advance will in the future be at a continually accelerated pace.

This reasoning is closely akin to that of Lewis H. Morgan in the chapter on the rate of human progress in his 'Ancient Society' (New York, 1878). He there argues that culture-progress proceeds by geometrical, not arithmetical ratios; which is substantially Mr. Iles' position.

It should be borne in mind, however, that true culture cannot be measured by criteria drawn solely from the utilitarian arts. Civilization has been nicely defined by a French writer as a 'state of mind,' rather than a schedule of possessions; and this is signally true.

THE ITALIAN ANTHROPOLOGICAL INSTITUTE.

Under the title 'Istituto Antropologico Italiano,' Dr. Giuseppe Marina has opened at Leghorn an establishment which has for its aim the popularizing of anthropologic work, and also the collection of material for scientific purposes. It embraces psychological, antropometrical, pathological and ethnographic investigations. Persons can apply and for a moderate fee have themselves examined by the most approved modern methods in all these directions. A careful record is kept, and the same individual may return from time to time to have the examination repeated—a procedure in which he has a personal interest, while the comparative results thus obtained will prove of value to science. In addition to this feature, lectures, publications, open discussions and other plans for attracting and educating the public in anthropologic matters will be cultivated. The history of culture, demography, sociology and hygiene will be brought forward with especial prominence.

Dr. Marina deserves great credit for this excellent and original scheme of bringing home to the general public the practical value of anthropology. A descriptive circular may be obtained by addressing him (Livorno, Italy).

'ORGANIC' SOCIOLOGY.

There was a time when it was quite useful to speak of language as an 'organism' and human society as an 'organism.' The word brought the inter-relation of parts clearly to the mind. That there was any actual identity, either of parts or of functions, or of laws of growth, with anatomical organisms was not intended. Of late, however, a class of writers have insisted on such identity, and have carried it out in quite ridiculous parallels, such as that the railroads are arteries, the frontiers are the epidermis, etc. (Lilienfeld, Worms).

Nothing is gained by these similes, which are, in fact, empty literary formulas; and it is gratifying to see that such solid writers as Lester F. Ward, in this country, in the *Journal of Sociology*, and Dr. S. R. Steinmetz, in the *Zeitschrift für Socialwissenschaft*, have condemned them as unscientific, and barren of profitable results. As much may be said of the term 'super-organism,' proposed by Mr. Herbert Spencer, though that writer defines it in such a manner as to divest it of most of its erroneous suggestiveness. Professor Giddings adopts 'physio-psychic organism' as the correct term for the social group; but this is just as applicable to the living individual, and, applied to a society, may be as misleading.

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NOTES ON INORGANIC CHEMISTRY.

Fuller particulars regarding the liquefaction of hydrogen and helium by Professor Dewar have come to hand in his paper in the *Proceedings* of the Chemical Society. As early as 1895 Dewar had constructed an apparatus by which he could produce a jet of hydrogen containing liquid. It was then shown that such a jet could be used to cool substances below the temperature which

could be reached by the use of liquid air. A much larger apparatus of the same type was then constructed, in which the liquid air plant was combined in its circuits and arrangements for the liquefaction of hydrogen. The construction of this apparatus consumed a year, and many months were occupied in preliminary trials and tests. On May 10th hydrogen was liquefied by allowing the gas, cooled to —205°, and under a pressure of 180 atmospheres, to escape continuously, at the rate of ten to fifteen cubic feet per minute, from the nozzle of a coil of pipe in a double silvered vacuum vessel of special construction, surrounded by a space kept below —200°. Liquid hydrogen commenced to drop from this vacuum vessel into another doubly isolated by being surrounded by a third. 20 cc. liquid hydrogen were obtained before the hydrogen jet froze up from the solidification of the air in the pipes. Liquid hydrogen is clear and colorless, showing no absorption spectrum, and the meniscus is as well defined as in the case of liquid air. It has a relatively high refractive index and dispersion, and its density appears to be in excess of the theoretical value 0.18 to 0.12, deduced from its atomic volume in organic compounds, and the limiting density found by Amagat for hydrogen gas under infinite compression. Dewar's experiments have given a density of 0.62 for hydrogen condensed by palladium, and this may not be far from the value for the liquid. No arrangements were at hand to determine the boiling point of hydrogen, but it must be excessively low, for a long piece of glass tubing sealed at the lower end and cooled by immersion in liquid hydrogen immediately filled with solid air where it was cooled. A tube of helium from the Bath gas was placed in liquid hydrogen, and a distinct liquid was seen to condense, thus showing that there cannot be any great difference in the boiling points of hydrogen and helium. All known gases have now been condensed to liquids which can be manipulated at their boiling points under atmospheric pressure in suitably arranged vacuum vessels. With hydrogen as a cooling agent, it will be possible to get within 20° or 30° degrees of the absolute zero, and its use will open up an entirely new field of scientific inquiry.

IN seconding a vote of thanks to Professor Dewar, moved by Sir William Crookes, Dr. Armstrong called attention to the fact that in the earlier days of the Chemical Society much attention had been given to the discussion of the properties of hydrogen, and the view that it possessed metallic properties had been strongly advocated. This was strongly supported by Graham's investigations of hydrogenized palladium, or, hydrogenium, as Graham called it, condensed on palladium. Dr. Armstrong ventured to think, however, that the subject had been too much regarded from the inorganic side, and that when the evidence to be derived from organic chemistry is taken into account it is more probable that hydrogen will be found to resemble the petroleum hydrocarbons rather than the metals. In reply to a query from Dr. Armstrong, Professor Dewar said that, since argon solidifies when cooled in liquid air, his experiment with helium shows that the gas (helium) from the Bath well does not contain argon, and, unless possibly hydrogen is present in small quantity, the helium from the well was pure.

ACCORDING to chemical literature the dark precipitate obtained by reducing bismuth solution with alkaline stannous chlorid is the monoxid, BiO. This oxid is also supposedly obtained in the fusion of the metal. L. Vanino and F. Treubert, of Munich, publish in the *Berichte* an investigation of this compound, and show that in the former case the precipitate is metallic bismuth and in the latter the compound is a mixture of the metal with the ordinary oxid

Bi_2O_3. This study shows the importance of repeating much of the work of earlier chemists. With the superior methods of manipulation and increased knowledge of to-day, much of the superstructure of the theory of inorganic chemistry rests upon a very insecure foundation of facts. In view of the decreasing affinity in the elements of the fifth group with increase of atomic weight, the existence of the oxid BiO is theoretically very probable, but that it really exists has not been shown experimentally. The same authors show that in an alkaline lead solution stannous chlorid precipitates all the lead as metallic lead.

J. L. H.

SCIENTIFIC NOTES AND NEWS.

THE ROYAL GEOGRAPHICAL SOCIETY.

THE annual meeting of the Royal Geographical Society was held in London on May 23d, Sir Clements Markham in the chair, and the annual dinner of the Society took place in the evening. At the annual meeting the medals of the Society were presented to Lieutenant Peary, Dr. Sven Hedin and others in accordance with the award that we have already announced. The President then delivered his annual address, in the course of which he said, according to the report in the London *Times*, that a very sympathetic reply had been received from the Prime Minister's private secretary to the appeal on behalf of a government Antarctic expedition. A meeting of very great interest was held in the beginning of the year by the Royal Society, in which eminent authorities were unanimous in insisting on the necessity of renewing Antarctic exploration, and on the duty of the British government to take a substantial share in it. A German expedition was being organized on a liberal scale, and funds were being collected throughout Germany for the purpose. Moreover there was reason to hope that the Norwegian government might send out an expedition also, perhaps under the leadership of Dr. Nansen, to carry out exploration mainly on land. Meanwhile the Belgian expedition, under M. de Gerlache, had been actively engaged, and the expedition, liberally supported by Sir George Newnes, under M. Borchgrevink, was in an advanced state of preparation. After a brief reference to Mr. Jackson's account of the Jackson-Harmsworth expedition, to Lieutenant Peary's labors and to those of Captain Sverdrup, Colonel Fielden, Mr. Pearson, Mr. Arnold Pike and Sir Martin Conway, the President said that German and Swedish expeditions were in progress for Spitzbergen and Franz Josef Land. Germany was setting an admirable example in scientific exploration. Besides the Antarctic expedition referred to, the German government had made a grant of £15,000 for oceanic research, especially in the Atlantic and Indian oceans. In the North Atlantic much good work was done under the joint cooperation of the Swedish, Norwegian, German and British governments. He hoped that during the coming summer authentic and satisfactory information concerning the hazardous balloon expedition undertaken by M. Andrée might be received. After reference to the other papers and the results of other expeditions during the past year and to the most important publications of the year, the President briefly dealt with the subject of education.

He said that both at Oxford and Cambridge geography continued to improve its position. At Oxford the University bore the entire expense of the readership. After long and careful consideration, the Council decided to continue the Society's contribution to the Cambridge lectureship, on the understanding that the University would take it over at the end of five years, and that the lectureship would be elevated to a readership. The reader, Mr. Yule Oldham, sent a satisfactory report of the work during the past year. With regard to Oxford, Mr. Mackinder had given the Society an account of his labors both at Oxford and at Gresham College. The measures adopted by the Council last year for increasing the efficiency and extending the scope of the system of instruction conducted by Mr. Coles had quite fulfilled expectations. Last year (1896–97) 41 intending travellers received instruction from Mr. Coles, one of whom was granted the Society's diploma. In the present year (1897–98) 65 intending travellers had received instruction, an