As I was unable at the time to refresh my memory on the subject, I wrote guardedly, "Unless we have misunderstood." A fitter expression would have been, "If we remember aright." It is satisfactory to know that my recollection was substantially correct. To object to the theory being called a "suggestion" seems fastidious. As to Prof. MacBride's suggestion, Mr. Elliot's reference was to a proof of vol. i. of "A Treatise on Embryology." J. A. T.

THE NATURAL HISTORY BUILDING OF THE UNITED STATES NATIONAL MUSEUM.[1]

MR. RATHBUN has done well to publish a full technical account of this building, which claims "to be greatly in advance of all other museum buildings intended for a similar purpose." The three objects aimed at have been storage, usable exhibition space, and laboratory accommodation. The epithet "usable" is important, for in exhibition galleries dark corners and obtrusive architectural details are worse than useless. "Usable" also implies facility of accommodation to growing and changing needs. With this in view, the building has been planned as a great shell, with few permanent division walls; and, by giving exceptional width to the main mass, the floor area is large in proportion to the extent of outer wall. The plan, which covers nearly four acres, shows a large pavilion surmounted by a rotunda facing south, and from it three wings extending towards the east, west, and north; the latter are connected near their outer ends by two L-shaped ranges, completing the enclosure of two large uncovered courts.

The length of the southern façade, shown in perspective in our Fig. 1, is 561 ft.; the greatest north and south measurement, which is along the middle block, is about 364 ft.; each court is 128 ft. square. The wings have a width of 116 ft.; and the L-shaped ranges a width of 61 ft.

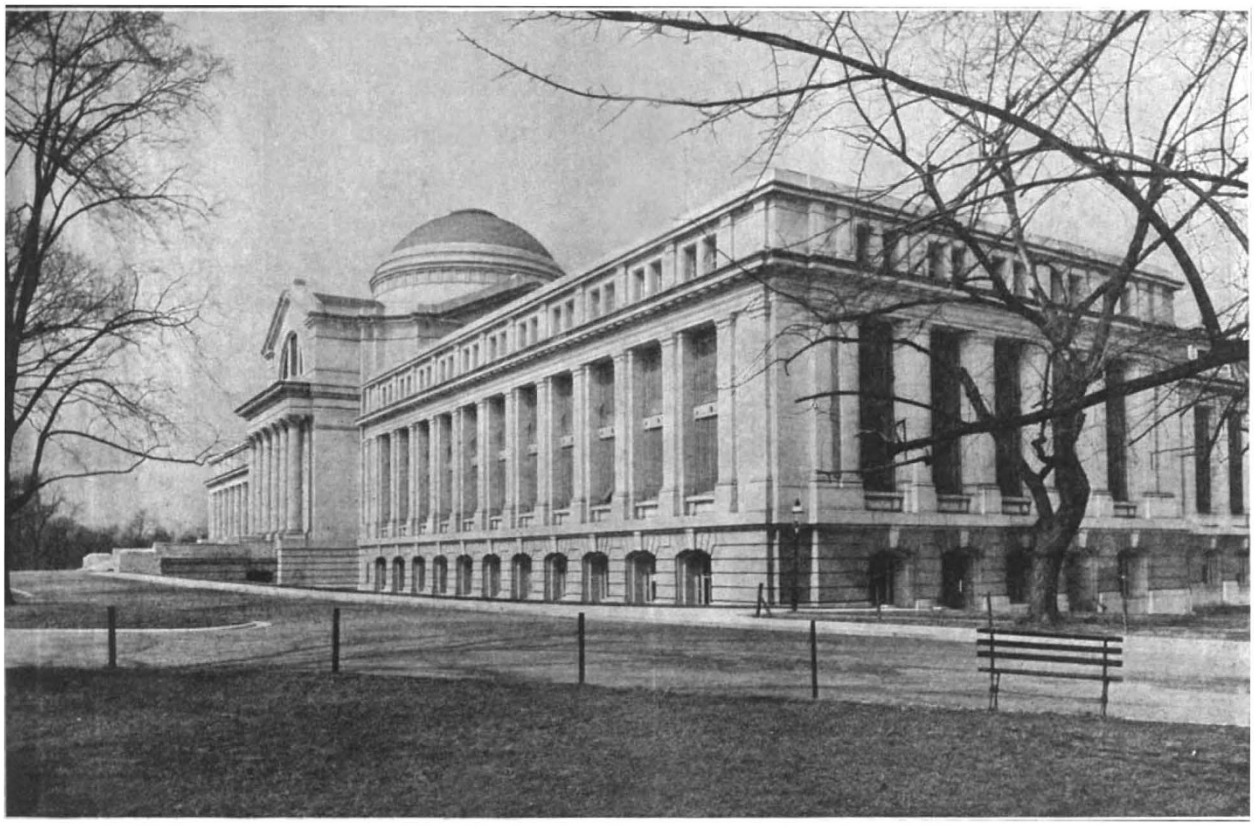

FIG. 1.—United States National Museum, Natural History Building, viewed from S.E., showing the South front, the outer end of the East wing, and the beginning of the East range.

This great width and the fact that the building is four storeys high might lead one to expect a deficiency of light. The modern classic style, however, has permitted exceptionally large windows (Fig. 1) in all but the upper storey, where, of course, skylights are available. Moreover, in these windows a maximum of glass surface has been secured by the use of light metal framing. Light is also furnished to the wings by light-wells 50 ft. wide, which break through the upper storeys and light all except the basement or ground storey. The floor of the first storey is thus all available, but the top-lit area is usually separated by glazed

[1] "A Descriptive Account of the Building recently Erected for the Departments of Natural History of the United States National Museum." By Richard Rathbun. U.S. National Museum, Bull. 80. Pp. 132+xxxiv plates. (Washington, 1913.)

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screens from the surrounding aisles. Our second figure shows part of an L-shaped range on this floor, with the outer windows on the right, and on the left windows to the open court. The actual interior width is 54 ft. 2 in., and the ceiling height is 20 ft. The severity of the interior is not unpleasing, and for exhibition galleries is better than any ornament.

The general absence of interior structural walls has necessitated the introduction of piers and columns arranged in one or more rows, as shown on the right of our Fig. 2. These, as well as the wall piers, are at a distance of 18 ft. 6 in. from centre to centre. Rooms can be formed in multiples of this unit by the building of partitions between the columns, or to meet varying needs the exhibition galleries can likewise be broken up by slighter screens of material appropriate to each case. As the museum grows and changes there will be no difficulty in making such alterations, for all the mains from the heating and lighting plant run in tunnels under the basement, and are connected with each floor by two vertical chases cut in each wall pier. These chases also serve for electrical communications, ventilating flues, vacuum-cleaning pipes, hot and cold water supply, and the like. Thus for the future we can almost imagine that in this building "neither hammer, nor axe, nor any tool of iron" will be heard in the hands of the workmen, but that the staff will be left to work in peace.

The vacuum-cleaning pipes lead from a single pump in the basement, driven by a 25-h.p. motor, and are connected with seventy-three inlets to which can be attached rubber dust-hose provided with a complete equipment of dusting tools. These will be of particular value in the cleaning of exhibition cases.

The rounds of the night-watch are controlled by a system of recording clocks with paper dials, which mark the signals and transmit them to a central station. Time is indicated by sixteen dials electrically controlled by a master clock and corrected each noon from the Naval Observatory.

There are six electric Otis elevators, four for passengers and two for freight. The latter are near the large wagon entrances, and run from ground to attic; their cars measure 7 ft. 3 in. by 11 ft. 4 in., by 12 ft. high, and can take a load of 12,000 lb.

Nearly all the ground storey of the east wing is occupied by the machinery plant, which serves the older buildings also. Except for the generator engines, the two stoker engines, and six pumps in the engine-room, which are worked by steam, all motive power is supplied by electricity and is conveyed to the various laboratories and workshops.

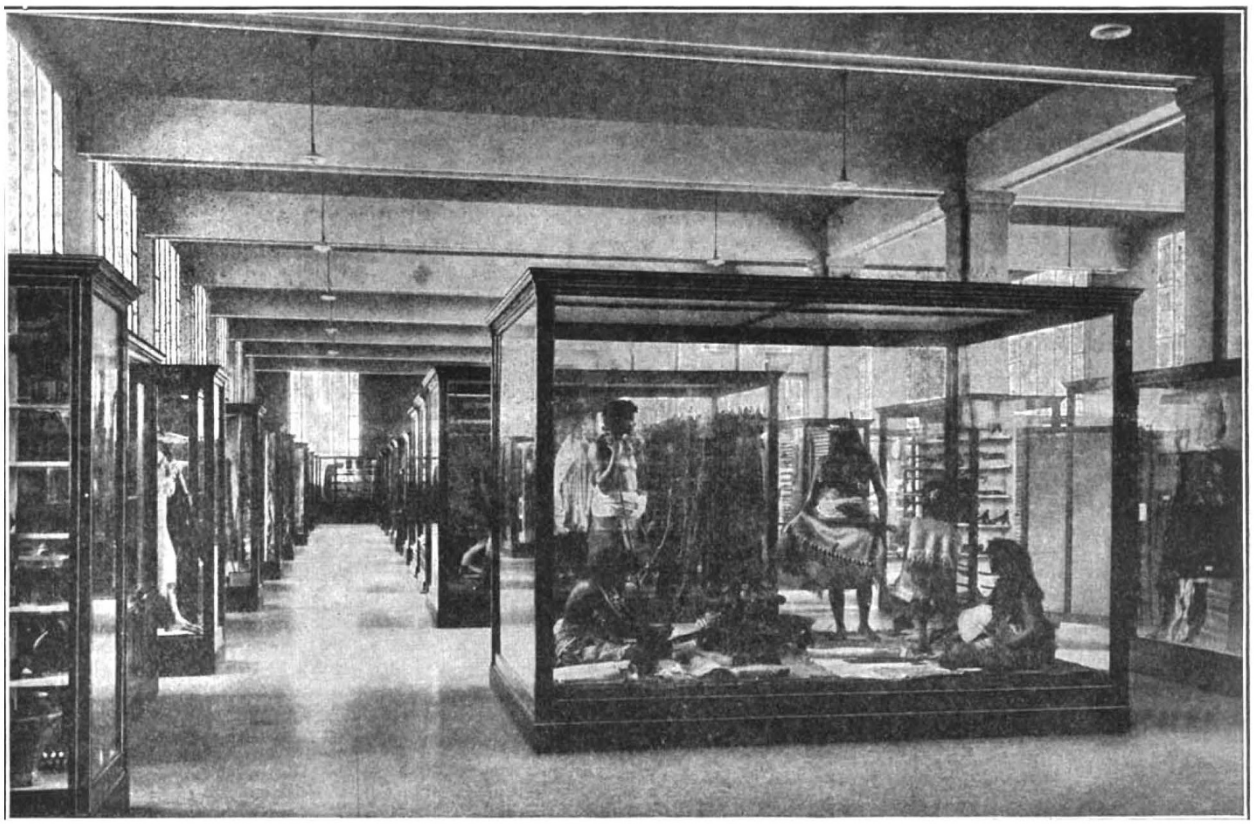

FIG. 2.—United States National Museum, Natural History Building. The Gallery of Ethnology, on the first storey of the East range.

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The latter consist of painters', cabinet-makers', joiners', and metal-workers' shops, all on the south of this wing. This concentration warrants the use of machinery, and almost every kind of wood-working tool, down to the oil-stone, has its individual electric motor. The "sweat of man's brow" sounds archaic here, but none the less the artisans have a shower-bath and dressing-room. Each department has also its own laboratories, work-rooms, and "comfort-rooms."

The abundant storage space is fitted with standardised shelves, drawers, and cases, permitting ready rearrangement and interchange.

The auditorium is well designed, accessible, and isolated. There are also two rooms for committees and small scientific meetings.

This book does not profess to describe the installation of the exhibits, though a few plates (see Fig. 2) show the general effect. Its value lies in its account of structural detail and practical fitments; it should be read by every museum governor, and digested by every architect of future museum buildings. The claim advanced may not be substantiated at every point, but as regards those here mentioned it is enough to say that the United States Museum possesses what our own Natural History Museum notoriously lacks.

DUTY-FREE ALCOHOL FOR SCIENTIFIC PURPOSES.

IN the recent discussions on the best means of developing the colour industry in this country, reference has frequently been made to the duty charged upon pure methyl and ethyl alcohol, which are essential for certain products. Although the past and present stagnation is mainly due to other and much more deep-seated causes, the fact that the trade is still handicapped by a form of taxation which does not exist in Continental countries is one of the signs of the steady indifference of the Government to scientific industrial development of which Thomas Thomson so bitterly complained in his history of chemistry written nearly a century ago.

As the result of a very widespread feeling of dissatisfaction with the high cost of these alcohols (a feeling which had long existed in all the important centres of chemical research in this country) the subject was brought before the chemical section of the British Association at the Glasgow meeting in 1901, and an influential committee was formed, which was successful in persuading the Board of Inland Revenue to forgo the duty on methyl and ethyl alcohol used for scientific purposes in approved institutions. Their recommendations were embodied in the Finance Act of 1902, the working of which has, we believe, given general satisfaction. Whether or not the laboratories of manufacturing firms are permitted to share these advantages we cannot state. Yet in spite of the virtual, if tardy, concession of the principle that research can be usefully promoted in this way, one is constantly confronted with the sort of trivial annoyance such as Sir William Ramsay and Prof. Hickson have recently suffered at the hands of the excise authorities (see NATURE, February 11 and 18), who imposed a duty on the spirit in which specimens coming from abroad were preserved. "Red tape" seems almost too soft a material for binding the cast iron regulations which govern the Excise Department. If, however, the above principle is recognised and conceded, surely it might be adopted in a broad and, if possible, scientific spirit on the part of the authorities. It is not only carried out in the narrowest spirit of officialdom, but also is applied with an extraordinary absence of logic, such as is only conceivable where ignorance of the elements of organic chemistry exists.

For example, chloroform and ether made from ethyl alcohol pay duty, whereas that from methylated spirit (methylated ether) in one case and acetone in the other do not, although the products are practically identical. Again, methyl and ethyl alcohol used for research are exempt from duty, whereas ethyl acetate and butyrate, ethyl chloride, bromide, iodide, and chloral hydrate, in all of which ethyl alcohol is used, are not exempt. The corresponding methyl derivatives which are obtained in precisely the same way from methyl alcohol are not scheduled and, we presume, are free to all consumers. It may be seen from the table of excise regulations that chemists keeping or using stills are subject to a tax of ten shillings on each still, although it should be stated to the credit of the excise department that the payment is rarely if ever enforced in laboratories so far as we know. Perhaps at some future date the regulation may be modified. We see in all this a tardy and grudging response to those pressing demands for liberty of research, which foreign Governments have so successfully encouraged.

But it is not the duty on alcohol which has been the main factor in crippling the colour industry during the last thirty years. Nor is it defective training, equipment, or ability of the young chemists turned out from our universities, whose scientific work stands second to none. It is that the manufacturing world is only beginning to realise at this time of crisis in the chemical industry the true value of the research chemist. We say "beginning to realise," for it was only a few days ago that a professor of chemistry in one of our provincial universities received a request from a large and wealthy corporation to recommend a first-rate chemist, to whom the handsome salary of thirty shillings a week was offered, or about a third of the earnings of a coal-miner working full time!

It would take up too much space to attempt to trace the cause of that attitude of indifference among nearly all classes to the application of scientific research to industry which is such a striking feature of German commercial development. There can be no question that the key to the problem is to be found in our educational system. The very terms "humanities" and "stinks" are fraught with deep significance. They would appear to contrast what is real and living

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