SCIENCE.

FRIDAY, MARCH 25, 1887.

COMMENT AND CRITICISM.

PROF. ALFRED MARSHALL, the university successor of Fawcett, comes forward in the current number of the *Contemporary review* to propose remedies for fluctuations of general prices. His thesis is that the greater part of the fluctuations of general prices are not of such a nature as to be capable of being diminished, as some suppose, by the adoption of two metals instead of one as the basis of currency, but that the true and only effective remedy for them lies in divorcing the currency from the standard of value, and establishing some other and authoritative standard of purchasing power independent of the currency. This is a plan by no means new in the literature of economics, but Professor Marshall urges it with particular reference to present economic conditions. His first step is to prove the evils of a fluctuating standard of value, which is a tolerably easy task. The second step will meet with more opposition; namely, that the precious metals cannot afford a good standard of value. By an ingeniously constructed diagram, the writer illustrates the fact that prices show about as much variation when estimated in terms of the two metals, gold and silver, as they do when estimated in gold alone. From this he infers that the adoption of a bimetallic standard would, in the long-run, give us prices hardly more stable than they are now. In order to the establishment of a bimetallic standard, however, negotiations with other countries would have to be entered into. Before undertaking this, Professor Marshall asks that inquiry be made as to whether the standard of value ought not to be altogether independent of the currency.

"The industrial arts generally," says the writer, "have progressed by substituting several specialized instruments for one that used to be applied for many purposes. The chisel and the plane, the hammer and the saw, are all developments of the primeval tomahawk: they do their work well, because none of them is expected to cover a wide range of work. And so, if we have one thing as a medium of exchange, and another as a standard of value, each may be able to perform its share of the work thoroughly well, because it is specially fitted for it. The currency will retain a material form, so that it may 'run' from hand to hand as a medium of exchange; while the amount of the currency which is required to discharge a contract for deferred payment will be regulated neither by weight nor measure, but by an authoritative table of figures issued from time to time by a government." This supposititious government department, then, would extend to all commodities the action now taken by the English commissioners of tithes with regard to barley, wheat, and oats. It would ascertain from time to time the prices of all important commodities, and publish at intervals the amount of money required to give the same purchasing power as one pound had at the beginning of, say, 1887. This standard unit of purchasing power Professor Marshall would call the 'unit.' In effecting a loan, it could be made in currency or in units. If made in units, the lender would know that whatever change might take place in the value of money, whether it were an appreciation or depreciation, he would receive on the repayment of his loan an amount of money that would enable him to purchase just as much and as many commodities as the amount he had loaned. Under this plan Professor Marshall believes that the heavy risks caused by a general rise and fall in prices would be avoided, and each trade would be left to contend with its own peculiar dangers only. His standard, he admits, would not be free from all imperfections, nor always easy to obtain, but it would be as serviceable for its purpose as a yard-measure, and the same sort of an advance over the use of the value of gold, or even the mean between the values of gold and silver, as a standard, as is the substitution of the yard-stick for the length of the foot of one judge or for the mean between the lengths of the feet of two.

THE RESULTS OF THE STUDY of typhoid-fever in both this country and Europe during the past decade have been of great value to sanitarians and to the public. It would seem that the facts already discovered must indicate methods by which this disease, which is well-nigh universal,

may be controlled, and perhaps ultimately exterminated. There seems to be no doubt that the bacillus which was described by Eberth in 1880 is the germ of the disease. On this point Dr. Sternberg, in a paper read at the meeting of the Association of American physicians, says that pathologists are disposed to accept this bacillus as the veritable 'germ' of typhoid-fever, notwithstanding the fact that the final proof that such is the case is still wanting. This would consist in the production in man, or in one of the lower animals, of the specific morbid phenomena which characterize the disease in question, by the introduction of pure cultures of the bacillus into the body of a healthy individual. Evidently it is impracticable to make the test upon man, and thus far we have no satisfactory evidence that any one of the lower animals is subject to the disease as it manifests itself in man. Typhoid-fever discharges have been fed to swine, apes, dogs, cats, guinea-pigs, rabbits, white mice, calves, and fowls, without any positive results. The evidence upon the etiological relation which Eberth's bacillus bears to typhoid-fever is summed up as follows: No other organism has been found, after the most careful search, in the deeper portions of the intestinal glands involved in this disease, or in the internal organs. On the other hand, this bacillus has been demonstrated to be constantly present. The various facts observed in connection with this disease indicate that it is due to a micro-organism which is capable of multiplication external to the human body in a variety of organic media, at comparatively low temperatures, and that it is widely distributed. From the endemic prevalence of the disease over vast areas of the earth's surface, we may infer that it is induced by a hardy micro-organism which forms spores. Eberth's bacillus complies with all of these conditions. The paper of Dr. Sternberg is an admirable *résumé* of all that is best in modern experimentation and research in connection with this bacillus, and may be found in the Transactions of the association of American physicians.

AS SPRING APPROACHES, the interest in cholera begins to revive. It will be remembered that last year a cholera commission was despatched from England to Spain to study the epidemic in that country. The members of the commission were Drs. Ray, Graham Brown, and Sherrington, and represented the Royal society, the University of Cambridge, and the Association for the promotion of scientific research. In a preliminary report recently made by them, some of the results of their investigation are given. They failed to find Koch's bacillus in all the cases, and they do not look upon it as being the cause of the disease. They claim to have discovered a new fungus, which has been pronounced to belong to the Chytridiaceae. It consists of granular masses and a delicate mycelium. The commission evidently do not feel thoroughly convinced that they have discovered the veritable germ of cholera, as they recognize that further investigation is necessary before its etiological relation to cholera is firmly established. For our part, we prefer to accept the views of Koch, whose experience gives him opportunities for investigation possessed by few.

FOR SEVERAL YEARS PAST, a suspicion has been current among students of glaciology in this country that the European studies of the drift were not advanced quite as far as similar studies with us. It is not only that our terminal moraines have been traced and mapped with unexpected detail, but they have given great additions to the evidence for land ice as against floating ice action, and they have vastly increased our knowledge of the style of motion characteristic of a continental ice-sheet. Similar revelations have heen expected concerning the extinct ice-fields of Europe, as soon as their marginal deposits should receive proper correlation, and the expectation seems well justified by the work of Mr. Carvill Lewis of Philadelphia, who during a two-years' trip abroad has attempted the investigation of the English and Irish drift-margins after what may be called the American method His studies were presented at last summer's meeting of the British association, and are now published in the *American naturalist* and in the *American journal of science.* They give account of curvature and irregularity in the drift-front, of interlobate moraines with kettle-hole topography, like the classic example is Wisconsin, — for in this matter we have our classics at home, — and of the critical differences between the working of floating bergs and creeping sheets. This must excite interested comment from those who have not yet made such interpretation of glacial deposits, and awaken agreeable anticipation of the greater discoveries yet to be made on continental Europe.

Another interesting effect of American geological work in Europe appears in a small way in

the annual of the French Alpine club for 1884. Mr. de Margerie, whose studies of our recent geological literature have done much to make it known in France, a few years ago prepared reviews of Captain Dutton's monograph of the Colorado Cañon, and published them in the bulletin of the French geological society as well as in the annual of the Alpine club, inciting thereby the preparation of an admirable view of a great 'cirque' in the Pyrenees by Mr. Schrader, a fellow club-member. "Shall it be," says Schrader, "that the cañon of the Colorado, so far away, becomes better known in France than the Cotuatero, on the very frontier of the country?" Doubtless the dimensions of the American plateau and cañon are greater than those of the massive Cotuatero and cirque in the Pyrenees, but the latter have the advantage in rising from a forest-clad base to a snow-crowned summit. The colored plate illustrating the Cotuatero is a thoroughly artistic and appreciative work, and it is grateful to find that the illustrations in our survey reports have been instrumental in securing its publication, and in bringing it before an interested circle of the French public.

These European Alpine clubs are producing a valuable literature of their own. They have, to be sure, the advantage of high snow-mountains that tempt travel and climbing; their membership is large, with many sectional meetings and excursions; and their treasuries are correspondingly well supplied, enabling them to publish selected material in well-illustrated annual volumes. The English Alpine club is more conservative than most of the others in these respects, as its matter is largely composed of narratives such as its adventurous members can well contribute, not only from the Alps, but from the Caucasus, the Himalaya, New Zealand, and the Andes, where they now seek new fields, taking trained Swiss guides with them. The Swiss club holds closely to its own country, but gives a good share of attention to scientific matters in its line, as well as to narratives and descriptions. Forel reports, for example, on the oscillations of glaciers; and our summer travellers will be glad to see from his diagram that the recession of the ice, that lately threatened seriously to diminish one of the main attractions of the Alps, reached its maximum about 1876, and is now followed by a well-marked advance. Long panoramic views from mountain-summits make a characteristic feature of these volumes, an annual bibliography of Alpine literature adds much to their value, and an index lately prepared for the first twenty volumes greatly increases their utility. The first volume is unfortunately extremely rare, as is the case in several other clubs; and a republication of the early numbers, such as has been lately done by our active Appalachian mountain club, would give general satisfaction.

The German-Austrian club is a union of two originally independent societies, and has a very large membership. Under its auspices an excellent 'Guide to scientific observation on Alpine journeys' was published a few years ago, and is by far the best book of its kind. The annual of the French club is naturally more vivacious than any of these others. Its articles are attractively written, and many of the woodcuts are extremely good. Scientific papers have a good showing, though lacking the systematic sequence of those in the Swiss 'Jahrbuch.' Some of the narratives have so little to do with Alpine matters that the annual might almost be called a geographic journal. Deep-sea exploration is introduced under the title of 'Les montagnes de le mer,' and Janssen describes his astronomical voyage in the Pacific to the Caroline Islands, any thing but a mountainous isle, for the solar eclipse of 1883. But to make up for this, one member climbs and photographs Popocatapetl, and another visits the volcanoes of Java, bringing home a well-illustrated account of his travels. The Alps naturally have most attention, but the Pyrenees come in for a good share, and much information of this comparatively little-known range is to be found in these attractive volumes. It is indeed regrettable that our White Mountains have not the few thousand additional feet of elevation that would cover their summits with snow and fill their valleys with glaciers, to the admiration of all.

A RECENT BULLETIN of the U. S. fish commission states that the total distribution of shad fry for the season of 1886 amounted to 90,000,000. As the entire number of shad taken for the market is less than 6,000,000, it will be seen, that, for every shad taken from the waters this season, there have been artificially hatched and returned to the waters fifteen young shad. Assuming that the entire cost of production and distribution has been $20,000, the young fish have been produced and distributed over the entire United States at a

rate of about $215 a million, or about 46 fry for one cent. Another interesting fact to note is, that, for the entire time up to and including 1882, there were produced 200,000,000 young shad; while, for 1883 alone, the total was over 90,000,000. This indicates that we are certainly approaching a position where the work may be regarded as profitable from a commercial stand-point.

THE COAST TRIBES OF BRITISH COLUMBIA.

Dr. Franz Boas, who visited the tribes of British Columbia in the fall of 1886, gives the following preliminary report (with map) on some results of his journey: —

Vancouver Island and the mainland opposite are inhabited by numerous tribes, which belong to three linguistic stocks, — the West Vancouver tribes, of the outside coast of Vancouver Island; the Selish tribes, which occupy the south-east part of the island as far as the narrows separating it from the mainland, and inhabit the banks of the lower part of Fraser River and the neighboring fiords; and the Kwakiutl tribes, which occupy the northern part of the island, and the mainland as far north as Gardner Channel. The latter tribes surround the territory of the Bilhula of Bentinck Arm and Dean Inlet, a tribe belonging to the Selish stock. Farther north we find the Tsimpshian and Tlingit on the mainland, and the Haida on Queen Charlotte Islands.

The Selish language is divided into a great number of dialects, differing widely from one another. Under the name 'Coast Selish' we include the dialects of Puget Sound and of the Gulf of Georgia, as those dialects are more closely connected with one another than with the Selish dialects of the interior.

Through the descriptions of Swan, Sproat, Krause, and others, the mode of life of these tribes is tolerably well known. Their large wooden houses, their canoes, their fishing-gear and hunting-methods, have been frequently described; but their traditions, religious ideas, and social organization are not known equally well. According to all observers, the principal figure in the mythology of the Tlingit is the raven Yetl, who created the sun, moon, and stars, who gave man the fresh water and the fish, and whose exploits are said to be so numerous that a lifetime is not sufficient to relate them all. Dawson found the same traditions among the Haida; and, according to the Rev. Mr. Duncan, the Tsimpshian tell the same stories of Tghemshen, the man who was able to transform himself into a raven. It is a characteristic feature of the 'raven' legend that the bird did not create all things for the benefit of mankind, but in order to revenge himself. While studying the tribes of Vancouver Island, numerous traces of this legend were found, though only very fragmentary and disconnected. Among these people the raven is not considered the creator of the sun, the water, the trees, etc.: but his adventures, which generally refer to his voracious appetite, and his cheating people and animals in order to satisfy it, are frequently related by the natives.

The most important legends of the Kwakiutl are those referring to Kanikilak. They believe in a supreme being living in heaven, whom they call Kantsoump ('our father,' or, in some instances, 'our elder brother'). He sent down to the earth his two sons Kanikilak and Nomokois, who were born there again of a woman, the wife of the woodpecker. Their mother's blanket contained the salmon, which they liberated by dipping the corner of the blanket into the water. Then Kanikilak travelled over all the world, becoming the friend of all the mighty chiefs whom he met on his way, and transforming all the malignant men into animals. The name, in the Kwakiutl language, of those ancient beings who were neither men nor animals, is Nughnemis. We find the same or a similar tradition belonging to all the tribes from Puget Sound to the district of the Tsimpshian. Among the Selish tribes the name of the son of God is Häls; among those of the west coast the name is Alis. The northern tribes — the Tsimpshian, Haida, and Tlingit — tell of those human-like beings which were transformed into animals during a great flood.

The supreme being spoken of above seems to have originally been the sun, though the identity of both does not appear very distinctly in the traditions of the natives. However, their ancient identity may have been lost in course of time, as among all the tribes legends of different origins are evidently intermixed. In the same way as the raven story has spread south, losing on the way its important place in the mythology of the tribes, the Kanikilak story seems to have spread north; and the traditions, in their present state, seem to consist of elements of at least two different origins. The Skoamish call the sun 'the great wandering chief.' The Nanaimo (Snanaimugh), in speaking of the sun as the supreme being, call it Shimthayith. The Bilhula call their supreme being, besides Taata ('our father'), by the name Sngh, which is evidently connected with *sōngh* ('sun'). In the Kwakiutl legends the sun is the father of the mink, and this tradition is so closely connected with others relating to the