

myself, and must have used them in a moment of mental aberration. I should have said that the bolometer had given us most of the reliable data concerning the absorption and transmission of radiant energy by the atmosphere, although at that time I fully believed, both from a general knowledge of Prof. Langley's work, and from conversations with him, that the atmosphere was a pretty good valve. Prof. Davis's references and a recent study of the published data show that the valve is leaky indeed. Still, if the atmosphere absorbs 50% of the Sun's radiations, and 50% of those from the earth, we have 25% of the Sun's radiations let in and not let out. If we take the figures which I believe Langley recommends, 70% for the solar, and 40% for the terrestrial radiations, we should have a catch of 40% of that originally arriving from the Sun.

Many unexplained points concerning this complex problem continually appear. What becomes of the 30-40% of the solar radiations and the 40% of terrestrial radiations absorbed by the atmosphere? It has but little mass and low specific heat, and yet it does not get hot, except in its lower layers. This source of energy it seems to me would be more than sufficient for all meteorological phenomena. Prof. Langley's data, voluminous and wonderful as they are, still appear incomplete in certain very important directions, leaving a very attractive field for investigation.

As to terminology, it seems to me very convenient to speak of 'heat rays' so long as we know exactly what we mean by the expression. We are all familiar with 'light rays,' and a 'heat ray' is the same thing, only, as Maxwell says, considered in its 'thermal aspect.' The term 'ray' is no doubt bad, but it is convenient and should be permissible with a tacit understanding that it is only a makeshift term. It would, of course, be better if we had some term to signify energy in its radiant form, as to direction of propagation, wave front, etc., but so long as we have not, and inasmuch as we all recognize its identity, why not use the old names and avoid multiplication of words. Even Prof. Langley's 'Luminous heat' ought to mislead no one; evidently he refers to the heat effects of that kind of radiant energy which is also capable of

producing light effects; 'dark heat rays' are incapable of so doing. When Professor Langley speaks of the 'radically different character of the heat in two maxima' he refers, of course, to their different wave-lengths. A similar remark about a treble and bass note would not mislead any one into the idea that both were not sound. I fail to see what is wrong with the last quotation from my article, or exactly what is meant by the 'mis-recognition of the early part of this century.'

I sympathize most sincerely with Professor Davis in his demand for precise terminology, but we must not allow even this worthy desire to lead us into complexities of expression which may be even more fatal to perspicuity than old terms with modern significations.

W. HALLOCK.

COLUMBIA COLLEGE, October 11, 1895.

A REPLY.

EDITOR OF SCIENCE: If it be fair to presume, as does Dr. Emory McClintock on page 453-4 of SCIENCE, under a heading which I think should be 'Professor Halsted Corroborated,' that because neither in a private letter nor in print one specifies his many mistakes, therefore one did not disapprove both his 'half on Saccheri as well as the half on Gauss,' then I must beg of SCIENCE a line to say that among other mistakes in this letter of his, he is completely wrong in saying of me: "He found that the two words *diuturnum prælium* were meant by Saccheri to indicate a mental attitude of constant war against the 'hypothesis' as heretical."

GEORGE BRUCE HALSTED.

AUSTIN, TEXAS, October 7, 1895.

THE RUDOLF LEUCKART CELEBRATION.

SEVERAL months ago the following circular (Cf. SCIENCE, Vol. I., p. 187) was sent out from Leipzig, signed by about a hundred and fifty scientists from various parts of the world:

"Zur Feier des am 13 December, 1895, stattfindenden fünfzigjährigen Doctorjubiläums von Rudolf Leuckart, dem Nestor unter den deutschen Zoologen, dessen Wirken weit über den Kreis seiner Specialwissenschaft hinausreicht, fordern die ergebenst Unterzeichneten zu Beiträgen auf. Im Herzen seiner zahlreichen