ment with radium bromide which has been recently in solution, and, therefore, sends off few of the β particles.

Bending Moments in Rails, for the Same Superstructure, under Different Types of Locomotives: P. H. DUDLEY.

In previous communications to the academy, the author presented from stremmatograph tests, tabulations of the recorded unit fiber stresses in the base of rails, and their distribution under moving locomotives and cars.

The determination from the unit fiber strains, of the negative and positive bending moments of the rails, due to the passing wheel effects, indicates that for a definite construction of the superstructure of the permanent way, they are independent, partially, of the total load of the locomotive or car, but dependent upon the type of each, in construction of wheel base and wheel spacing, in loading the foundation.

In a series of stremmatograph tests, on the New York Central and Hudson River Railroad, near mile post No. 10, December 23 and 30, 1899, locomotive No. 870, an eight-wheel type of engine, weight 220,000 pounds, drawing the 'Empire State Express' of four cars, weight 430,000 pounds, at speeds of 42 and 44 miles per hour, the average positive bending moments for the engine were 12.40 inch-pounds, per pound of static load, for one rail, constrained by a negative bending moment of 1.88 inch-pounds.

The average positive bending moments for the entire locomotive were 11.48 inch-pounds, per pound of static load, constrained by a negative bending moment of 1.71 inch-pounds.

On December 30 locomotive No. 2032, a ten-wheel type of engine, with closer wheel spacing, weighing 283,900 pounds, drawing the 'Southwestern Limited' of ten cars weighing 910,000 pounds, at a speed of 40 miles per hour, at the same place as the preceding tests, the positive bending moment for the engine was 10.80 inch-pounds per pound of static load, for one rail, constrained by a negative bending moment of 2.18 inch-pounds—a more favorable result than for the eight-wheel type.

For the entire locomotive, the positive bending moment—for normal tender wheels—was 9.82 inch-pounds, for one rail, constrained by a negative bending moment of 1.90 inch-pounds, indicating a more favorable loading of the foundation. The bending moments of different types of locomotives on the same superstructure are a measure of the relative efficiency of the distribution of their loads to the foundation; while with the same type of engine the relative efficiency of the construction of the superstructure of the permanent way can be measured. These are first bending moments measured in rails under moving locomotives and cars.

Dr. H. G. Pifford exhibited an electrometer specially designed for use in measuring radioactivity and showed the action of the instrument by lantern projection.

C. C. TROWBRIDGE,
Secretary.

DISCUSSION AND CORRESPONDENCE.

APPENDICITIS AND THE RACE.

IN the possible effects upon the race of surgical intervention as a cure for disease we have a curious anomaly; nothing less in fact than the direct contradiction of the general proposition which is at the basis of the law of the survival of the fittest, viz., that what is good for the individual is good for the race. Some have questioned the validity of this so far as its application to certain phases of our social and institutional life is concerned, but I have yet to learn of any serious doubt having been cast upon it in its bearing upon the organic evolution of animal forms under natural conditions. Yet under the artificial condition of the removal of diseased parts in order that the life of the individual may be prolonged we have precisely this. In order to give the discussion concreteness let us consider the possible racial effects of the now common operation for appendicitis. Since the old theory of foreign lodgments—grape stones and the like—in the appendix as the cause of the trouble has been proven false, at least in a vast majority of cases, we are forced to consider appendicitis a disease; an inflammation of a particularly serious nature, yet no more accidental in its origin than are similar congestions in other parts of the body. But

scientists tell us that diseases of all sorts—at least the predisposition to them—are transmissible; that they run in families, and that the probability is greater that the children of diseased parents will fall heir to the particular maladies of the latter than that the children of unaffected parents will be troubled by them. It is true that in the case of appendicitis, recent acquisition as it is to the catalogue of bodily ills, we have no exact data in support of the belief that it is transmissible, yet reasoning from analogy we have every right to believe that it is so. A hereditary predisposition to many other forms of inflammation similar in all respects except that of the part affected has been fully demonstrated and the inference is certainly a logical one that appendicitis is no exception to the rule.

But under the conditions of nature, such a transmission of disastrous predispositions is taken care of through the early death of the individual with the consequent impossibility of passing them to the descendants. If death comes before the period of maturity is reached the lack of offspring means the total annihilation so far as the race is concerned, of disastrous consequence in that particular line of descent. If it comes early in maturity such annihilation is not absolute but only relative, the danger to the race increasing with the length of life as measured by the number of children. In any event nature demands death without offspring on the part of the individuals possessing racially disastrous predispositions. Yet that is what the prolongation of life through surgical intervention controverts. All danger of death from the particular diseased part, so far as the individual is concerned, is removed without lessening seemingly one whit its disastrous effects upon the race. A long life is assured so far as the particular disease is concerned and, all other things equal, a correspondingly large family with all the laws of heredity potent, so far as the probable transmission of the difficulty is concerned. To believe that the surgical removal of the diseased part does away with the probability of the transmittal of the disease would be to accept the theory of the transmission of mutilations. This, few thinking persons, familiar with the field of scientific thought, are willing to do. Generations of artificially misshapen heads among certain savage tribes, of the mutilated feet of the Chinese women without racial effect, to say nothing of the lack of results of century upon century of circumcision, are all in opposition to it. And the corollary is that the good offices of the surgeon—whom, by the way, we shall probably continue to patronize in spite of any disaster we may see impending future generations—are the surest means of making permanent his calling. That this is true in the case of appendicitis is more easily seen than for other surgically prevented diseases, for we can not doubt that nature, left to herself, would in time eliminate the vermiform appendix altogether with the consequently disastrous results to the surgeon's income. We need not, however, impute to him any sordid motives when we say that he is taking the surest means of preventing such a catastrophe.

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'THE TREE-DWELLERS.'

To the Editor of Science: Since the two articles which have appeared in recent numbers of Science regarding 'The Tree-dwellers' contain several statements not supported by facts, and since the criticisms made rest largely upon a hypothetical basis, it may not be out of place to call attention to the same through the columns of the paper in which the articles appeared. The articles referred to are a letter from Dr. E. C. Case, State Normal School, Milwaukee, Wis., published in Science, April 1, and an article by Dr. Theo Gill, entitled "'Horses' not Horses," appearing May 6.

At the outset I wish to acknowledge an indebtedness to Dr. Case, for it was his criticism which first called my attention to the possibility of making the startling interpretation which he makes of the illustration on page 67, which he refers to as a Jurassic dinosaur chasing an Eocene horse, and the illustration on page 62 which he refers to as 'a man in a tree watching a herd of the same horses (?) that were pursued by the Jurassic dinosaur!' Dr. Case continues, 'This makes