Population Problems.

THE article by A. M. C.-S. in NATURE of Dec. 29 shows convincingly how urgent are the population problems confronting the British community, and how inadequate is the knowledge at present at our disposal to solve them. These problems are by no means exclusively British, and they are much more acutely realised in many countries than here. It is therefore appropriate that, with the Editor's permission, I should remind readers of NATURE that an organisation has recently been established to deal with precisely such questions as are raised in the article, namely, the "International Union for the Scientific Investigation of Population Problems," with its constituent bodies, the national committees which are now being set up in each of the countries represented in the Union.

I cannot ask for space to describe the plans for developing research, both internationally and within the various national units, from which the founders of the Union, men eminent in many branches of science in many countries, confidently expect a great advance in the elucidation of population problems, and I must confine myself to the question of the financial provision on which the success of their efforts will depend.

Sufficient resources are already in great part assured to the International Union itself, and to certain of the national committees, notably those of the United States and Italy; but they are at present almost non-existent in the case of the British section. It will not do for Great Britain, with her vast and varied responsibility for human populations, to fall behind in this enterprise, and it is with the object of trying to enlist support for the British National Committee which has been formed under the title of the "British Population Society" in connexion with the Union that I am asking the Editor to publish this appeal.

The only way in which we can hope to raise the very moderate income required for current expenditure is by way of subscriptions both from institutions and from individuals, which we propose to fix at a minimum of £1 per annum, giving the right to attend meetings, receive publications, etc. The primary object of the Society is to focus and co-ordinate research, and we are therefore specially anxious that all institutions of scientific or sociological character, universities, and other learned bodies interested in one or other branch of the population question, should join the new Society. We are encouraged to hope that they may do so by the fact that two or three important institutions of this character have already consented to be represented on the council and to support our work by quite substantial subscriptions, but we should hope that individuals interested or qualified in any particular branch of population research may also be induced to join us. I need scarcely add that if we are to take a worthy share in assisting and promoting research, both by the Union and at home, much more will be needed, but for this we shall have to look in the future to the generosity of donors inspired by a conviction of the great importance of this work to the welfare of human population.

The original members of the council, which will be added to as time goes on, are Sir William Beveridge, Sir Charles Close, Sir Arthur Keith, Sir Humphry Rolleston, the Dean of St. Paul's, Mr. Maynard Keynes, Capt. Pitt-Rivers, Dr. R. A. Fisher, Dr. David Heron, Mr. M. Pease, and Profs. A. M. Bowley, F. A. E. Crew, A. M. Carr-Saunders, B. Malinowski, J. S. Huxley, and J. W. Gregory.

May I add that I shall be glad to answer any inquiries on the subject either of the International Union or the British Society, and that communications may be addressed either to me as chariman of the council, or the honorary secretary, Mr. Eldon Moore, c/o The Eugenics Society, 20 Grosvenor Gardens, London, S.W.1.

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Magnetic Properties in Relation to Chemical Constitution.

THROUGH the kindness of Dr. Kapitza and Dr. Webster, we have had the opportunity of examining in the Cambridge Magnetic Laboratory a number of compounds to which formulæ with single-electron bonds have been assigned. These compounds are of two principal types: (1) *Pervalent salts*, including PCl_5, $SbCl_5$, $SbMe_3Cl_2$, $SbMe_3Br_2$, $SbMe_3I_2$, the α and β forms of $TeMe_2Cl_2$, $TeMe_2Br_2$ and $TeEt_2I_2$, α-$TeMe_2I_2$ and α-$TeMe_2I_4$, and a number of analogous compounds such as PCl_3, $POCl_3$, $AlCl_3$, TlI_3, BiI_3, CsI_3. (2) *Co-ordination compounds*, including the Li$^{\cdot}$, Be$^{\cdot\cdot}$, Al$^{\cdot\cdot\cdot}$, Co$^{\cdot\cdot}$, Ni$^{\cdot\cdot}$, and Fe$^{\cdot\cdot\cdot}$ derivatives of benzoylcamphor. Except in the case of substances containing a metal of the transition series, these compounds have all proved to be diamagnetic. We therefore conclude that all the electrons are magnetically paired, just as they are in compounds in which the valency-electrons are present as pairs of shared electrons or as 'lone pairs' of unshared electrons. The numerical results of these experiments will be published later.

We have also examined some cuprous and mercurous salts for which no magnetic data appear to have been given previously. We find that mercurous chloride and cuprous iodide are both diamagnetic, whereas mercuric chloride is diamagnetic and cupric chloride is strongly paramagnetic. The diamagnetism of mercurous chloride can be accounted for readily, since physico-chemical measurements with dissolved mercurous salts point to the existence of a diatomic ion derived from bivalent mercury, for example, $Hg_2(NO_3)_2 \rightleftharpoons Hg_2^{++} + 2NO_3^-$. Moreover, X-ray analysis of crystals of calomel has disclosed the existence of chain-molecules containing bivalent mercury, as shown by the formula Cl-Hg-Hg-Cl. The metallic atoms in the mercurous salts therefore contain completed shells of 18 unshared *O*-electrons, with an outer shell of 2 or 4 shared electrons, and are diamagnetic like the free metal. On the other hand, the copper atoms in a bivalent cuprous salt would contain an incomplete shell of 17 unshared *M*-electrons, with an outer shell of 2 or 4 shared electrons, and would therefore be paramagnetic like the cupric salts.

The fact that cuprous iodide is diamagnetic, shows that the cuprous salts, unlike the mercurous salts, contain only univalent ions or atoms of the metal. This result also is in agreement with X-ray analysis, which has shown that the structure of cuprous iodide is similar to that of silver iodide, $\overset{+}{Ag}\overset{-}{I}$. Conversely, however, the fact that cupric sulphide, CuS, is diamagnetic like cuprous sulphide, Cu_2S, suggests that it may really be a cuprous disulphide $\overset{+}{Cu}\,\overset{-}{S}\text{-}\overset{-}{S}\,\overset{+}{Cu}$, just as iron pyrites has been shown by X-ray analysis to be a ferrous disulphide, $\overset{++}{Fe}\,\overset{-}{S}\text{-}\overset{-}{S}$. This conclusion can be justified by comparison with the polysulphides of the formula Cu_2S_x; but it is also confirmed by X-ray analysis, which shows that the crystal structure of cupric sulphide is different from, and more complex than, that of all other binary monosulphides.

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