set forth on the co-ordination of engineering training at the Conference of Engineers and Educational Associations held at the Institution of Civil Engineers, London, on October 25 last, with the object of securing increased efficiency in the training of apprentice engineers and a wider appreciation of the value in industry of education of university rank.

THE EXPLOITATION OF THE SEA-FISHERIES.

THE sea-fisheries as a source of food was the subject of an interesting series of letters published by the *Times* between February 8 and 18. First of all, Dr. W. S. Bruce directed attention to the abundance of whales and seals in Antarctic seas, and inquired whether Lord Rhondda and "the National Service" had sought advice about all this. Ought not "canning factories and refrigerating vessels to be started immediately in the rich Antarctic whaling grounds"? There are, he stated, whale meat there which "is better to eat and tastes better than beef"; seals and penguins, also an additional meat supply; and "millions and millions of new-laid penguin eggs, larger and better than hen's eggs." Other correspondents supported these remarks, but they did not suggest where the canning factories and refrigerating vessels were to be constructed, nor did they show that it was sounder economics to send fishermen and large vessels to high Antarctic latitudes rather than employ men and small motor-driven vessels to obtain the fish that is plentiful enough just now a few miles away from our own shores.

About the same time Lord Morris and others had an interesting discussion at the Aldwych Club with reference to Newfoundland fisheries and other matters. The remarkable quantities of plaice and soles existing there were mentioned. Letters in the *Times* from Dr. Shipley and Mr. C. Tate Regan rather dulled the alluring picture, and cast doubts on the knowledge of the speakers, by showing that there are *no* plaice or soles in Newfoundland waters. Whether it is better policy to send men and vessels there after the war or to employ them here was not discussed at the Aldwych Club. Before the war British fishermen caught so much sea-fish in British waters that about one-half was exported. The remainder worked out as a ration of about 1½ oz. a day for all persons above five years old. Even then the fishing trades had to organise a "fish as food" campaign to promote the demand.

To the same correspondence remarks were contributed by Capt. Howell, (late) Director of Fisheries for the Punjab, contrasting this country with the United States. We fail because we do not do artificial fish culture on the American scale—fish culture which has been studied here and in Norway as intensely as it is in the United States. Because of this lack of application of science, we are told in the letter of Capt. Howell to the *Times* that "dogfish have ousted plaice as the staple fish of the English Channel." Also, our Governments have lagged behind America in promoting the study of "the pure science of marine biology." America appropriates 8000*l*. a year for that purpose; had any British Government ever voted half that amount? Capt. Howell apparently does not know that, before the war, the Imperial Parliament gave 42,000*l*. a year to the scheme of international exploration of the sea.

Finally, Dr. J. T. Cunningham directed attention to the failure of the Fish Food Committee to promote the general use of pickled herrings as food—a matter about which most people have heard a great deal during the past few months. In further letters Mr. Cecil Harmsworth and Mr. Geo. M. Tabor gave an account of what had been done in this way. Mr. Tabor points out that the stocks are already nearly exhausted. (There were, we believe, some 250,000 barrels of pickled herrings in stock last Easter.) They were offered at "artificially low prices," Mr. Tabor says. These prices were (wholesale):—

Scottish pickled herrings, mean of 1904–13, 24*s*. per barrel; 1913, 36*s*. per barrel; April, 1917, 80*s*. per barrel; September, 1917, 65*s*. per barrel; February 1918, 42*s*.–48*s*. per barrel.

Mr. Tabor's own advertisement (*Fish Trades Gazette*, February 16) points out that Scottish pickled herrings can be bought for 48*s*. per barrel and sold at 4*d*. per lb., making a profit of 30*s*. per barrel, while Norwegian pickled herrings (bought in order to prevent Germany from getting them, Mr. Tabor says) can be had at 29*s*. per barrel and sold at 3*d*. per lb., making a profit of 20*s*. per barrel. The controlled maximum price for pickled herrings is 6*d*. per lb., and that is now also the general minimum price. J. J.

SEISMIC DISTURBANCES CONNECTED WITH THE GUATEMALA EARTHQUAKE.

IN view of the widespread destruction caused by the earthquake in Guatemala, the accompanying notes, written by Dr. Crichton Mitchell, superintendent of Eskdalemuir Observatory, are of interest. We are indebted to the Director of the Meteorological Office for these notes, and are glad to be able to publish them.

From December 25, 1917, until January 4, 1918, a number of seismic disturbances were recorded at Eskdalemuir Observatory by means of the Galitzin seismographs. Some of these were without doubt connected with the disastrous earthquake in Guatemala. But the epicentral distance, about 8500 kilometres, is so great that except in favourable circumstances it is difficult to detect the primary and secondary waves which form the preliminary phases and from which a determination of epicentral distance is usually obtained. It must also be remembered that the Galitzin instruments are of such high sensitiveness that they record microseismal movements and also local tremors due to wind effects on the building.

The following notes have been drawn up from the seismograms for the period referred to above:—

December 25, 1917.—From 11h. 15m. until 20h. wind effects on the record make it impossible to say whether there was any true seismic effect or not. Otherwise there was no disturbance recorded.

December 26, 1917.—After 5h. a faint disturbance was recorded. Its maximum on the E.-W. instrument occurred at 5h. 15m. 47*s*.; its period was 19*s*., and the amplitude was 1·5 μ. These were long waves due to some distant earthquake, but no preliminary phases were noticeable. Similar waves were recorded on the E.-W. instrument from 6h. 4m. to 6h. 22m.

Between 9h. and 10h. the long-wave phase of a disturbance, the preliminary phases of which were too feeble to be identified, was recorded. The first noticeable portion consisted of a slight impulse in a direction nearly from S.W. to N.E. at 9h. 26m. 11*s*. Fairly well marked long waves began at 9h. 28m. 55*s*., with a period of 18*s*. and a maximum amplitude of 10·6 μ at 9h. 29m. 28*s*. The end of this slight disturbance came about 15m. afterwards.

Another series of long waves of low amplitude occurred from 14h. 5m. to 14h. 15m.

December 27, 1917.—A slight disturbance with no distinctly marked phases began at 7h. 52m., and lasted until 8h. 8m.

December 28, 1917.—A large disturbance was re-

corded between 21h. and 22h. The timings of the preliminary phases are somewhat doubtful, first, because the motions connected with them were very slight; secondly, because wind and microseismic effects masked the true earthquake effect. The following may, however, be taken as approximately correct:—Primary, 21h. 24m. 44s.; secondary, 21h. 34m. 4s. The beginning of the long-wave phase was about 21h. 49m. These times correspond with an earthquake at the distance of Guatemala. The following maxima were recorded:—

	Time	Period	Amplitude
N.-S. component	21h. 57m. 33s.	19s.	18·5 μ
E.-W. component	21h. 58m. 13s.	18s.	17·1 μ

The largest vertical motions occurred about the same time. The displacements due to the horizontal waves were in the S.W.–N.E. direction. The disturbance continued until about 24h.

December 29, 1917.—Another large disturbance occurred on the evening of this day. Very unfortunately, the light failed about an hour before the earthquake began, a minute particle of soot having blocked the acetylene jet. In consequence, the photographic record for the horizontal components is too faint to be read with accuracy. The vertical instrument gave a very fine record, however, and from it the following times are taken:—Primary, 23h. 2m. 43s.; secondary, 23h. 12m. 39s. The maximum displacements were at 23h. 37½m., and had a period of 21s. The disturbance did not die down until 1h. 30m. on December 30.

December 30, 1917.—A faint disturbance was recorded from 16h. 41m. until 17h. 9m.

January 1, 1918.—From about oh. until 15h. a somewhat unusual record was obtained from the horizontal instruments. Ordinarily, on a seismically quiet day, the trace shows nothing but the regular microseisms. But, superposed on these, there was, during the interval referred to, an almost continual movement of an irregular kind, due most probably to a large number of minor shocks at some distant epicentre.

January 3, 1918.—From oh. 19m. to oh. 42m. a faint disturbance occurred. From 14h. 0m. to 14h. 21m. a slight disturbance, including two groups of long waves, was recorded. The first group had a period averaging 26s., the second averaging 20s.

Wind effects obscured the seismogram about midnight, but the trace shows signs of faint disturbance.

January 4, 1918.—A larger disturbance was noticed four hours later. The primary wave occurred at 4h. 44m. 37s., the secondary at 4h. 54m. 38s., and the long-wave phase began about 5h. 9m. These timings indicate an epicentre at the distance of Guatemala. The maximum displacement occurred at 5h. 19m. on the E.-W. instrument, its period being 20s., and the amplitude 4·2 μ.

At 16h. 30m. a slight, indefinitely marked disturbance began and lasted for nearly an hour.

All the above times are G.M.T.

THE PITTSBURGH MEETING OF THE AMERICAN ASSOCIATION.

THE seventieth meeting of the American Association for the Advancement of Science was held in Pittsburgh, Pennsylvania, December 28, 1917–January 3, 1918. The total registration at the office of the permanent secretary was 692.

The impressive keynote of the whole meeting was war preparation and efficiency. This was borne out not only in a number of symposia devoted to specific war topics, but also in other discussions, and in other papers, the titles of which would not necessarily lead one to expect a development along the line of war preparation.

The opening general session of the association was held on Friday night, December 28, in the lecture hall of the Carnegie Institution. The president of the association, Prof. T. W. Richards, of Harvard University, was absent, and Dr. G. H. Perkins, of the University of Vermont, senior vice-president, presided. Mr. H. M. Irons, city attorney of Pittsburgh, gave an address of welcome on behalf of the mayor of Pittsburgh, to which Dr. Perkins replied.

Dr. C. R. Van Hise, retiring president of the association, in his address on "Some Economic Aspects of the World War," set the note for the entire meeting. Certain special items on the programme of the week may be especially mentioned on account of their war bearing.

Section C held a symposium on "Education in Chemical Engineering." Section M held an important symposium on "Factors Concerned in an Increased Agricultural Production." Section I listened to a paper by the Hon. John Barrett on "The War and the New Pan-America," and before the same section Mr. H. E. Coffin, President of the Aircraft Board at Washington, spoke on the subject of "General Standardisation." Section B held a general interest session on the subject of "Relationship of Physics to the War." Section G, with the Botanical Society of America and the American Phytopathological Society, held a joint session on "War Problems in Botany." Dr. Vernon L. Kellogg, formerly of the Belgium Relief Commission, and now with Mr. Hoover's board in Washington, gave an exceedingly strong address before the Entomological Society of America on "The Biological Aspects of the War." Section I held a special symposium on "War Problems." Section F held a symposium on "Contributions of Zoology to Human Welfare," in which many war problems were discussed. Section K held a very important symposium on the subject of "Medical Problems of the War." This symposium included an address by Lieut. George Loewy, of the French Army, on "The Treatment of War Wounds by the Carrel Method," which was illustrated by moving pictures. The School Garden Association of America held a symposium on "Organisation of War Gardens." The Association of Economic Entomologists discussed the two following topics at length: "Insects and Camp Sanitation" and "How the Entomologist can Assist in Increasing Food Production." The Botanical Society of America and the American Phytopathological Society held a symposium on "Phytopathology in Relation to War Service."

It was decided to hold the next meeting of the association in Boston, Massachusetts, the meeting to begin on Friday, December 27, 1918. The following officers were elected:—*President*, J. M. Coulter, of the University of Chicago; *Presidents of Sections*: A, G. D. Burkhoff, Harvard University; B, G. T. Hull, Dartmouth College; C, Alex. Smith, Columbia University; D, I. N. Hollis, Worcester Polytechnic Institute; E, D. White, U.S. Geological Survey, Washington, D.C.; F, W. Patten, Dartmouth College; G, A. F. Blakeslee, Cold Spring Harbour; H, (no election); I, J. Barrett, Washington; K, F. S. Lee, Columbia University; L, S. A. Courtis, Detroit, Mich.; M, H. P. Armsby, Pennsylvania State College.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

BIRMINGHAM.—The council of the University and the Principal (Sir Oliver Lodge) have issued, for presentation at the annual meeting of the Court of Governors, their reports for the session 1916–17. The war has reduced the total number of students to about 63 per cent. of the normal. The diminution affects all facul-