SCIENCE.

FRIDAY, APRIL 2, 1886.

COMMENT AND CRITICISM.

THE SUBJECT of agricultural experimentation is coming more and more to the front, both by the multiplication of state experiment stations, and through the endeavor to secure national aid. But, while the making of experiments in increasing numbers appears to be assured for the immediate future, the more important subject of the interpretation of experiments appears to receive but little consideration. It seems to be assumed, that, once an experiment is honestly made, its teachings will be so obvious that he who runs may read. As a matter of fact, however, the correct interpretation of the results of an agricultural experiment (we speak now of scientific experiments) is a matter of no little difficulty, and is deserving of equal attention with the making of the experiment. We are glad to note that the director of the New York experiment-station, in his last report, which we notice in another column, emphasizes the importance of a proper method of interpretation and of the application of the doctrine of chances. In the strictest sense of the word, no agricultural experiment can as yet be called scientific, because in none do we so fully understand the conditions as to properly control them. In all experiments with plants or animals, we have to reckon with the individual peculiarities of the organism; and, except under the most favoring conditions, there are other conditions which cannot be accurately controlled or allowed for. As a consequence, the final result of such an experiment, or series of experiments, is a probability, greater or less as may be, that a certain law holds. The subject is too broad a one to be discussed here; but we are convinced, that in proportion as agricultural experimenters learn to distinguish clearly just what and how much their experiments really prove, will they be in condidition to make more rapid and certain progress in knowledge.

A CONTEMPLATIVE and retrospective naturalist can hardly escape the curious fantasy that the very term 'fishes' may become altogether obsolete, unless, indeed, it survives in the future as an historical reminiscence of the time when men thought there were 'fishes.' In fact, the word has lost by successive trimmings a large share of its ancient scope; for it is only by generous etymological tolerance that we graciously permit ourselves to still talk of the invertebrate cray-fish and shell-fish as fish at all, and we feel a comfortable sense of sustained politeness towards our more ignorant ancestors, while we order the waiter to fetch us some of the same tid-bit fishes. Then we learned to extend our linguistic purism to the very vertebrates, and became wise with the knowledge that those evident fishes, the porpoises and the whales, are not fishes at all. But the taste for lopping off the meaning from an innocent word had grown by indulgence; and so, having cut off the top of the fishes of our fathers, we turned to the bottom, which we added in our own day, and removed Amphioxus. We are quite agreed that the poor creature is not even a fish. Just at present we apparently are making ready for another discardment. The progress of science is rendering it clear that the sturgeon and his congeners — the ganoids all — are more nearly related to the amphibians than to the true fishes. Their development in the ovum is very closely similar to that of the frog and newt, and differs strikingly from that of the bony fishes and sharks. In the structure of the adults, too, the indications point to the same affinity. Of course, if the ganoids go, the dipnoans must go too, as every one will admit. Now appears Monsieur Fulliquet with a valuable study of the brain of one of the latter, Protopterus, and discovers that it is quite like that of an amphibian, and not at all like that of a true fish. Our perplexity fairly reaches its climax, and we wonderingly ask, Is any fish really a fish? If we can forecast the progress of the future by that of the past, we must answer, No.

THAT SOME PORTIONS of New South Wales are not desirable as permanent places of abode year in and year out, may be judged from the fact that during the past three years thirteen million sheep have died from want of water. It is maintained by some that the recent drought was by no means

unprecedented. The Darling River, in 1839, was merely a chain of water-holes; and again, ten years later, it was but little better; in 1851 the river was so dry that grass had grown in it, and in fact it was the only feeding-ground available; in 1863 and 1865, and again in 1868, the water was very low. In 1870 the great wet season began, and it was this superabundance of rain which led to the overstocking of the country and the consequent disaster. It is clear that those who occupy the western part of the colony have to encounter some very bad seasons, intermixed with some very good ones; and arrangements should be made by which the stock which in wet years may be supported, may be transferred to more favorable regions when the grazing fails, or to *abattoirs*, where it can be killed, and turned into canned or frozen meat. There now seems to be some hope for a return of rain, as the natives are reported to be moving to higher ground, and the white ants are said to have commenced building their curious elevated dwellings, which serve them as places of refuge during wet weather. These two indications are referred to by Australian journals as unfailing evidences of a probable change in the weather.

Perhaps in no other branch of zoölogy has the instability of nomenclature become more burdensome than in ornithology. He who, after a lapse of even a few years, attempts to renew his acquaintance with our bird fauna, is depressed and disheartened by the innumerable strange names and tedious lists of synonymes that he everywhere encounters. The Ornithologists' union has recently published a new check-list of North American birds that calls attention forcibly to this evil, but which also contains an excellent code of the principles and canons of zoölogical nomenclature, that, it is hoped, will be of some avail in lessening it. The committee appointed to draught this code was composed of five of our best students of vertebrate zoölogy, and may thus fairly represent the views held by the great body of zoölogists. The most important of the principles therein laid down are: the strict and rigid enforcement of the *lex prioritatis*, without any 'statute limitations' whatever of time; that a 'synonyme once is a synonyme always,' and that the same name cannot be retained for more than one genus in the animal kingdom; that a generic or subgeneric name may be based upon a designated recognizably described species; and that the original orthography of a name is to be rigidly preserved, unless a typographical error is evident. With most of these principles zoölogists in general will agree. The necessity of inflexibility in the law of priority has steadily become more and more apparent; there is no mean position that does not admit of all manner of abuses, and the same may be said of the use of names that have once been synonymes. The last-mentioned principle is also a very important one. In entomology at least, and especially among many German purists, infractions of this safe rule have become in many cases almost unendurable. Those who, in their zeal for philological rules, amend, alter, or even reject names altogether, forget that nomenclature is not the end, but the means, of science. The Greek might write *αἱμορῥαγία*, but the modern zoölogical classicist would insist upon haematorrhagia. The principle, however, that virtually admits catalogue generic names to recognition, will, we believe, receive vigorous protest from many zoölogists, as subversive of the essential rule that a species or genus must be described in order to be accepted. A specific description does not necessarily contain higher characters, and such characters must be given before a generic name can obtain currency. Students in distant parts of the world cannot depend upon specimens. A tyro can say such and such a species belongs to another genus, and give it a name, but it requires scientific discrimination to point out reasons. As well give to the bird-specimen No. 999 in the national museum a specific name, and leave the student to find out the characters as best he can. Ornithologists sometimes forget that rules applicable to their much-studied class may be intolerable in less-known groups.

PASTEUR AND HYDROPHOBIA.

The place Mr. Pasteur now occupies in the minds of the world affords a striking example of the extremes to which the popular judgment is liable. On the one hand, we have in the 'Pasteur institute' an organization which proposes to put the new method of curing hydrophobia into operation on the largest scale in all civilized countries. At the other extreme we hear from many points the cry that all of Pasteur's pretensions are fraudulent. These extreme views are equally unwarrantable, and equally illustrative of the lack of sober judgment with which the world receives