then with a half-twist bring the ends together, and fasten the corresponding ends each to each. Our half-twist will have brought one end of the lower strip into contact with the other end of the upper strip; and what we then obtain, on opening out, is the long loop (or "worble," to use Maxwell's word) with its two curls, which Prof. Boys starts with. We have simply *split* into two sheets our original one-sided, one-edged surface, and obtained a new *bifacial* surface thereby, precisely as Mr. B. M. Sen explains in his recent paper on "Double Surfaces" in the Proc. Lond. Math. Soc.

We may vary the experiment by starting with three sheets (or with five) instead of two. The middle sheet or strip, joining on to itself, will always remain the half-twisted loop, the unifacial surface; while each adjacent pair of strips will constitute a bifacial surface such as Prof. Boys describes. The median loop will involve, or link together, all the others; but the manner in which these latter interlace with one another is more complicated. The problem of how to split an anchor-ring into two rings, interlinked with one another, is a simple corollary.

It is somewhat curious at first sight, but obvious after all, that we arrive at precisely the same result whether we split our sheet, or cut it longitudinally. Begin with one broad strip, joining its ends together into the half-twisted unifacial surface; then make one continuous longitudinal cut, not far from the edge. This single cut gives us two complete loops, one being the border and the other the median zone of our broad strip. The median band has its properties unaltered; it is still the half-twist unifacial surface, only narrower than before. The other, on which our scissors have bestowed a second edge, is the bifacial surface which Prof. Boys calls his "puzzle band."

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Active Hydrogen by Electrolysis.

WENDT and Landauer (Jour. Amer. Chem. Soc., March, 1922, p. 513) failed to get any evidence for the presence of active hydrogen, generated by the action of an acid on a metal, or by the electrolysis of a solution of KOH. Similar results were also obtained by Y. Venkataramaiah (Proc. Sci. Assoc. Maharaja's College, Vizianagram, July 1921, p. 2). We have repeated the experiments, and find that hydrogen is actually activated when a conducting solution is electrolysed. We electrolysed a solution of dilute sulphuric acid, employing a platinum tube with a large number of pin-holes bored in it, and using a current varying from 3 to 15 amperes. While the electrolysis was going on, compressed nitrogen was bubbled through the solution, through the platinum electrode, to see if any ammonia were formed, as Wendt and Landauer found that active hydrogen combines with nitrogen to form ammonia. After a run of nearly twelve hours, the presence of ammonia was tested in the resulting solution. The result was positive.

Another method was also tried, using an iron tube as an electrode. It is known that nascent hydrogen diffuses through metals like iron even at ordinary temperatures. So it was found convenient to diffuse nascent hydrogen through the iron tube and test for the presence of active hydrogen by drawing it over cold powdered sulphur, the presence of hydrogen sulphide being tested for with a lead acetate paper. Here also a positive result was found.

The experiments with a metal and an acid are not yet successful. The failure in the case of the experiments of Wendt and Landauer, in our opinion, is due not only to the difficulties in removing the spray but also to the action of active hydrogen on the spray itself. Certain preliminary experiments conducted by us show that active hydrogen is decomposed by the spray with the formation of hydrogen peroxide.

It is a pleasure to note from the latest number of NATURE to hand (May 5, p. 600), that Prof. A. C. Grubb has succeeded by an ingenious experiment in demonstrating the presence of active hydrogen in the hydrogen generated by the action of hydrochloric acid on magnesium.

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The Transfinite Ordinals of the Second Class.

THERE is a theorem in the transfinite calculus that any ascending sequence of ordinal numbers of the second class has a limit which is also of the second class. This theorem is important, being wanted to prove that the aggregate of these ordinals is unenumerable.

Now consider the set of numbers 1, 2, 3, ω, $\omega+1$, $\omega+2$, $\omega.2$, $\omega.2+1$, ω^2, ω^2+1, etc. The mode of formation is that each number exceeds the preceding one by unity, except that if the plan we are following leads us to a limit we write down only a finite number of numbers according to that plan, and then write down the limit and the limit increased by unity, and so on. The set is normally ordered, and each element has an immediate predecessor, whence we easily see that it is a sequence. But it cannot have any limit in the second class, for if the limit is α the sequence must contain α and $\alpha+1$.

Does this contradiction with the first theorem show that the ordinals of the second class form an "inconsistent" aggregate? It differs from that of the Burali-Forti paradox in that we do not assume that our aggregate has an ordinal number before we get the contradiction. It agrees with it in that no contradiction arises if we consider segments only of the aggregate of ordinals.

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Shakespeare and the Indian Meteors of 1592.

WITH reference to Mr. Denning's remark in NATURE, June 23, p. 848, I beg leave to point out that the word in Persian for west, namely *khāwar*, also means east, and so it may be that the passage in the Akbarnama means that the meteors were travelling from east to west and not from west to east.

Dean Inge lately observed in a lecture that there was a mystery about what Shakespeare did in the last five years of his life. May it not be that he was travelling in Europe or on the high seas when he saw so many stars shoot madly from their spheres ("Midsummer-Night's Dream," Act II., Scene II.)? There is another allusion to meteors, "Yon fiery o's and eyes of light," in Act III., Scene II., where Lysander speaks of Helena's eyes. This seems to show that Shakespeare's mind was running upon stars and meteors.

I may mention that in a letter to me Sir Sydney Lee seemed to say that there was something in my suggestion, and referred to another topical allusion to natural phenomena in "Romeo and Juliet."

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