowing, but in the more immediate outskirts of the town, on the gently-sloping hill-sides that offer such excellent fresh air and such extended prospects of landscape and sea-view, there is ample accommoda-

tion for all comers, thanks to the really warm local hospitality and to the careful arrangements of the Local Committee.

A fair number of papers are down for reading in the various sections, the usually popular section of geography, however, exhibiting a sad dearth of contributions; we trust things may look brighter here before the end of the meeting.

INAUGURAL ADDRESS OF ANDREW CROMBIE RAMSAY, LL.D., F.R.S., V.P.G.S., DIRECTOR-GENERAL OF THE GEOLOGICAL SURVEY OF THE UNITED KINGDOM, AND OF THE MUSEUM OF PRACTICAL GEOLOGY, PRESIDENT

#### On the Recurrence of Certain Phenomena in Geological Time

IN this address I propose to consider the recurrence of the same kind of incidents throughout all geological time, as exhibited in the various formations and groups of formations that now form the known parts of the external crust of the earth. This kind of investigation has for many years forced itself on my attention, and the method I adopt has not heretofore been attempted in all its branches. In older times, Hutton and Playfair, in a broad and general manner, clearly pointed the way to the doctrine of uniformity of action and results, throughout all known geological epochs down to the present day; but after a time, like the prophets of old, they obtained but slight attention, and were almost forgotten, and the wilder cosmical theories of Werner more generally ruled the opinions of the geologists of the time. Later still, Lyell followed in the steps of Playfair, with all the advantages that the discoveries of William Smith afforded, and aided by the labours of that band of distinguished geologists, Sedgwick, Buckland, Mantell, De la Beche, Murchison, and others, all of whom some of us knew. Notwithstanding this new light, even now there still lingers the relics of the belief (which some of these geologists also maintained), that the physical phenomena which produced the older strata were not only different in kind, but also in degree from those which now rule the external world. Oceans, the waters of which attained a high temperature, attended the formation of the *primitive* crystalline rocks. Volcanic eruptions, with which those of modern times are comparatively insignificant, the sudden upheaval of great mountain chains, the far more rapid decomposition and degradation of rocks, and, as a consequence, the more rapid deposition of strata formed from their waste—all these were assumed as certainties, and still linger in some parts of the world among living geologists of deservedly high reputation. The chief object of this address is, therefore, to attempt to show, that whatever may have been the state of the world long before geological history began, as now written in the rocks, all known formations are comparatively so recent in geological time, that there is no reason to believe that they were produced under physical circumstances differing either in kind or degree from those with which we are now more or less familiar.

It is unnecessary for my present purpose to enter into details connected with the recurrence of marine formations, since all geologists know that the greater part of the stratified rocks were deposited in the sea, as proved by the molluscs and other fossils which they contain, and the order of their deposition and the occasional stratigraphical breaks in succession are also familiar subjects. What I have partly to deal with now, are exceptions to true marine stratified formations, and after some other important questions have been considered, I shall proceed to discuss the origin of various non-marine deposits from nearly the earliest known time down to what by comparison may almost be termed the present day.

*Metamorphism.*—All, or nearly all, stratified formations have been in a sense metamorphosed, since, excepting certain limestones, the fact of loose incoherent sediments having been by pressure and other agencies turned into solid rocks constitutes a kind of metamorphism. This, however, is only a first step toward the kind of metamorphism the frequent recurrence of which in geological time I have now to insist upon, and which implies that consolidated strata have undergone subsequent changes of a kind much more remarkable.

Common stratified rocks chiefly consist of marls, shales, slates, sandstones, conglomerates, and limestones, generally distinct and definite; but not infrequently a stratum, or strata, may partake of the characters in varied proportions of two or more of the above-named species. It is from such strata that meta-