sculpturing. The microscopic structure has not yet been examined.

In general the form, size and arrangement of the ossicles are much as in the bones in the *Grypotherium* skin from Patagonia. The skin fragment first described by Woodward was thought to represent mainly the region of the neck and shoulder. The Californian specimen mantles over the outer side of the scapula, and is presumably not far removed from its original position with relation to this bone. The generic position of the form represented by this specimen appears as yet somewhat uncertain, but a satisfactory determination of its affinities will probably be possible when the skeletal material available has been finally assembled.

John C. Merriam.

A SUGGESTION FOR INTENSIFYING THE DÖPPLER EFFECT.

It has never been pointed out, I believe, that the relation between the conjugate foci of a concave mirror furnishes, at least in theory, a means of enormously intensifying the Döppler effect. If we have a source of light a little outside the principal focus of a concave mirror we shall have an inverted image formed at a considerable distance; and if the source move toward or from the mirror the image will move in the opposite direction with a much greater speed.

Let f_1 and f_2 be any two conjugate focal distances, and F the principal focal distance; then

$$\frac{I}{f_1}+\frac{I}{f_2}=\frac{I}{F}$$

Differentiate with respect to t;

$$-\frac{I}{f_1^2}\frac{df_1}{dt}-\frac{I}{f_2^2}\frac{df_2}{dt}=0$$

Writing v_1 and v_2 for the speeds of the source and the image, we have

$$\frac{v_1}{v_2}=-\frac{f_1^2}{f_2^2}$$

that is, the speeds are proportional to the squares of the distances from the mirror.

To show the theoretical possibilities of this formula let us suppose a source of light moving with a speed of 10^5 cm. per second at a distance of 10 cm. from the mirror, whose focal length, of course, must be a trifle less than this figure; at what distance must the image be formed in order that its speed shall be 10^{10}, one third of the speed of light?

$$\frac{x^2}{10^2}=\frac{10^{10}}{10^5}$$

$x=316$ meters, nearly, a distance obtainable in the laboratory with a moderate number of reflections.

The chief difficulty to be overcome in any experiment of this nature would be the faintness of the image due to its great size. A continuously moving source of light could be obtained either by a wheel with mirror teeth or with a self-luminous rim.

Paul R. Heyl.

Central High School, Philadelphia.

THE COMPULSORY RETIREMENT OF THE DIRECTOR OF THE BRITISH MUSEUM OF NATURAL HISTORY.[1]

In a letter which we publish to-day Professor Ray Lankester, who is this year president of the British Association, tells the story of the summary termination of his directorship of the Natural History Museum, some imperfect versions of which have obtained currency. The standing committee of the trustees have taken advantage of the civil service rule that the head of a department may call upon any officer in it to retire at the age of sixty, upon such pension as he is entitled to by the general regulations. That rule is not usually acted upon in the absence of some special reason, unless the officer has completed such a term of service as entitles him to the *maximum* pension. Dr. Lankester was appointed at the age of fifty-two, so that when he reaches sixty next May a regulation intended to apply to men who have spent their lives in a government office decrees that his pension shall be £160, which the treasury of its goodness may raise to £300. In any country but this it would be thought grotesque and monstrous that a distinguished man of science asked to serve the state after the age

[1] From the London *Times*.

of fifty, with his abilities fully tested and his scientific reputation fully established, should be treated on the same footing as a clerk who might never have done anything but copy documents and perhaps post a ledger. In this country there used to be a way of mitigating the absurdity of the system. The treasury could in such cases add twenty-one years to the service for pension purposes, thereby enabling a man joining late in life on some special ground to be put in a position not much worse than that of an undistinguished copyist joining early. But in recent years the treasury has curtailed its own powers and can not now add more than seven years. Were another Newton to-day made master of the mint, and were he to be dismissed or to become incapable of performing his duties five years afterwards, he would receive at the most a pension calculated on twelve years' service. That is how this nation enlists knowledge and ability for the carrying on of its affairs. But that is not by any means the worst it can do. A man may serve it like Lord Milner for a long term of years in difficult and arduous positions, but if he is not technically in the civil service he may be dismissed into private life at an age when other remunerative employment is unattainable, without any compensation at all.

No explanation has been vouchsafed to Dr. Lankester for the cavalier treatment he has received. His eminence in his own scientific field is unquestionable, and has been abundantly recognized by those most competent to judge both abroad and at home. Nor is he one of the unpractical students who do not know how to handle business. On the contrary, he has all the qualities required in an efficient administrator. We are thrown back, therefore, upon reasons of a more personal kind. He was appointed by the three principal trustees in whom power of appointment and dismissal is vested by statute. But the appointment was resented by some active members of the standing committee, which has taken the first opportunity to reverse it. It may be presumed that he has not succeeded in conciliating those who were opposed to his appointment, and as he holds his own views rather strongly and is not too patient with what presents itself to him as stupidity, it is even possible that he has not tried very hard to conciliate them. In most situations in life it is necessary to reckon with these personal factors, which indeed may be raised to the dignity of impersonal factors in circumstances where harmonious cooperation among many becomes as important as the most commanding ability in one man. If the difficulty in the present case is of this order, it may now be regarded as insuperable. Dr. Lankester himself would probably recognize that, whatever the causes, his usefulness at the museum and his own comfort in remaining there are alike at an end. But, though this may be a good reason for the severance of his connection with the museum, it is no reason at all for turning him adrift at the age of sixty with a derisory compensation calculated upon rules intended for a totally different purpose. If he does not 'get on' with the other people in the museum probably there are faults on both sides, and too much zeal for science may have been one of his. In any case failure to get on with somebody else is not by a very long way misconduct of the kind that forfeits a position. He gave up a secure position at Oxford to take the directorship, trusting to a general but not well-founded impression that the state may be relied upon to treat its servants with generosity. There are not many things open to a man of sixty; and there are few suitable to the student of biology. The museum may manage its affairs in its own way, but it is a disgrace to the nation to treat a distinguished man of science, entering its service in exceptional circumstances, as if he were an ordinary clerk, merely because an absurd technicality places both in the same category.

SUMMER MEETING AND COLLOQUIUM OF THE AMERICAN MATHEMATICAL SOCIETY.

THE thirteenth summer meeting of the society will be held at Yale University, New Haven, Conn., on Monday and Tuesday, Septemper 3 and 4.

A colloquium will open on Wednesday, Sep-