In conclusion, it may justly be said that the study of the properties of crystals is in a very flourishing state in the U.S.S.R. at the present time, and it is to be hoped that the move towards co-operation so generously started by the Soviet Government will be reciprocated in the coming years.

PEDOLOGY

By DR. ALEX MUIR

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THE development of pedology or soil science owes much to the initiative of Russian men of science, foremost among whom was V. V. Dokuchaiev, who laid the foundation of modern methods of soil classification. It is appropriate, therefore, that the principal centre of soil study in the U.S.S.R., the Dokuchaiev Soil Institute of the Academy of Sciences, founded twenty years ago, should bear his name. Many well-known figures in soil science have been associated with this Institute—Glinka, Gedroiz, Neustruev, Lebedev—and the British soil workers attending the recent Academy celebrations have had close contacts with the Institute since its foundation. We were given a great welcome on our arrival, and made honorary members of the staff for the duration of our stay so that we could come and go as we pleased. The present director, Academician L. I. Prasolov, and his staff had made careful preparations for the visit, and all the accounts of work in progress were fully illustrated with maps, diagrams and apparatus.

The activities of the Institute include research work on theoretical problems of soil science such as the genesis, geography and cartography of soils, soil systematics and classification, soil chemistry, physical chemistry, biochemistry and physics; but the practical side is not forgotten, and there are departments of agrochemistry and soil erosion, while saline soils and their utilization receive considerable attention.

Prasolov, who recently celebrated his seventieth birthday and forty years of scientific activity, is ably assisted by some 116 scientific and technical workers. A number of the senior members hold chairs in other institutions, which ensures close collaboration between the different organizations. In addition to this overlapping of staff, the Dokuchaiev Institute has a number of affiliated institutes in the various republics and some out-stations for the study of soils *in situ*.

Prasolov himself directs the work of the section on geography, cartography and classification, the activities of which are not confined merely to Russian soils. The Russians have long been interested in the application of their ideas of soil zonality to the rest of the world, and Prasolov has recently produced a new soil map of the world for inclusion in the Large Soviet Atlas. More detailed studies of the literature on the soils, vegetation, etc., of other regions have led to the production of new soil maps of Africa, South America and Australia. These maps and their accompanying memoirs, when they become generally available, should give a good picture of the extent to which the Russian conceptions of soil types can be applied to the more tropical countries.

For the U.S.S.R., one of the principal tasks of the cartography department is the preparation of a soil map of the Union on the scale of 1 : 1,000,000 which

will be the standard map for the whole country. During the War, the surveys of the Institute were found of great use in the transfer of agriculture to the eastern regions, and considerable work is being done in the Urals, Kazakstan and Uzbekistan. While general soil surveys form an important part of the Institute's work, special surveys in connexion with erosion and salinization are also made and form the basis for the study of these phenomena and of methods of dealing with the practical aspects.

The weathering of rocks and minerals is the first stage in soil formation and is receiving considerable attention in the Institute. An interesting study is being made of the ash content of plants and the rock or soil on which they grow, and it has been shown that in the red Georgian soils there is a considerable movement of aluminium between the soil and certain plants in the natural vegetation; for example, hornbeam, beech and rhododendron. This fact has an obvious bearing on the relative movement of the soil constituents during development of the soil. In a study of rock weathering and soil formation under lichens, it is concluded that biological influence may be an important factor in the formation of clay minerals of the montmorillonite type.

The study of the nature and distribution of the clay minerals in soils has received close attention and a large body of data has been obtained. In addition to the usual X-ray and thermal methods of examination, use is being made of an electron diffraction method with some success. Other laboratory studies include exchange reactions, the nature of soil acidity, soil solution by high-pressure extraction and the nature of soil aggregates. The study of aggregates is made from the physico-chemical aspect with the view of elucidating their structure and origin in the various soil types, and also from the purely physical aspect to obtain a measure of their resistance to the destructive influences of erosion. The first aspect is an elaborate study involving microscopic examination of the aggregate at the different stages of the chemical treatment. The interesting result of the case of chernozem aggregates is that the clay minerals seem to be wrapped round the organic matter, resulting in a very stable aggregate.

Of the out-stations set up for the study of soils *in situ*, the best equipped, namely, those in the podzol and chernozem-zones, suffered greatly during the War and work on them has had to be begun afresh. Some valuable results had, however, been obtained. It has been found that there is a seasonal shifting of the carbonate horizon of the chernozem up and down in the soil, the range of movement depending on meteorological conditions, but in one year reaching as much as 17 cm. This seasonal migration of carbonates impedes the loss of calcium from the rooting zone and so results in the chernozem being an extremely stable type.

While this account of the work going on in the Dokuchaiev Institute is necessarily brief, mention must be made of the soil museum which is still housed in Leningrad. It is one of the most complete collections of Russian soils and forms a valuable guide to the soil geography of the country. Since soil excursions were not possible during our visit, it was a most useful refresher to be conducted round the museum by its curator, Miss Shokalskaya, and have its contents explained by her in excellent English.

Recent articles in *Nature* have referred to the very fine geochemical studies being carried out in the U.S.S.R., and since these have an obvious bearing on

certain soil problems, we were glad to have the opportunity of visiting the Vernadsky Laboratory of Geochemical Problems of the Academy. In this institute, under A. P. Vinogradov, there is going on a great amount of work on the distribution of the minor elements in soils and biological materials. The laboratories are very well equipped with modern

(To be continued.)

physical apparatus, including X-ray spectrographs and recording photometers. One of the principal tasks of the institute is the construction of a map showing the geochemical provinces of the U.S.S.R., and considerable attention is being paid to the relation of endemic diseases and minor element distribution.

THE INFERIORITY COMPLEX AND THE PARANOID TENDENCY: WITH A BRIEF REFERENCE TO NAZI PSYCHOLOGY*

By DR. WILLIAM BROWN
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THE subject-matter of this essay has a very important bearing upon the world problems of the present day. The popular conception of the inferiority complex has become a scandal in modern psychology. It is a term easy to use, and it has suffered a fate somewhat similar to that of the word 'idea' in John Locke's 'Essay Concerning Human Understanding' (1690). In that work he used the term 'idea' in a special sense, as illustrated in his definition ("Essay", Bk. I, Chap. i, § 8): "whatsoever is the object of the understanding when a man thinks". The general line of his argument was "the new way of ideas", of which Stillingfleet spoke—disapprovingly—on the first appearance of the "Essay". But Locke himself used the word in several different ways, and very soon it got into the general vocabulary of English literature in a large number of senses. That is an aftermath of Locke's important work.

Misuse of the Term 'Inferiority Complex'

It seems fated that the term 'inferiority complex', which had a fairly definite meaning when originally developed by the late Dr. Alfred Adler and some of his followers, should come into general use in so vague a form as to be of practically no value for the man of science. It is misleading because it gives an air of profundity to statements which are extremely elementary and superficial. Here I am not criticizing Adler's general position in the succession of the great medical psychologists, Sigmund Freud and C. G. Jung. We have much to learn from all three of them. Each has a message and to each belongs much solid research work on the mind. But it is a little unfortunate that Adler's position in psychology should be so much easier to understand at first blush than the systems of Freud and Jung. The result has been that it has attracted popular thought and opinion because of its simplicity, and has discouraged deeper consideration of these problems by the general educated public.

I am not at all sure that it was Alfred Adler himself who first used the term 'inferiority complex'. He spoke first of 'organ-inferiority' (*Minderwertigkeit von Organen*), a physical deficiency to which individuals react physiologically and psychologically in different compensatory ways. Adler's book on "The Neurotic Constitution"† contains much fundamental discussion along this line of thought. But when he came to deal more closely with the mind and its reactions, some-

one or other—I do not know who—introduced the term 'complex' in popularizing his psychological point of view: a word much used in those days, starting with Freud's 'Oedipus complex', and Jung's use of the term as meaning a repressed system of ideas with an emotional colouring, revealing itself in consciousness in a *disguised* form. So the word became attached to inferiority—*Minderwertigkeit*. This 'feeling of inferiority', *Minderwertigkeitsgefühl*, which in some respects we all share in one direction or another, undergoes (through repression) transformation in various ways to become an 'inferiority complex'—in other words, the total mind reacts to the feeling of inferiority, with all manner of results in thinking, feeling and behaviour.

Every one of us is, of course, inferior in some direction or other. No one can do everything well. A man may be a genius in some directions, but a dunce in others. We have to accept our limitations, recognize them for what they are, realize that nothing can be done about it, and push on with those lines of activity in which we are outstanding, or relatively normal and efficient. If we attach an excessive value to certain abilities and powers, artistic or intellectual or whatever they may be, which we ourselves do not possess to any great extent, but wish we did, we may come to imagine ourselves possessing them in a greater degree than we do, so that a certain distortion appears in our mental outlook. We are no longer single-minded, honest-to-goodness people moving forward with all the forces at our disposal; we begin to pretend to be something which we are not, and we deceive ourselves, and perhaps—which is less likely—deceive others. Man is the only animal capable of deceiving himself, and that self-deception accounts for many of the troubles of the world. We do not like to admit our inferiority even to ourselves, and in hiding it, we develop an inferiority complex. We pass from a 'feeling of inferiority', which is straightforward and unblamable, to develop an 'inferiority complex', a reaction which is not straightforward, which is a sin against our own nature, by pretending to be what we are not, and putting up a mere facade in the sight of the world.

Compensation and Over-compensation

In trying to hide our inferiority from ourselves we may over-compensate. There is an automatic tendency in any organism to compensate for deficiency, but it is easy to compensate to excess. A familiar example is the youth who is by nature diffident, retreating, and shy; and who, as a result of over-compensation, develops a blustering and swaggering attitude. Again, many people compensate for lack

* Based on a lecture delivered at Christ Church, Oxford, on November 25, 1944.

† Translation by B. Glueck and J. E. Lind (New York: Moffat, Yard and Co., 1917).