

a general consideration of meristic characters of fishes in relation to temperature and water movements. The third group of papers dealt with the inter-relation of temperature and salinity with the distribution and metabolism of marine animals as well as the more general aspects of respiration, temperature adaptation and physiological variation.

Genetical constitution and distribution formed the subject of the fourth group. The general impression gained was that, although for some species much is known regarding the response to environmental stresses over the area of distribution, a great deal remains to be done before any general principles can be formulated. Progress in this direction will come only from a concerted attack by all available techniques on the biology of a few selected and representative species that are able to live throughout a wide latitudinal range or in a wide variety of environmental conditions. To this end, the conference resolved that the attention of appropriate bodies should be directed towards increasing the number of permanent positions in marine laboratories, and to the provision of technical personnel so as to permit a world-wide programme of continuous records of a physical, chemical and biological nature to be established. Collaboration with existing bodies devoted to marine science was recommended, and furtherance of international co-operation by the support of fellowships, travel, meetings and an information service was suggested.

The problems arising in the organization of co-operative research were discussed in two general papers and also by the conference sitting in committees. Divergent opinions were revealed. It was felt by some that for real progress some of the work should be in the hands of a limited number of specialists with security of tenure and at the same time freedom to move from place to place. Others felt that much could be done with the expansion of facilities for individual workers within the framework of existing institutions. Certainly the latter has more chance of immediate attainment. To this end a resolution was passed urging the importance of investigations of the biology of marine species throughout their geographical range; it was further recommended that institutes should be encouraged to set up programmes of continuous collection of basic information and that a means for its distribution should be established. The importance of publishing fauna and flora lists was emphasized; lists of common species, and if possible their breeding seasons and abundance, would be most valuable.

It was recommended that a small committee should be set up to further the objects and resolutions of the conference.

H. BARNES

BRITISH GELATINE AND GLUE RESEARCH ASSOCIATION

RESEARCH PANEL MEETING

THE twelfth meeting of the Research Panel of the British Gelatine and Glue Research Association was held on June 7, with Mr. S. G. Hudson (Richard Hodgson and Sons, Ltd.) in the chair. Two papers were presented, each by members of the staff of the Association, during the morning session, and both were followed by lively discussion. In the afternoon the Association's laboratories at 2a Dalmeny

Avenue, London, N.7, were open for informal discussions.

The first paper, by Dr. A. Courts, on the collagen-gelatin transformation, described a series of fundamental investigations into the changes which occur during the pretreatment and extraction of collagenous material such as hide and ossein (demineralized bone). Both type and intensity of pretreatment influence the degree to which the extraction stage can be regarded as a 'melting out' of already preformed gelatin. In the normal industrial processes some further hydrolytic reactions are known to occur, especially during the later stages of extraction. One tool of which extensive use was made was the technique of Sanger¹, in which reaction between amino-groups and 1-fluoro-2:4-dinitro benzene gives, after hydrolysis and chromatographic separation, the number of α -amino-groups in a protein. Since these groups terminate polypeptide chains, the average chain-length can be obtained from this figure. Ossein, after treatment for periods of between two weeks and six months with a suspension of calcium hydroxide in water at 20° C., was found to reach rapidly the stage at which the average chain-length in the treated ossein could be related to that of the gelatins which could be obtained from it. The residue left after each extraction of gelatin by hot water had a chain-length which remained substantially constant. It may be presumed that all slightly shorter chains produced by hydrolysis went into solution as gelatin. The diphenylamine method of Anderson and Maclagan² was used to estimate mucoprotein at all stages of the process. The action of lime in removing this group of substances was clearly shown.

Dr. Courts also described the successful preparation of gelatin without the use of heat. Raw material which had received alkaline pretreatment was extracted by strong solutions of hydrogen bond-breaking agents, at room temperature. A substantial proportion of the material passed into solution as good-quality gelatin. This shows clearly that at late stages of pretreatment the raw material is primarily held together by hydrogen bonds.

The second paper, on the molecular weights of some gelatin fractions by the light-scattering method, was by Dr. A. Courts and Dr. G. Stainsby, and was read by the latter. He described briefly the technique used in measuring the light scattered by dilute gelatin solutions at 40° C., and also how the weight-average molecular weight (M_w) can be deduced from this. He then described the method³ which has been developed to allow for the light scattered by the small quantities of suspended particles present in the solutions. These, which are of a non-gelatin nature, remained to some extent even in the most carefully purified solutions. After measuring the light scattered from the gelatin solution, a small addition of a solution of crystalline trypsin rapidly reduced the size of the gelatin molecules to a level at which they scattered only negligible amounts of light. The residual scatter at this stage was due to the solvent and to the suspended impurities. Measurement of its intensity enabled the scattering due to gelatin to be obtained, by subtraction, from the scattering figures for the original gelatin solution. Only by developing this technique was it possible to get reliable figures for gelatin weight-average molecular weights.

Two series of fractions, one of an alkali-processed gelatin (first extraction) and the other of an acid-

processed gelatin (also first extraction), were examined by the method of light scattering for M_w , and by the Sanger end-group technique for C_n (the number-average chain-length). The results for the alkali-processed material are given in Table 1.

Table 1

Fraction	M_w	C_n
2	270,000	55,000
3	142,000	70,000
4	74,000	70,000
5	57,000	70,000

If the gelatin molecule consisted of a single polypeptide chain, it would be expected that M_w and C_n would only differ slightly, owing to imperfect fractionation. The very large differences observed may be interpreted as indicating that the gelatin molecules of higher molecular weight are composed of some half a dozen chains covalently linked in some way. It seems likely that these linkages have their origin in the collagen and are not produced in the conversion of collagen to gelatin.

Refractionation has been used to show that the extreme heterodispersivity needed to account for the results, if C was identical with M , is not the cause of the discrepancy. An examination of the F.D.N.B. reaction in the light-scattering cell has shown that the conditions used do not cause marked degradation while the reaction is in progress. There is, on the contrary, some indication of a cross-linking reaction. This would not interfere with the determination of the α -amino-groups.

Somewhat similar results to those with the alkali-processed gelatin were obtained with the acid-processed gelatin fractions. The situation was complicated by an indication that, at least for the lower molecular weights, the chains did not always terminate in an α -amino-group at one end.

A. G. WARD

¹ Sanger, F., *Biochem. J.*, **39**, 507 (1945).

² Anderson, A. J., and MacLagan, N. F., *Biochem. J.*, **56**, xxv (1954).

³ Stainsby, G., *Nature*, **177**, 745 (1956).

INTERNATIONAL WHALING COMMISSION

EIGHTH ANNUAL MEETING

THE eighth annual meeting of the International Whaling Commission was held in London during July 16-20, all the seventeen contracting Governments, with the exception of Brazil, being represented. They were: Australia, Canada, Denmark, France, Great Britain, Iceland, Japan, Mexico, the Netherlands, New Zealand, Norway, Panama, South Africa, Sweden, the U.S.S.R. and the United States. Italy and Portugal were represented by observers, as were also the Food and Agriculture Organization of the United Nations, the International Council for the Exploration of the Sea and the International Association of Whaling Companies. Dr. G. J. Lienesch (Netherlands), chairman of the Commission, presided.

According to the figures compiled by the Bureau of International Whaling Statistics at Sandefjord, nineteen factory ships with 257 catchers were engaged during the 1955-56 Antarctic season, and the total catch by floating factories increased from 2,061,789 barrels to 2,134,012 barrels inclusive of sperm oil; there are six barrels to the ton, and the average price for whale oil is £70-80 per ton. The chief object of

the Commission is to arrange a balance between killing- and replacement-rates of the whale populations, and to achieve this it sets limits upon the total catch. The limit takes into consideration the views of scientists upon the size of the stocks of whales and of the whalers on the economics of the industry, the scientific opinion being almost unanimously in favour of a substantial reduction in the catch on account of evidence that the stock is declining. The existing limit is 15,000 blue whale units, and the Commission recommended that the catch for future seasons should not exceed this amount, and it further recommended (with one dissentient) that the limit should be reduced during the coming 1956-57 season to 14,500 blue whale units.

Infractions of the whaling regulations during the past year were fewer than those of the previous year. At present every factory ship is required to have on board two inspectors who are generally of the same nationality as the flag of the ship. However, following the seventh meeting of the Commission in Moscow in 1955, the United States was asked to prepare a protocol for the amendment of the Convention so as to permit consideration of a scheme to appoint independent observers in addition to the national inspectors. All possible steps are now being taken to ensure that the protocol can be brought into force in time for the Commission to take action under its provisions at its ninth meeting, and it is hoped that the protocol will very soon be signed.

A statement of expenditure for the year ending May 31, 1956, amounting to £3,196, was approved by the Commission. For the current year due to end on May 31, 1957, the expenditure by the Commission is estimated at £2,935, and the contribution requested of each of the twelve contracting Governments remains at £150. £500 was set aside towards the cost of whale marking, which is the means of providing much of the essential scientific data on which the Commission's recommendations for the conservation of the whale stocks need to be based.

It was decided that a scientific sub-committee should again if necessary meet to consider certain scientific problems in anticipation of the next annual meeting, which will also be held in London, commencing on June 24, 1957.

THE B.B.C. AND ITS EXTERNAL SERVICES

A BOOKLET entitled "The B.B.C. and its External Services"*, describing the B.B.C.'s transmissions for listeners overseas, is of special interest at the present time in view of Sir John Glubb's recent convincing arguments that expenditure on the dissemination of ideas brings a higher dividend than expenditure on weapons. The booklet does not indicate what proportion of the B.B.C.'s income of £21 million from licence receipts (of which in 1955-56 the Government retained £2.75 million), £1 million from publications and £5.322 million from grants-in-aid was expended on external services; but these services in English and forty-three other languages are heard throughout the world, and occupy about eighty hours daily.

* The B.B.C. and its External Services. Pp. 32. (London: B.B.C. 1956.)