Entente Scientific Literature in Central Europe during the War.

THE chief object of my letter, "A Tribute from Prague," published in NATURE of December 11, 1919, was to congratulate the Editor upon the jubilee number and to express my delight at again being able to obtain this invaluable journal after an interval of more than five years. I thought it worth while to state very briefly that this break was caused by political reasons.

The letter by Mr. Lawson published in NATURE of January 1 induces me, unwillingly, to enter a little into non-scientific details.

There is a decided difference between the point of view during the war of an interned distinguished foreigner enjoying the well-known hospitality of the inhabitants of the capital of the late Austro-Hungarian Empire and that of us Bohemians or Czechs whose country was, by the Government of the same Vienna, nearly converted into a desert, whose best men (even poets) were imprisoned and condemned to death for their regard for the Entente, and who, had the war lasted only half a year longer, would have experienced the same fate as 1,500,000 Slavonic, chiefly Serbian, children in Bosnia and Herzegovina, condemned to starvation. Their parents, in so far as they were not shot down, escaped from death only by eating grass and other herbs!

No Englishman can wonder that we (Austrian) Slavs fully sympathised with the contents of the following two remarkable articles, which I select from a great number:

(1) The leader, "The War and After," published in NATURE of September 10, 1914 (p. 29). Never previously had such a fine political article been published in your columns, and I would beg readers to convince themselves that its great truth, and even prophecy, were fulfilled to the last point.

(2) An article published by Sir Oliver Lodge during the early part of the war in the *Psychological Review*. Sir Oliver says that there exists a Great Justice watching over the destinies of mankind who will never allow a crime to become a law. The editor of our leading daily paper introduced this view as "strange ideas of a spiritualist," and only by this trick did it escape the watchful eye of the censor. I thank Sir Oliver for this article, which kept many of my countrymen and me firm in the days of our greatest distress.

All this was known to the Austrian Government, and it is well understood why it withheld during the whole war the circulation of periodicals which contained such articles as those referred to above.

Towards the end of the war, when everyone saw that the old Monarchy was going to pieces, the Austro-Hungarian Foreign Office—and I assure Mr. Lawson that I am by no means "unaware of the fact"—asked the Senate and professors of our University to fill a circular with the names of the Entente scientific journals which they would like to obtain. I denoted several journals—in the first place, NATURE. I know that those belonging to the "privileged nations" obtained the journals they wished, but no notice at all was taken of my desire or that of any other Bohemian scientific institution up to the very end of the Monarchy.

BOHUSLAV BRAUNER.
Chemical Laboratory, Bohemian University,
Prague, January 20.

Percussion Figures in Isotropic Solids.

ALL anthropologists will be glad to see the subject of percussion figures receiving attention in the pages of NATURE (October 9 and November 20, 1919), as the figures form the basis of flint-fracture—the important factor in determining the age and origin of man. Unfortunately, the fracture cone is by no means so simple and constant in outline as one might be led to expect from what has already been advanced, and a number of factors enter into the question, such as the shape and elasticity of the percusser, the velocity of the blow, the striking angle, the perfection of surface of the percussed, its elasticity, and, above all, its varying refrangibility.

In Nature and practice we generally find that after the cone has maintained itself for a distance, the surface resolves into a cylinder in the striking plane, which is maintained for a certain varying distance; then it resolves outwards in a more conical direction, which may extend until rupture takes place; or it may even resolve again and again as before, giving rise to *step-cones*. Specimens before me show seven such steps. Further, from causes into which we cannot now enter, the well-known conchoidal ripplings may be set up. These may be very simple and concentric or the very reverse, and may be either apical or marginal; they pass into *step-cones*. Frequently the surface turns inwards, producing cylindrical fracture more or less normal to the striking plane.

Generally, with glass and flint there is another set of features in the form of stellate lines, which may be very few or numbered by hundreds. An examination of these shows the cone to be a surface of revolution, and the direction of the gyrations is shown by the steps made by every radial (some dozen of these are faintly shown in Prof. Raman's illustration in NATURE of October 9). These may increase in size until we get *step-fracture*, where the steps may be, say, 3 mm. or 4 mm. high. It may be noted in passing that these are the lines along which fracture in plate-glass takes place.

Perhaps the most remarkable thing about these steps is that they indicate right and left revolutions in relation to the cone. Sometimes the two hemicones coincide, and we get a perfect cone. At other times the fracture-waves overlap for a distance, giving rise to the mysterious *éraillure*; they may also meet in a re-entrant angle, which may become very acute, say down to 30°. This is only the beginning of the complications. Cones may be quite asymmetrical; one hemicone may be reduced to a plane. There are also *faceted cones*, *shell-cones* (*cones in cones*), and *cones in cups*. Then there are the phenomena of *cone-capture*, and still greater complications of positive and negative hemicones, and multiple hemicones which by mutual capture produce large flat surfaces, and many others.

I suggest that the study involves something more than isotropics, seeing that in glass, silica, and many other substances new atomic or molecular re-arrangements set in which soon render them anisotropic or anisoclastic, and in one direction end in spontaneous disruption into forms which call for mathematical explanation quite as much as, and indeed more than, simple percussion figures in ideal isotropes; and, on the other hand, colloids pass into crystals where both optical and dynamical properties vary according to the lines along which the alterations take place.

W. J. LEWIS ABBOTT.
St. Leonards-on-Sea.

Change of Colour in Plumage of Captive "Sun-birds" or "Honey-suckers."

WE have had considerable success at the Zoological Gardens here in keeping in health nine varieties of "sun-birds" or, as locally known, "honey-suckers,"

all of Natal, South Africa. The aviaries are of simple wire-netting, in which are growing flowering shrubs and weeds. Their dimensions are 12×9×6 ft.

The food provided is Mellin's (baby) food, honey, and Swiss milk (tin) in equal proportions, and pea-flour one-quarter to the above.

The brilliant scarlet borne by certain of the varieties has changed in every case to a bright orange colour, thus causing the bird to present a great contrast to its original colour. Metallic green, which is borne by so many of the "sun-birds," is in no manner affected. Other colours of these birds are also not affected.

It would appear to be a case of change of plumage caused by the feeding, for the condition of life is almost natural.

We are not aware of such variety of colour having been observed previously. It would be of interest if any contributor to NATURE could give information of examples of similar occurrences with respect to captive wild birds, or offer an explanation of the physiological causes which are at work.

HAROLD MILLAR,
Director.

Zoological Gardens, Mitchell Park, Durban,
Natal, December 30, 1919.

MATHEMATICS IN THE UNITED STATES.

NOT very long ago (perhaps fifteen or twenty years) an English lady, spending a visit in Utrecht, met a distinguished Dutch professor of mathematics. In the course of conversation the lady asked the professor what he thought of contemporary English mathematicians and their work. The answer was not calculated to flatter our national vanity, for it was to the effect that he rarely looked at English mathematical papers, because they were so unconnected with the general progress of the science, and written in such a peculiar way that he could scarcely understand them. Incredible as it seems, this opinion was expressed when Salmon, Cayley, Sylvester, and Clifford had published all their best work. Prejudices die hard, and the professor's attitude would have been intelligible in the earlier part of the nineteenth century.

One moral of the story is that, as there are nationalities in drinks, so there are in mathematics, in spite of the growing tendency towards universal co-operation. The history of recent mathematical progress in the United States presents many points of interest. To a great extent, American mathematicians may be regarded as the grown-up pupils of Germany. From Germany they have acquired habits of thoroughness, breadth of view, and collaboration. But they have clearly passed the time of pupilage, as we see from their growing list of original and eminent writers; it is enough to refer to such men as the two Peirces and Willard Gibbs.

There are several features of the attitude of the Americans towards mathematics which deserve our careful attention. In the first place, it should be noted that the State and private benefactors encourage mathematics for its own sake, quite apart from considerations of utility. Many American professors are allowed to devote themselves to research in such things as group-theory, abstract geometry of all kinds, function-theory, and the higher arithmetic; the predominance of such subjects in American journals and transactions is quite remarkable. The Government and people of the United States appear to be fully conscious of the fact that special ability of *every* kind should be encouraged.

An excellent American institution, which might well be adopted here, is that of the sabbatical year, which gives the teacher an opportunity of bringing his knowledge up to date, or of carrying out some laborious research. As an example of what can be done in such periods of leisure, we may refer to the recently published first volume of Prof. L. E. Dickson's "History of the Theory of Numbers." With almost incredible industry, the author has personally consulted and summarised thousands of papers, notes, and memoirs; and if the work is carried out on the same scale it will fill four or five large octavo volumes, and be an indispensable guide to all who work in this field. It may be remarked here that we owe to the States many valuable works on the history of mathematics (especially from the teacher's point of view), and reprints and translations of scarce and valuable works.

Collaboration, both in the composition of books and in that of papers, is more common than with us. There are two sides to this question; in some cases the advantages of joint authorship are obvious, but those treatises which rank as masterpieces (such as Salmon's "Conic Sections" or H. Weber's "Algebra") are usually, if not always, the work of one man.

American mathematical colloquia are far more serious affairs than anything we have here. They are meetings of experts, lasting for a week or so, at which a serious programme is carried out, and carefully prepared addresses and short sets of lectures are delivered on topics of outstanding interest. In this matter we ourselves seem to vibrate between two extremes; either we have a technical meeting where papers are read (or taken as read), which seldom interest more than one or two of the audience, or we indulge in a picnic, at which a few casual notes are communicated, mainly for the sake of securing priority.

While thus directing attention to some things in which we might well imitate the States, we have no intention of carping at our own countrymen. The *general* condition of mathematics in this country is probably better now than it has been for many years, and we should be sorry to see some of the old English characteristics disappear. For instance, the view that mathematics is a gentlemanly recreation has something to be said for it, and we may avoid being needlessly solemn and serious in our study of it, however conscious we may be of its vital importance for national welfare.

G. B. M.