1·58–1·59 to the man of La Chapelle-aux-Saints, or even perhaps 10 mm. less. The attitude is regarded as having been less habitually erect than in recent races.

The numerous and important differences which we encounter in all parts of the skeleton are sufficient to distinguish Neandertal man from all existing races; he differs more from them than they from one another, and is therefore to be regarded as a distinct species, which, according to the recognised rules of nomenclature, should be named *Homo neandertalensis*.

All anthropologists will welcome the very interesting chapters on fossil Pleistocene man and the evolution of mankind which conclude the work. They are valuable not merely as a compendium of existing knowledge, but above all as an expression of Prof. Boule's personal opinions. We have not space to dwell on these, but we may briefly enumerate one or two points. No very close affinity is admitted between *Homo neandertalensis* and the aborigines of Australia; though they share many primitive characters in common, yet in still more they offer a decided contrast (Figs. 4 and 5). Pithecanthropus is regarded as a gigantic gibbon. The Mauer jaw is assigned to the Chellean stage. Some resemblance is recognised between the Grimaldi skeleton and the Bushmen, and it is admitted that the Aurignacian artists may have been the ancestors of this interesting people. No convincing evidence has yet been adduced of the existence of man before the Pleistocene epoch, and the so-called "rostro-carinates" are rejected.

The whole history of the discovery at La Chapelle-aux-Saints, from the exposure of the skeleton in its tomb down to its lodgment and reconstruction in the museum at Paris and the appearance of this monumental memoir, is a faultless record of skill and foresight. There are no lost opportunities to be regretted, and every significant fact that the material could yield has been elicited and set before us by a master hand.

THE AUSTRALIAN MEETING OF THE BRITISH ASSOCIATION IN 1914.

PROJECTED TOURS BEFORE AND AFTER THE MEETING.

BESIDES numerous excursions, in some cases over long distances, which are being arranged in connection with the meetings in the different capital cities of Australia next year, two more extended tours are projected with the object of giving selected members of the main party an opportunity to see portions of the continent which will otherwise not be touched. The first of these will be in Western Australia, and will be open to a limited advance party composed mainly of geologists, zoologists, anthropologists, and botanists.

The work of the party will lie in various directions from Perth. Geologists will be taken east to the goldfields, and also north to the Irwin River district. The geological relations of the latter (permo-carboniferous glacial beds with good exposures, and with excellent opportunity for collecting specimens) are more readily grasped on a short visit than are those of the goldfields. In addition an excursion will be arranged to Yalling-up (south from Perth), and here there will be opportunity for botanists and zoologists to collect. For the latter, also, a marine excursion with dredging will be arranged at Bunbury on the return journey. A shorter trip by motor from Perth to Mundaring Weir will interest the same members, the zoologists visiting the region where Peripatus occurs. Marine dredging excursions in Swan River (for Ascidians), and by Rottnest Island, will also be arranged.

As regards the time that is required for a satisfactory working of the programme, a week is a minimum, and will mean much crowding and hurry. The Government of Western Australia and the committee in charge of matters connected with the visit would welcome a stay of a fortnight, and are prepared to grant railway facilities and find hospitality for that time. The number in the party must be limited, and membership restricted to people who are keenly interested in the work proposed. Twenty-five to thirty would be a convenient number, which might, perhaps, be extended to thirty-five, but must not exceed this.

The second tour would begin after the last meeting of the association in Brisbane, and the proposed itinerary is the following:—Brisbane viâ Rockhampton to Longreach by rail; coach to Winton; rail to Hughenden and Cloncurry; motor to Croydon and rail to Normanton. The party would then be taken to the mouth of the Norman river, and be met by the steamer belonging to the Administration of the Northern Territory (Dr. J. A. Gilruth, Administrator), and conveyed across the Gulf of Carpentaria, and about one hundred miles up the Roper river. They would proceed through the Territory by motor-car (there are no roads) to Pine Creek, and thence by rail to Darwin, where the steamer to England viâ Java, Singapore, and Colombo would be met.

A very considerable portion of Australia would be covered, and fine opportunities offered for the study of botany, geology, agriculture, &c., and, what is of great importance to Australia at the present time, the conditions of white settlement in the tropics. Obviously the party must be small, and it is suggested that it should include a botanist, a geologist, a zoologist, and a physiologist, or persons connected with mining, agriculture, and the development of Empire. Four would be a suitable number, or at the most five. Representative men only would be acceptable, for the trip will be costly; but if a party of sufficient standing and enthusiasm be prepared to undertake it, the Hon. D. F. Denham, Premier of Queensland, has promised, on behalf of his Government, to bear the expenses of the Queensland section, and the Administration of the Northern Territory will be responsible for the later section. A rough estimate of the time that might be spent on the whole trip is one month, but this would need to be adjusted in accordance with the time-table of the boats from Darwin to England.

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It is hoped that both of these parties may be arranged by about the middle of November, while the organising secretary for the Australian meeting (Dr. A. C. D. Rivett) is in England. Inquiries should be addressed to the Secretary, British Association, Burlington House, Piccadilly, W.

TWENTY-FIVE YEARS' WORK AT THE PHYSIKALISCH-TECHNISCHE REICHSANSTALT, CHARLOTTENBURG.

THE Physikalisch-Technische Reichsanstalt, which may be aptly termed the German "National Physical Laboratory," plays such an important part in physical science that it may not be without interest to readers of NATURE to indicate briefly a few of the more prominent questions which have been dealt with at the institution since its foundation in 1885, which, by the way, was due in great measure to Werner von Siemens. Considerable information is afforded in two articles[1] recently published by members of the staff, and these papers should make interesting reading to those desiring further particulars of the work.

In addition to carrying out research work of direct interest to science and industry, the Reichsanstalt carries out the verification against standards of all kinds of instruments in the same manner as does the National Physical Laboratory in this country. It is, however, the research work to which we will confine ourselves here. The remarkable growth in the activities of the institution has kept pace with the advancement in scientific research during the last quarter of a century.

Dealing first with heat, the Reichsanstalt has occupied itself with practically every question in this branch of physics. One of its first tasks after getting into working order was the continuation of Regnault's famous work: he had shown that the scale of the mercurial thermometer could not be used as a standard owing to the influence exerted on the readings of the instrument by the expansion of the glass tube, the indications differing considerably in the range above 100° C. with thermometers made of different sorts of glass. Great difficulty had been experienced in finding a glass suitable for high temperatures when the Reichsanstalt commenced operations. Schott and Genossen, of Jena, experimented with different types of glasses and produced thermometer tubes constructed of new types of glass, and the Reichsanstalt tested these tubes as regards their accuracy over the fundamental interval 0–100° C., and their suitability for higher temperatures. The result is that the well-known Jena 59 quality has up to the present proved the most suitable in respect of small thermal expansion and of robustness. Extensive comparisons were afterwards carried out between the mercury thermometer and the air thermometer, owing to the difficulty experienced in realising the hydrogen thermometer scale at temperatures above 100° C. These measurements were carried to 500° C. At the present day nitrogen-filled thermometers are recognised as the most practical for high temperatures, and their success is to no small degree due to the labours of the Reichsanstalt. The institution has also played a not inappreciable rôle in the development of pyrometry, from the introduction of the thermo-couple by Le Chatelier to the more recent progress which resulted in the introduction of radiation pyrometry, based on the early observations of Becquerel, and on the later investigations of Kirchhoff and Wien on the subject of "black body" radiation. Following on Regnault's experiments, the Reichsanstalt has carried out research on the thermal properties of substances: this included experiments on the expansion of water between 0° and 100° by the communicating tube principle, and the determination of the saturation pressure between −60° and +370° C. The determination of the specific heat of gases—a question of high importance in internal combustion engine work—has been carried out with nitrogen, carbonic acid gas, and water vapour up to 1400° C., thus completing the work of Le Chatelier and Mallard in this connection, and the determination of the specific heat of gases at low temperatures has been made by Callendar's continuous flow method, improved by the counter-flow principle.

The electrical side of the work is no less interesting, and the activities of the institution have kept pace with the unceasing progress of this all-embracing science. It is, of course, of prime importance that the electrical units of measurement should be defined and realised as accurately as possible, and in this connection the Reichsanstalt has taken part in international conferences dealing with the subject, as well as cooperating with the State laboratories of other countries in carrying out measurements. Mercury copies of standard resistances had been found to be inconvenient in practice, and resistance boxes of German silver had proved inconstant and shown the resistance to be an intimate function of the temperature. It was Weston, in America, who first paved the way to improvement in this respect by inventing an alloy which showed but slight change of resistance with temperature; but it was left to the Germans to improve on Weston's discovery, the result being the introduction of the alloy (copper eight parts, nickel four, and manganese twelve) known universally as "manganin." Twenty years' experience at the Reichsanstalt with manganin resistances has shown the material to be unsurpassed by any other.

At the time the Reichsanstalt was founded standard cells were scarcely in use: it was only in the 'nineties that the Reichsanstalt, as the result of investigations, produced a practical standard cell, and one capable, moreover, of undergoing transit. This cell has, however, been superseded by the well-known Weston normal cell, which was accepted as the standard of e.m.f. by the London

[1] "Die Physikalisch-Technische Reichsanstalt; Fünfundzwanzig Jahre ihrer Tätigkeit." By Profs. Scheel, Holborn, Jaeger, and Brodhun. *Die Naturwissenschaften*, 1913, Nos. 8, 10, 12, 14.
"Die Physikalisch-Technische Reichsanstalt in Charlottenburg." By Prof. Karl Scheel. *Akademische Rundschau*, January, 1913.

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