the rabbit, or the guinea-pig. The frog is a very aberrant member of the Batrachia, and it would be very instructive for the student to examine a more typical representative of the class. Such a one is the American Proteus (*Necturus maculatus*, Ref.), used at Cornell University, Ithaca, N.Y. During the last few years I have received many specimens of Vertebrates from two fishermen—Mr. Russell Dee and Mr. F. C. Audibert, from Marietta, Ohio. Lately, Mr. Audibert has written to me that he could procure any quantity of material, if wanted, and he would charge only 25 cents. (a little over one shilling) for each specimen. From the list of specimens sent to me by Mr. Audibert I select the following, which appear the most important for laboratory use :—

Accipenser maculosus, Les.
Polyodon folium, Lat.
Lepidosteus osseus, L.
Necturus maculosus, Ref.
Menopoma alleghaniensis, Daud.
Trionyx muticus, Les.

The instructive value of these specimens is certainly very great, and the low price could enable any biological laboratory to secure this material. G. BAUR.

New Haven, Conn., September 30.

"Darwinism."

IT has now become to me a matter of amusement to note how those naturalists who of late years have drifted most widely from the doctrines of evolution as these were held by Darwin, habitually accuse me of Darwinian heresy because I have not seen any adequate reason to depart from those doctrines in their entirety. Perceiving that there has been some change of relative position, while failing to perceive that the movement has been altogether on their own side, these naturalists represent that I have been falling away from Darwinism, when the fact is that they have been advancing beyond anything that was ever countenanced by the judgment of Darwin—and even expressly accepting the view which he so vehemently rejected, viz. that of regarding natural selection as the sole cause of organic evolution. Thus, for example, when in NATURE of October 10 (p. 569) Prof. Ray Lankester gravely designates my paper on physiological selection a "laborious attack upon Darwin's theory of the origin of species," it becomes evident how fast and far he has travelled from his Darwinism of two or three years ago. For, to put it briefly, unless it can be shown that Darwin considered natural selection the only possible cause of organic evolution, and did not consider sterility between allied species as probably due to some other principle of change, it is obvious that there *can* be nothing in my "additional suggestion on the origin of species" which may in any sense be designated an attack upon the distinctively Darwinian theory. Yet it is with regard to these very points that the opinion of Darwin was steadily opposed to that of Wallace; *i.e.* to the present opinion of Lankester. Therefore, quite apart from any question touching the truth of this "additional suggestion" or "supplementary hypothesis" (which, however, I may here parenthetically remark, will soon be shown to be in no way seriously affected by Mr. Wallace's sole remaining criticism), it is sufficiently evident that, when the object of publishing the hypothesis was expressly and repeatedly stated to have been that of meeting the main difficulties which had been advanced against the theory of natural selection, the present designation of this hypothesis as an elaborate attack upon that theory is simply absurd.

But my object in now writing is to state, *apropos* of Prof. Lankester's remarks on the inadequacy of Mr. Wallace's criticism of Mr. Gulick's paper, that I have just received a communication from the latter gentleman (who writes from Japan), requesting me to exercise my discretion as to publishing in these columns a reply to that criticism. Unfortunately this reply is too long for insertion, and as I do not see how it can be curtailed without serious detriment, I have refused to incur the responsibility of publishing it in an abbreviated form. At the same time it seems but just to let the readers of NATURE know that a full reply to Mr. Wallace's criticisms (in these columns and elsewhere) has been prepared; since otherwise the silence of its author might be misinterpreted.

To me it appears that Mr. Gulick's work is much the most profound that has ever been published on the important matters of which it treats (viz. isolation in all its forms, with its consequences in "segregate breeding" and "divergent evolution"); and therefore I am glad to take this opportunity of recognizing his priority, by some fifteen years, in thinking out, and largely verifying by his researches on land shells, the theory of physiological selection. GEORGE J. ROMANES.

Geanies, Ross-shire, October 12.

Sunset Glows.

IT is a curious fact that a revival of sunset-glows, similar to those described by Sereno E. Bishop in a letter published in NATURE for August 29 (p. 415), was observed in Western New York at almost precisely the same time that he saw them at Honolulu. I inclose a clipping from the *Rochester* (N.Y.), *Democrat and Chronicle*, which was published on July 21 :—

"The skies at evening show signs of the gradual return of the red light. It will be of interest to ascertain if the phenomenon reappears as the solar disturbances continue to increase in energy to the maximum. It is quite apparent now that the minimum has been passed, and the tendency is toward an increase in the number and in the violence of solar disturbances. There are certainly three and probably four well-defined disturbances at present." M. A. VEEDER.

Lyons, New York, September 13.

"The Teaching of Science."

I BEG that the following alterations may be made in the "Suggestions for a Course of Elementary Instruction in Physical Science," printed in NATURE of October 17.

HENRY E. ARMSTRONG.

P. 602, Problem II., line 11 from above, read "by means of iron" instead of "by means of phosphorus."

P. 603, Problem VII., line 20 from below, instead of "when metals are heated with acids," read "when metals are dissolved in acids."

P. 604, Problem IX., line 31 from above in right-hand column, read "dried hydrogen," instead of "dried oxygen."

P. 605, Problem XII., line 17 from above in right-hand column, read "zinc oxide," instead of "lime oxide."

TELESCOPES FOR STELLAR PHOTOGRAPHY.[1]

II.

IN considering the essentials of a good system of control for equatorial clocks, it is necessary to keep in view the exact conditions required. It is not sufficient that the controlling apparatus (of whatever form it may be) should simply bring the *rate* of the clock, which has been interfered with by some adventitious disturbance, correct once more; it must do more, it must correct this error. For, suppose a star be set on the slit of a spectroscope, and the clock started, and say, as in Dr. Huggins's case, a photographic plate inserted for a two hours' exposure. Now suppose that five minutes after the commencement of the exposure, an error of one-tenth or two-tenths of a second occurs from some disturbing cause (a fragment of dirt on the tooth of a wheel, or other cause); if the controlling apparatus be of such a nature as simply to bring the clock-rate correct again, the position of the telescope will be the above quantity, one-tenth or two-tenths of a second, in error for the remainder of the exposure, although the rate may be absolutely correct for the whole times. In other words, the star will have moved off the slit, by a quantity equivalent to what the instrument would move in one-tenth or two-tenths of a second, and will continue off the slit for the remainder of the two hours. So it will be seen that no controlling apparatus is of any use whatever, unless, as well as keeping the rate uniform, it corrects the errors that have crept in. In consequence of not keeping this point in view, many most ingenious but useless arrangements have been from time to time proposed. A little consideration will show that this arrangement meets all requirements.

The above arrangement is somewhat similar to Dr. Gill's.

[1] A Paper read by Sir Howard Grubb, F.R.S., before the Society of Arts, on April 18, 1888. Continued from p. 444.