separate sub-groups. In the present case the sixty-four years were divided into three periods, 1854–73, 1874–93, 1894–1917; the semidiurnal components obtained by analysis of the three corresponding mean hourly inequalities of pressure were, in mm. of mercury,

$$0{\cdot}0080 \sin (2t + 96^\circ)$$
$$0{\cdot}0089 \sin (2t + 112^\circ)$$
$$0{\cdot}0104 \sin (2t + 127^\circ),$$

between which there is sufficiently satisfactory accordance.

On comparing the determinations for Batavia and Greenwich it appears that the amplitude of the lunar atmospheric tide varies approximately as $\cos^4 \lambda$, where λ is the latitude. At Greenwich the tide is nearly an hour in advance of the moon, whereas at Batavia the order is reversed. It is possible that the amplitude and phase are subject to some modification from local causes. The fact that the observed tide is larger than the equilibrium tidal theory would predict may be attributed to the occurrence of resonance with a free period of atmospheric vibration of rather shorter duration. But, as Laplace suggested, the rise and fall of the oceans may also be partly responsible for the observed tide, and, if so, some differences might be expected between the results from oceanic and continental stations in the same latitude. The lunar tidal range of pressure is equivalent to the weight of a column of air of normal density of height 4·4 ft. at Batavia and about 7 in. at Greenwich. Hence in northern latitudes quite a small tide, existing over a considerable area, might suffice to affect the tide in the atmosphere to an appreciable degree.

S. CHAPMAN.

INTER-ALLIED CO-OPERATION IN CHEMISTRY.

INTER-ALLIED co-operation in chemistry, of which a brief notice appeared in NATURE for April 24, should be of interest to all men of science, for what is true of chemistry is very largely true of all branches of science. Men of genius have developed in all countries, and of the really important scientific discoveries the Allies have contributed at least their due proportion, if not more. But the total volume of scientific work turned out by Germany during the last fifty years has been immense, and in the application of scientific discoveries to chemical manufactures the Germans have been easily first. Moreover, in the laborious and useful work of abstracting, indexing, and publishing, the Germans have displayed their usual methodical industry; and they have not by any means under-estimated their achievements, or neglected to give them world-wide advertisement.

A good deal of antipathy to Germans and German ways now prevails, especially in those countries which have experienced German methods of devastation. French chemists and chemical manufacturers can scarcely be expected during this generation to co-operate in any way with their eastern neighbours, and they have invited the Allied chemists, pure and applied, to join them in undertaking a mass of work which hitherto has been done, and, on the whole, well done, by Germany. In chemical matters there has been during the war a considerable amount of real co-operation between the Allies. The French, Americans, and British have been of great help to each other in solving chemical problems, both of research and manufacture. It is felt that the Allies will all gain by continuing, so far as is possible, the co-operation thus begun.

Prof. Moureu presided over the recent conference in Paris, and among his French colleagues were Profs. Haller, Béhal, and Matignon, MM. Kestner, Poulenc, Marquis, and Gérard. The British delegates were Prof. Louis, Sir William Pope, Messrs. Chaston Chapman, W. F. Reid, E. Thompson, and S. Miall. America was represented by Mr. Henry Wigglesworth, Lt.-Cols. Bartow, Norris, and Zanetti, Dr. Cottrell, and Major Keyes; Italy by Senator Paterno, Drs. Pomilio, Giordani, and Parodi-Delfino; and Belgium by MM. Chavanne and Crismer.

It was unanimously decided to form an Inter-Allied Federal Council of not more than six representatives of each of the countries mentioned above, the members to hold office for three years, one-third to retire annually and be eligible for re-election. The executive body is to consist of a president, a vice-president, and a general secretary. M. Jean Gérard will provisionally act as the secretary. In addition to the council a consultative committee will be formed, consisting of as many sections as may be necessary to secure the complete representation of pure and applied chemistry. The objects of the confederation are: To strengthen the bonds of esteem and friendship existing during the war between the Allied peoples; to organise permanent co-operation between the associations of the Allied nations; to co-ordinate their scientific and technical resources; and to contribute towards the progress of chemistry in the whole of its domain.

Neutral countries may be admitted later. The next meeting of the conference will be held in London on July 15–18, that being the date of the annual meeting of the Society of Chemical Industry.

So far as Britain is concerned, the choice of representatives and the supervision of the arrangements for the first meeting will be in the hands of the Federal Council for Pure and Applied Chemistry, of which Sir William Pope is president and Prof. H. E. Armstrong the honorary secretary. Until the various nations concerned have chosen their representatives, little can be done, but Sir William Pope and Prof. Louis are provisionally acting as the British representatives, and are in communication with their French colleagues.

The meeting in Paris was held under the auspices of the French chemical societies, especially the Société de Chimie Industrielle, the president of which, M. Paul Kestner, presided at some

of the meetings. The final meeting of the members of the conference was held at the Palais d'Orsay at a banquet presided over by M. Loucheur, the Minister of Industrial Reconstruction, at which Lord Moulton was also present.

During the meeting of the conference some interesting papers were read. Prof. H. Louis gave an excellent summary of the magnetic concentration of poor iron-ores, a subject of special importance to our Allies at the present moment.

Dr. F. Cottrell reported fully on the recent production of helium in the United States, describing the new plant which has been erected in the U.S.A. for the freezing of gases by the cylinder-expansion process. Helium is one of the most recent and best illustrations of the co-operation of science and practice. First detected in the sun by Sir Norman Lockyer by means of its spectrum, and afterwards found in the earth by Sir William Ramsay, it was detected in gases from subterranean sources by various observers, especially by Prof. Moureu, who published his results in the *Annales de Chimie* in 1915 and 1916, and gave some further particulars of his researches in the discussion on Dr. Cottrell's paper. At the commencement of the armistice the practical work done in the United States, following that carried out in connection with the British Admiralty Board of Invention and Research (see NATURE, February 20), had resulted in the accumulation of a large quantity of helium, which is now available for other than warlike purposes.

On April 16 many of the delegates visited the devastated region of Chauny, Tergnier, and St. Gobain. This is classic ground for the chemist, as it was here that the Leblanc soda process was first installed on a large manufacturing scale, and the Gay-Lussac tower was also originated there, its inventor being a director of the St. Gobain Company. The date, 1665, on the ruined portal of the glass factory shows its antiquity. The ruin wrought by the invaders was systematic and complete; in the villages not even the humblest cottage remained uninjured, and what was an industrious and prosperous community has been totally ruined: let us hope for a short time only.

The Inter-Allied Council has a big task in front of it, and the first thing will be for the various members of the council and committees to get to know each other. Not only has the work to be done, but the right men have also to be chosen to do it. It will be some time before the different nations, speaking different languages and looking at matters from different points of view, can so organise themselves that they can accomplish their task smoothly and efficiently. But the goodwill and determination which exist should be sufficient to enable them to achieve success. The various chemical societies in this country will no doubt communicate their wishes and ideas to the Federal Council, and by the end of this summer it should be possible to put forward some practical scheme and a carefully considered programme.

THE ROYAL ACADEMY.

A VISIT to the Royal Academy cannot fail to be of interest to those who take pleasure in the ways of Nature, the varying moods of which are shown in so many of the pictures exhibited. Unfortunately, it has to be admitted that while there is much of interest to the scientific worker in each year's exhibition, there is also much that is jarring by reason of its lack of adherence to the truth. So much adverse comment is passed upon the works of the exhibitors by artistic critics at the opening of the exhibition each summer that it is perhaps natural for artists to make greater efforts to meet this criticism than a purely scientific criticism, which in general, though well deserved, remains unvoiced. To the man of science no result can be pleasing which is produced merely for the sake of effect and in its production overrides the laws of Nature. As an example of this type may be cited "Off the Western Land" (198) in the exhibition which opened at Burlington House at the beginning of the present week. It is difficult to believe that the combination of colours there depicted on the sea and in the sky could ever be approached in Nature. In the same way the colouring of the clouds in "The House on the Sea Wall" (309) cannot be passed over without comment. The complete semicircular rainbow in "Passing Storm" (232) seems to be independent of the presence of raindrops in its formation. While rain is seen to be falling in one part of the sky, the artist appears to have gone out of his way to indicate that there is no rain in another part of the bow, the cumulus cloud behind showing up with absolute clearness.

A study of the landscapes in successive exhibitions reveals the fact that an artist may often be known by his clouds, just as surely as by the type of country which he chooses for his subject. The typical cloud in a Leader is the soft cumulus, always produced with admirable effect. Arnesby Brown is another whose works may readily be distinguished by the cloud forms depicted, though the meteorologist is not always able to pass an entirely favourable verdict upon the result. The cloud effect in "A Village by the Sea" (96) by this artist deserves, however, its meed of praise. Peter Graham's mountain scenes generally show patches of mist amongst the hills, while this year, in "A Shower across the Hills" (150), falling rain has been introduced with a very pleasing result. A study of the fairly numerous pictures in which a portrayal of rain is attempted leads to the conclusion that the subject is far from an easy one to treat successfully. In "By the Woodside" (H. Sylvester Stannard, 673) an unpretentious but natural sky showing through the trees adds much to the success of the picture. Snow scenes have attracted an unusually large share of attention in this year's exhibition, and they are generally dealt with successfully. In "Through the Woodland Snow" (J. Farquharson, 19) the soft, moist look