

ly, local concentrations of iodides stained lead, while cyanides had the same effect on cadmium and zinc.

#### Precautions to avoid Stains on Silver Tableware

To prevent the formation of stains during washing up it is necessary to preclude the possibility of local halide concentrations at the metal surface.

Thus the silverware should be washed first to avoid the risk of salt particles falling on to it from dinner plates. It would also appear advisable to avoid the use of *solid* detergents, but if they should be used it is essential to dissolve them completely before immersing the silver.

The adoption of these suggestions should prevent, almost completely, the occurrence of staining. However, it is still possible that stains may be formed occasionally when forks, etc., with particles of salt adhering are immersed in the water.

#### Removal of Stains

As previously stated, the normal methods of silver cleaning are not effective in practice with this type of stain. Although no quick and easy method of stain removal has been found, it is possible to effect removal by immersing the silverware in a hot strong salt solution. The stain will become lighter in colour and is then more easily polished to match the surrounding area. It is rather strange that a substance causing the stain in the first place may be used afterwards as a cleaner. In the stain removal process the salt solution should be well mixed to a uniform concentration. Chemical solution of the stain then proceeds, but electrochemical action also sets in. At the metal surface in the area of the stain there is formed a relatively high concentration of the  $\text{NaAgCl}_2$  complex, hence a lower sodium chloride concentration

and therefore a higher silver ion concentration compared with the rest of the surface. Consequently this area becomes cathodic and deposition of silver occurs, while in the surrounding anodic areas silver passes into solution. This loss of silver is, of course, small and is spread over a large area, but slight darkening of the area due to the attack may be just noticeable, and if so is easily removed by a rouge type of cleaner. The silver cathodically deposited in the stain area is similarly polished until it matches the other surfaces. It is probable that this mechanism of stain removal occasionally sets in immediately after stain formation and produces the white type of stain so frequently observed. In this case it is possible that agitation of the solution causes the dispersal of the local salt concentration and hence the reversal of the electrode polarities.

Practical experiments were performed to support the existence of electrochemical action in the stain removal process. For example, when freshly prepared silver chloride rests on a smooth silver surface immersed in hot sodium chloride solution for a short time, it is found, after rinsing, that metallic silver particles adhere to the surface on the areas where the precipitate had rested, while the surrounding areas are slightly darkened due to anodic corrosion.

An alternative stain remover is ammonia solution. This quickly dissolves the stain; but the area remains fairly dark due to the roughness of the underlying corroded metal and, therefore, this method is not recommended.

We are indebted to the directors of the Sheffield Smelting Co., Ltd., for permission to publish the results of these investigations. We also wish to acknowledge the help of the British Non-Ferrous Metals Research Association on stain identification by electron-diffraction methods.

## THE INTERNATIONAL GEOLOGICAL CONGRESS

### MEETING IN MEXICO

THE XXth Session of the International Geological Congress held in Mexico in 1956 was the largest gathering of geologists that has yet taken place. It was widely representative. It was characterized by an ease of interchange and co-operation, between all the national delegations, to a degree not attained at the two previous post-war sessions. It was successful and productive. This account of the proceedings has been deferred in the hope of assembling and taking account of the complete reports of all the Commissions, since these record some of the most valuable products of the Session. A number of them has lately been received; although some are not yet to hand, an appreciation of the Session and of the complex labours and generous hospitality of the Mexican hosts should be no longer delayed.

The programme began in the middle of August and lasted until October. The sessional meetings took place in Mexico City during September 4-11. Sixteen geological excursions before the meetings and sixteen afterwards, with places for two thousand participants, traversed all the Mexican States. Well over two thousand members attended the Session;

eighty-three countries were represented. Some nine hundred papers were offered for presentation and pre-printed in abstract. There were thirty-six separate series of meetings—of the Bureau, Council and Commissions, symposia and subject sections, the International Paleontological Union and the Society of Economic Geologists. There were often twenty or more meetings in simultaneous progress.

The inaugural general assembly was held in the National Auditorium on September 4. Prof. Charles Jacob, president of the XIXth Session held in Algiers in 1952, took the chair until the election of his successor. The Assembly was welcomed by the President of the Republic of Mexico, Don Adolfo Ruiz Cortines, and by the Secretary of National Economy, Lic. Gilberto Loyola. Ing. Antonio García Rojas, director of exploration of Petroleos Mexicanos, was elected president of the XXth Session; and Ing. Eduardo J. Guzmán of Petroleos Mexicanos and Dr. J. González Reyna of the Geological Institute of the National University were elected general secretaries. The president and secretaries had held corresponding offices in the executive committee responsible for the organization of the Session.

All the subsequent meetings of the Session took place in the huge and fiercely brilliant buildings of the new National University, built in the past few years on a vast site eight miles from the centre of the capital.

Five symposia were organized. In published form, two of them, each in five volumes, will continue the Congress series of works on the geology and world resources of important minerals: "Oil and Gas Deposits", edited by E. J. Guzmán, and "Manganese Deposits", edited by J. González Reyna. Two stratigraphical symposia were promoted by the Commission on Stratigraphy, namely, "Cambrian Paleogeography and the Base of the Cambrian System", edited in three volumes by John Rodgers, and "The Cretaceous System and its World Correlations", organized by Lewis B. Kellum. The first three of these symposia were printed or in the press at the time of the Session. That on the Cretaceous system will be printed later, as will also a symposium on geochemical exploration which was organized by T. S. Lovering. In this, sixty-two papers presented at the Session showed the progress of many methods of exploration, including new field techniques for trace analyses of tin and selenium in soils, the application of geochemical soil surveys in the search for copper, gold and uranium, and reconnaissance for base-metal deposits by sampling drainage systems. In connexion with this symposium, the Council of the Session agreed to a proposal by L. R. Lambert (France) for the adoption of a universal scale based on the solar spectrum for colours on geochemical maps.

The Commission on the International Geological Map of the World, under the presidency of M. F. Blondel (France), reported substantial progress in the preparation of an International Geological Atlas, scale 1 : 10,000,000, and of co-ordinated regional maps of the world on the scale of 1 : 5,000,000. Dr. M. S. Krishnan (India) has served as co-ordinator for Asia since 1954; the Commission for the Geological Map of Europe, under the presidency of Dr. A. Bentz (Germany), has collaborated for Europe; and revised maps of Africa and North America are in hand. The work for South America is less advanced. Following propositions in Mexico by the Soviet delegation, the Commission undertook preparatory work for an international tectonic map and an international metallogenetic map.

The Association of African Geological Surveys and the Commission on the Geological Map of Africa were merged at the Session. In future, the Association will continue the functions of both, with the rank of a Commission. Most African territories were represented at meetings of the Association. Prof. P. Fourmarier (Belgium) was elected honorary president, and Dr. F. Dixey (United Kingdom) as president. In discussions on the geochronology of Africa, an outstanding paper was presented by Prof. Arthur Holmes (United Kingdom) and L. Cahen (Belgian Congo). Proofs of a structural map of Africa (1 : 10,000,000) by R. Furon and G. Daumain were examined. It was agreed that for its meeting in Africa in 1958 the Association should prepare a report on the geology of uranium in Africa, under the direction of G. Dubois (Belgian Congo).

The Commission on Gondwanaland met with Dr. S. H. Houghton (South Africa) as president and Dr. J. C. Mendes (Brazil) as its new secretary, and discussed a series of papers, some highly controversial. An overall impression was the increasing amount of

evidence which suggests that the separate parts of Gondwanaland are in their original positions and have not been subjected to continental drift; though by no means all the contributors would be prepared to admit this.

Dr. M. H. Hey (United Kingdom), secretary of the Commission on Meteorites, of which Dr. W. Campbell Smith (United Kingdom) is now president, reported that the Commission had agreed to proposals by Y. L. Krinov (U.S.S.R.) for extending its work of preparing a census of meteorites and of disseminating information on existing collections and new occurrences.

The Commission on Stratigraphy, with Prof. R. C. Moore (U.S.A.) as president, Prof. P. Pruvost (France) as vice-president, and Prof. John Rodgers as secretary-general, was commended by the Council for valuable progress in the production of the lexicon of stratigraphy, under the secretaryship of M. Jean Roger (France), and for its work on stratigraphical terminology under the secretaryship of Dr. H. D. Hedberg (U.S.A.).

Prof. P. Fourmarier (Belgium), as president of the Commission on the Crust of the Earth, reported progress in the compilation of a lexicon of tectonic terms.

The Commission on Author's Abstracts was dissolved because its objects had been substantially achieved. The Commission on the International Physiographic Map of the World was dissolved at the proposal of its president, Dr. Louis S. Ray (U.S.A.), because it had been found impossible to obtain sufficient international agreement on the criteria for physiographical regions.

The Commission for the Spenidarov Prize, which was endowed in Russia in 1897 and is awarded at each Session, met with Prof. D. I. Scherbakov (U.S.S.R.) as president and nominated Dr. Manuel Alvarez, jun., to receive the Prize for the XXth Session, in recognition of his geological work in Mexico.

At the meetings of the International Paleontological Union, the principles of a new constitution were determined and it is now being drafted. Dr. M. Maldonado-Koerdell (Mexico) is the new president, and M. Jean Roger (France) is secretary.

Dr. H. M. E. Schürmann (Holland) submitted to the Council a plan for the initiation of an International Geological Abstracting Service as a self-supporting but non-profit making organization, analogous to existing services in medical and chemical fields. A small permanent commission, with Dr. Schürmann as president, was set up to promote this project. Following a report from the provisional French organizing committee set up in Algiers in 1952 under the presidency of M. G. Drouhin (Algeria), it was agreed that a permanent International Association of Hydrogeologists should be formed. On the proposal of Dr. G. Salas (Mexico), a Commission on Geological Nomenclature in Spanish was set up to standardize terminology in that language.

The number and variety of the papers presented at the subject sections were immense. A balanced review is not practicable here, but a few particular papers can be mentioned. There were several interesting contributions from Great Britain. In the Section on the Relation between Tectonics and Sedimentation, Mr. N. L. Falcon described the structural picture of south-west Persia which had emerged during forty years of work by geologists of the Anglo-Persian and Anglo-Iranian Oil Companies,

and showed the tectonic effect of phases of evaporite deposition in early Cambrian and in Miocene times. He exhibited a first copy of an impressive folio of geological maps and sections of the area, prepared for publication by the British Petroleum Company, and dedicated to the late Dr. G. M. Lees. The folio presents the essential results of the geological work of the earlier companies in the form of six maps with overlays on the scale of 1:1,000,000 and eleven sheets of cross-sections and stratigraphical columns. In the Section on Micropalaeontology, Dr. Maurice Black described an investigation of the constituents of *Globigerina* ooze by means of mechanical analysis and the electron microscope. The size-frequency curves of the coarser fractions show numerous peaks representing different assemblages of foraminifera. Coccoliths and rhabdoliths predominate in the finer visible fractions, and the electron microscope shows the breakdown of some of these forms into minute particles of calcite which form the finest fraction of the ooze. In the Section on Cenozoic Vulcanicity, Profs. G. Mueller and S. E. Hollingworth gave an account of field and petrological work on sulphur deposits in Chile, Southern Europe and Iceland, including a laboratory study of the crystallization of sulphur melts as thin films which throws light on conditions during the formation of natural melts.

A good many papers dealt with new or improved methods and techniques. In the Section on Geology applied to Engineering and Mining, for example, E. B. Burwell, jun., and R. H. Nesbitt described the development by the U.S. Army Corps of Engineers of a camera for cylindrical colour photography in 3-in. boreholes, and its use in foundation problems. In the Section on Marine and Submarine Geology there were two papers, by R. F. Dill and by W. F. Tanner, on the study of sea-floor environments and sediments by 'free-diving' geologists.

A particularly notable paper in the Section on General Geology was "The Myth of the Sudbury Lopolith", by J. E. Thomson and Howell Williams—a vivid interpretation of this great structure as a volcano-tectonic sink.

It was generally agreed that the number of papers now received at each Session of the Congress is excessive, and that far too many are of only local interest. To some extent the breadth of the subject titles is responsible. The title of the Section on Palaeontology, Taxonomy and Evolution, for example, embraces every possible palaeontological topic. Only a selection of the papers can be read and discussed; but even so, the proceedings of most sections become unfocused, and the problems of publication unwieldy. During discussion of these matters by the Council, the Mexican hosts expressed the intention to publish, as a matter of international courtesy, practically all the papers which had been submitted to them. They no doubt had in mind the Report of the XIXth Session in Algiers, which totals 6,000 pages. That Report stands as a magnificent feat of publication, but can be a deterrent to potential future hosts of the Congress if it comes to be regarded as a precedent which they must emulate as an obligation or for prestige. The present writer believes it essential in future Sessions to reduce the scope of each section and define its object closely, and to reduce both the number of sections and the number of papers read in each. The organizers must feel free to reject all papers which are not of general interest and specific relevance, and to adhere to a maximum total length

for the whole report which is compatible with their particular financial and editorial resources. Reduction in the number of sections would give time in the programme of the Session for the presentation and full discussion of certain major authoritative contributions, arranged by special invitation, on the lines proposed by E. Wegmann and D. Schneegans in 1948 (Report of the XVIIIth Session, Part I, p. 175; 1950).

The Council received a most welcome though embarrassingly large series of invitations for the XXIst Session: from the Scandinavian countries jointly, including Finland and Iceland; and from India, from Venezuela and from Western Germany. The invitation from Scandinavia was accepted, subject to formal confirmation by the five governments. This confirmation has lately been announced. The invitation was presented at the Session by Dr. T. Sorgenfrei of Denmark and supported by Prof. T. F. W. Barth of Norway, who also spoke for Sweden. It was particularly welcomed as the first co-operative regional invitation to the Congress. The Session will be centred on Copenhagen. Mr. H. E. Fyfe presented on behalf of the Government of New Zealand an invitation to hold the XXIInd Session in that country in 1964, in conjunction with the centenary of the foundation of the Geological Survey of New Zealand. The invitation was welcomed and recommended for the consideration of the Council of the XXIst Session.

Among many interesting items in an exhibition arranged at the University City during the Session were the folio of maps of south-west Persia which has already been mentioned, and an elaborate and instructive series of oilfield models in transparent plastic, prepared by Petroleos Mexicanos. The most extensive exhibit was a series of geological maps of the U.S.S.R. These, fine examples of colour-printing, covered the whole of the Soviet Union on scales of 1:5,000,000 and 1:2,500,000. There were also regional maps and various special-purpose maps on 1:1,000,000 and larger scales. In Mexico City, the exhibited collections of the Instituto Geologico were specially re-arranged for the Session. They include a handsome series of Mexican minerals, and collections of Mesozoic and Tertiary fossils, among which is a particularly fine group of Liassic plants. The Instituto Geologico building, a magnificent period piece, was built in readiness for the Xth Session of the Congress, in 1906, which was attended by 321 members from thirty-four countries. Exhibitions were also arranged on the routes of some of the excursions; among these, there was at Cordoba an admirable exposition of oilfield research by the staff of the Vera Cruz Division of Petroleos Mexicanos.

The programme of field excursions as a whole illustrated clearly the great progress in knowledge of the geology and mineral resources of the Mexican States which has been made in recent decades. The programme involved elaborate organization, large parties, great distances, and transport by horse, boat and ferry, lorry and coach, special train, and aircraft. Inevitably there were hitches here and there, but many excursions were commended by participants as outstanding demonstrations of aspects of Mexican geology. There was opportunity on the excursions to study the massive grim beauty and sardonic detail of Aztec and Mayan architecture—and the reflexion of its qualities in some of the most modern Mexican buildings. Over all on the excursion routes, there was the enduring impression of endless variety in the

permutations of topography, geology, climate, ecology and human works which make up the Mexican scene.

In Mexico City and on the excursions, hospitality on a most generous scale was arranged by central and local government authorities and by industry. The functions in the capital included a reception at

Chapultepec Castle, a programme of traditional dances of the Mexican States in the National Auditorium, ballet in the Palace of Fine Arts, and a rodeo at the Rancho del Charro. This generosity of official entertainment was matched by the warm personal hospitality and helpfulness of Mexican geologists and their families.

A. J. BUTLER

## THE NATIONAL MUSEUM OF WALES

By THE RIGHT HON. LORD KENYON

President of the Museum

MARCH 19 marks the jubilee of the granting of the Royal Charter of incorporation to the National Museum of Wales by King Edward VII, and we are glad of the opportunity to assess what has been achieved in these past fifty years, and summarize our plans for the future.

The idea of a national museum for Wales arose as far back as 1876, in a paper read before the Honorable Society of Cymmrodorion, by which it was discussed from time to time. The matter was even raised in Parliament occasionally, until in 1903 a parliamentary conference was convened to discuss the formation, nature and location of a national museum and a national library for Wales. After discussions, petitions and speeches, the decision was reached to place the National Museum at Cardiff: for reasons which did not affect the Museum, the Library was placed at Aberystwyth.

The charter, besides bringing the Museum into being as an incorporated body, describes its objects, and the method by which it is to be governed and administered. The article describing its object is both long and comprehensive; it may be simply stated as to illustrate the natural history of Wales, and the life of man in it, both in the past and to-day.

In the following year, the first director, Dr. William Evans Hoyle, was appointed, beginning his task on St. David's Day, 1909. He was soon touring the museums and galleries of northern Europe to gather experience for the planning of the new buildings, for which an open competition, attracting no less than one hundred and thirty designs, was held. This culminated in the appointment of Messrs. Smith and Brewer in the following year. Constructional work began in 1911: it was continued, punctuated by constant financial and other set-backs, for more than twenty years; and the foundation stone was formally laid by King George V, accompanied by Queen Mary, in 1912. It was not, however, until ten years later, owing to the intervention of the First World War, that the first part of this building became accessible to the public, and a further five years elapsed before Their Majesties again visited Cardiff, on the completion of the whole south front of the building, for the opening ceremony.

Construction, however, continued on the east wing, which includes the lecture theatre and circular gallery, which were opened by the Duke of Kent in 1932; there building has had to cease, the architects' plans only half-completed, until funds permit a commencement. The total cost, so far, has been £429,744, of which £232,692 has been received in gifts and subscriptions, both large and small, and including much generous help from Cardiff City Council.

The collections contained in this building had, as their nucleus, the contents of Cardiff's Municipal Museum, the Welsh Museum of Natural History, Arts and Antiquities, which were transferred to the National Museum in 1912, although continuing to be shown in the Free Library until the building was able to receive them ten years later. These "Cardiff Collections" contained something for most of the departments into which the Museum is now divided.

Between 1914 and 1919, Departments of Geology, Botany, Zoology, Archaeology and Art were set up with the appointment of a keeper or an assistant keeper in charge, and these five Departments still occupy the main building in Cardiff. In 1924 Dr. Hoyle retired, and was succeeded by Dr. (now Sir) Mortimer Wheeler, who departed for a post in London two years later. His successor, Dr. (now Sir) Cyril Fox, remained to direct the Museum until his retirement in 1948, when his place was taken by Dr. D. Dilwyn John.

One further Department has occupied the galleries in Cardiff, but is now elsewhere. In 1932, a sub-Department of Folk Culture and Industries was added to the Department of Archaeology, in order to cater for the rapid growth in that Department's collections relating to the trades and crafts, the domestic environment, and the daily life of the past in Wales. Four years later it was raised to the status of a Department, when the Council affirmed its conviction that an Open Air Folk Museum was an essential development of the National Museum. This was achieved in 1946, through the generosity of the Earl of Plymouth, who presented St. Fagans Castle, near Cardiff, to the Museum for this purpose. At the same time, he permitted the acquisition of 80 acres of adjoining woodland, which has made possible the planning and establishment of a collection of typical buildings of all sorts from every part of the Principality. These at present include farm-houses of characteristic type, a working woollen mill, a chapel, a barn, and a one-roomed cottage; more will be added as opportunity offers. The rooms of the Castle itself are furnished from the Museum's collections to illustrate the styles of various periods, while the gardens and grounds are maintained as a setting for the buildings. The outbuildings accommodate craftsmen at work at turnery, basketry, and other country crafts; in the Mill, the workmen will be found employing machinery which has been in use for more than a hundred years. More recently, a small beginning has been made on the erection of a modern museum block needed to house the Folk Museum's ever-growing collections and to display its type col-