

accurate a knowledge of geological processes that they can speak with confidence either of the absolute or relative rates at which rock formation has advanced. The geologist has hitherto asked for more time, not because he himself was aware of his need, but from a generous regard for the difficulties in which his zoological brother found himself when he attempted to explain the diversity of the animal series as the result of slowly operating causes. The geologist asked for more time simply because he could form no just estimate of what was needed for the physical processes with whose results he was familiar. But palæontological domination is now at an end; and the increasing number of geologists who are also competent physicists and mathematicians appears to mark a new school, which will strive to interpret more precisely the accumulated facts."

Sir William Thomson's address to the Mathematical and Physical Section dealt with questions that seem unapproachable, but which will occupy the minds of physicists for many a year to come. What is really the geological age of the earth? Is the earth an absolutely rigid mass, or has it a certain amount of flexibility? The effect of rigidity on the earth's rotation would differ from that of flexibility. For some years astronomers have been aware of "variations in the earth's rotational periods," and these variations are supposed to have been produced by the friction of the tides. The amount of friction would vary according as the earth were rigid or flexible. Investigations of the question from the date of the first recorded eclipse, 721 B. C., lead to the conclusion that the earth, as a timekeeper, is going eleven and a half seconds slower per annum now than then. And taking recent observations, "it seems," says Sir William, "that the earth was going slow from 1850 to 1862, so much as to have got behind by seven seconds in these twelve years, and to have begun going faster again, so as to gain eight seconds in the period 1862—1872." This irregularity implies a change of sea-level occasioned by elevation or subsidence; and the same eminent authority assures us that "a settlement of fourteen centimetres in the equatorial regions with corresponding rise of twenty-eight centimetres at the poles would suffice;" and that this change "would be absolutely undiscoverable by astronomical observatories." These may be regarded as transcendental questions; but some day they will be found susceptible of practical application in science and the arts.

Sir William Thomson having visited the Philadelphia Exhibition as one of the British Commissioners, had something to say about science in America; the deep-sea soundings; the coast survey; the hydrographical researches which, as he confidently expects, will supply the data from tidal observations, by which the amount of the earth's elastic yielding to the distorting influence of the sun and moon will be measured; "and the fresh marine survey of terrestrial magnetism by the Compass Department, which, as is anticipated, will supply the navigator with data for correcting his compass without sights of sun or stars."—*Chambers' Journal*.

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