

can be made thereby zero for any particular latitude in one hemisphere only. There is a second correction due to the ship's motion in latitude, small and independent of the particular instrument, and there is a third correction, a ballistic correction due to change in the ship's motion in latitude. Space does not admit of these being followed out, but they are fully explained.

The directive force of the gyrostatic compass is about fifteen times as great as that of an ordinary magnetic compass undisturbed by surrounding iron. In addition, therefore, to its being undisturbed by the magnetism of the ship or the movements of heavy magnetic pieces, such as guns, a master gyrostatic compass may be set up in a protected and quiet spot low down in the ship, and there control a number of dials placed in convenient positions for steering or for taking azimuth observations. These local dials are provided with central dials geared up thirty-six times, so that a complete turn corresponds to ten degrees. With such a compass to steer by and steering

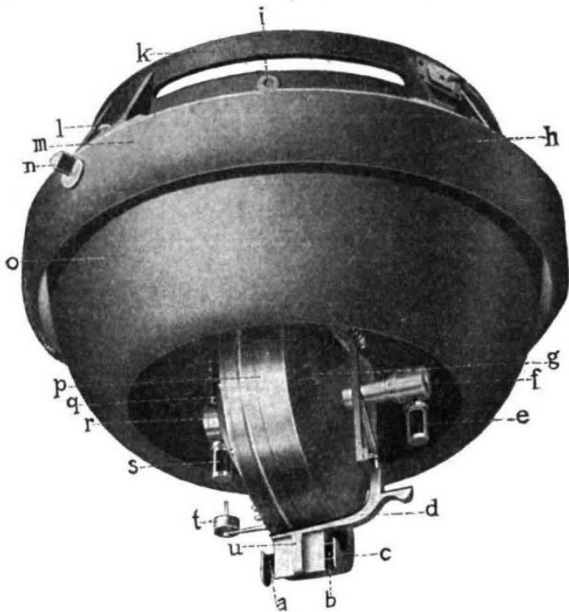


FIG. 2.—*a, b*, variable outlets for air blast; *c*, outlet pipe; *d*, pendulum arm; *e, s*, oil cup for gyro bearings; *f, r*, gyro bearings; *g*, inlet opening for air; *g*, terminal of gyro motor; *h*, gyro case; *o*, mercury bowl.

gear of greater precision than usual, the new compass should effect a saving in the actual distance run and in the horsepower at present wasted on the rudder, and it is an interesting question how long it will take for the reduction in the coal bill to pay for the compass.

It is not possible owing to limitations of space to follow the numerous details relating to the theory, construction, and use of this beautiful instrument, but anyone with a sense of fine mechanics will appreciate this excellent exposition, even though he may never have the chance of running the compass himself.

C. V. BOYS.

THE PRESERVATION OF ANCIENT MONUMENTS.

THE report of the Inspector of Ancient Monuments for the year ending March 31, 1911, is the first by the new inspector, Mr. C. R. Peers. There are 104 monuments under the care of the Commissioners of Works, forty-eight in England and Wales and fifty-seven in Scotland. During the last fifteen monuments have been placed under

the protection of the Ancient Monuments Acts, ten in England and Wales and five in Scotland. Eight of the newly-protected monuments are situate in Anglesey, all prehistoric monuments, three of which have recently been astronomically surveyed by Sir Norman Lockyer and others. Of the two prehistoric Orkney monuments now under protection, the Chambered Mound of Maeshowe has received the attention of the same authority.

Useful linear measures are given of the monuments noticed in the report, and in one case, as a sort of nest-egg, we have the information that the bearing of the dolmen at Trefigneth "comes within one degree of the line of the winter solstice." Never a word is found referring to the available astronomical surveys, while it may safely be asserted that the formal protection of the Anglesey and Maeshowe monuments is largely due to the local interest awakened in the astronomical inquiry. In connection with the statement that "no adequate record has up to the present time been kept of the treatment of each monument year by year," surely the annual reports issued by the Pembrokeshire archæologists should have been mentioned.

"Certain observations of a general character" are most timely and important. "The first Ancient Monuments Act has now been in operation for twenty-nine years. Of the fifty-one prehistoric monuments scheduled by it as worthy of preservation by the State, twenty-six have been placed under its provisions, by the consent of the owners, while the rest, for various reasons, have not been so placed. In regard to these latter, the position of the State is entirely unsatisfactory, and these monuments are in a worse case than if they had not been noticed in the Act." The second Act of 1900 has a wider scope, with the grand result that we have now three castles and three monastic buildings added to the State waifs and strays! This report, like others of its kind, reveals the deplorable ineffectiveness of high-sounding measures. It also shows that where a scientific survey of a monument is first made and the results duly published, owners of such properties are among the first to recognise the necessity for effective protection. Lord Boston, Lord Sheffield, and Major Fox-Pitt have nobly led the way in Anglesey. The first and foremost factor in the case is scientific inspection, and monuments are best preserved in accurate measures.

JOHN GRIFFITH.

THE PORTSMOUTH MEETING OF THE BRITISH ASSOCIATION.

IN about six weeks' time, on August 30, the citizens of Portsmouth will have the privilege of welcoming the members of the British Association for their annual meeting. In many respects this meeting will be a contrast to that at Sheffield last year. Portsmouth cannot offer the attractions of large engineering works or manufactories, but at the same time it holds a unique position as the first naval port of the United Kingdom, and one of the most ancient of its boroughs. The borough of Portsmouth fifty or sixty years ago included only a small portion of the island of Portsea, on which the town is situated. There were walls and gates (which were closed every day at sunset) and a military governor. The walls are gone, but some of the old parts of the town are still well worth a visit. Three years ago the borough boundary was enlarged, now including the whole of the Island of Portsea.

Opportunity will be offered to members of the British Association to inspect the old corporation plate dating from Queen Elizabeth onward, and the old charters of the town, covering the last 500 years, can

also be seen in the Town Hall, and are of great interest. The population of the borough has increased during the last decade by upwards of 40,000, the number of inhabitants, as shown by the census just completed, being about 232,000.

Not being a university or large industrial centre, Portsmouth cannot perhaps boast of as many large halls as other cities in which the association has met, but the accommodation will be found quite adequate. The general reception room will be in the Connaught Drill Hall, which is the headquarters of the 3rd Hants Volunteers. Here will be obtained all the literature relating to the meeting, tickets for excursions, postal facilities, &c. Most of the sections will be housed in the Municipal Technical College, a fine building, erected about four years ago at a cost of more than 70,000*l.*, and situated close to the Town Hall. This latter building itself will probably accommodate one or two of the sections, and is a magnificent edifice resembling the Town Hall, Leeds. As mentioned above, there are no large works, but several of the excursions will deal with objects of naval interest, such as visits to battleships, the dockyard, Whale Island (the gunnery school), or the *Vernon* (the torpedo and wireless telegraph instruction ship). Other excursions will include visits to Arundel Castle and various parts of the South Downs, and to the Isle of Wight. The Mayor proposes to give a garden-party to all members of the association, as well as a banquet to all the officers.

A good local guide-book is now well in hand, by the aid of which visitors will be able to find their way to the numerous objects of interest without difficulty, and also acquire much interesting information with regard to the borough and environs generally. If the number of visitors is large, the question of accommodation may present some difficulty. The best available accommodation in lodging-houses will probably soon be exhausted, as even at the end of August there are still a considerable number of visitors in the town. There are plenty of hotels, but in view of the above facts it will be well to apply early to the local secretaries for particulars of housing accommodation, as if the housing question is left until a few days before the meeting the choice may be very limited. There is no doubt, however, that the town and outlying districts will be able to accommodate as many as attend the meeting.

Portsmouth has during the last few weeks taken a prominent part in the Coronation Naval Review, and this has to a slight extent interfered with the meetings of the various committees which are dealing with the British Association gathering. Arrangements will, however, now go ahead fast under the guidance of the local secretaries, and in a few weeks we hope to publish further details respecting the meeting, which promises at present to be well up to the standard of any of its predecessors, both as regards work and pleasure.

It will be seen from the subjoined provisional programmes received from recorders of sections, that the scientific proceedings of the meeting promise to be of interest and importance.

PROVISIONAL PROGRAMMES OF SECTIONS.

SECTION A (MATHEMATICAL AND PHYSICAL SCIENCE).—The presidential address, by Prof. H. H. Turner, will be delivered at 10 a.m. on Thursday, September 1. Three discussions have been arranged: one on the principle of relativity, to be opened by Mr. E. Cunningham; one on stellar distribution and movements, to be opened by Mr. A. S. Eddington; the third (in conjunction with Section G) on mechanical flight, with Mr. A. E. Berriman as opener. The following papers have been promised:—Prof. Pettersson, on great boundary waves; parallactic tide set up in the bottom layers of the sea by the moon; Prof. F. T.

Trouton, on peculiarities in the adsorption of salts by silica; Major Hills, on the infra-red spectrum; Prof. F. R. Watson (of Illinois), on the effects of air currents on sound; Prof. L. Vegard (of Christiania), on the properties of the radiation producing aurora borealis; and by Prof. W. H. Bragg, on the corpuscular nature of rays.

SECTION B (CHEMISTRY).—*Discussion on colloids*: The theory of colloids, Prof. Freundlich; (1) colloids in pharmacy, (2) the blue absorption compounds of iodine with starch and other substances, Dr. G. Barger; the colloid theory of cements, Dr. C. Desch; adsorption of bromine by graphite, Dr. E. Wechsler. *Discussion on indicators and colour*: The origin of general and of specific absorption, Dr. T. M. Lowry; absorption spectra of vapours, J. E. Purvis; absorption spectra and refractive power of metallic vapours, P. V. Bevan; the use of indicators in modern physico-chemical research, H. T. Tizard; the application of methyl orange for the determination of the affinity constants of weak acids and bases, Dr. V. H. Veley. Joint meeting with Agricultural Sub-Section (Monday). Discussion on the part played by enzymes in the economy of plants and animals, opened by Dr. E. Frankland Armstrong; some points in the treatment of wheaten flour, A. E. Humphries. *Papers*: Optically active systems containing no asymmetric carbon atom, Prof. W. H. Perkin and Prof. W. J. Pope; the diffusion of gases through water, Prof. C. Barus; the compressibility of mercury, Dr. W. C. Lewis. *Reports*: Electric steel furnaces, Prof. A. McWilliam, and those of the Research Committees.

SECTION G (MECHANICAL SCIENCE).—Joint discussion with Section A on aeronautics, opened by Mr. A. E. Berriman; over-type superheated steam engine, Captain H. Riall Sankey and Mr. W. J. Marshall; suction gas plants, Mr. Tookey; Diesel engines, Mr. Chas. Day; the vibragraph, Mr. Digby; experiments on wireless telegraphy, Prof. G. W. O. Howe; electrical steering, Mr. Haig; electrical drives for propellers, Mr. H. A. Mavor; smoke abatement, Dr. J. S. Owens; on the origin and production of corrugation on tramway rails, Mr. Worby Beaumont; crude oil marine engines, Mr. J. H. Rosenthal; portable wireless telegraphy equipment, Captain H. Riall Sankey; the gyro compass, G. K. B. Elphinston; the single-phase repulsion motor, T. F. Wall.

SECTION H (ANTHROPOLOGY).—The proceedings promise to be as interesting and as varied as usual. The chief feature will be a discussion on totemism, to be opened by Dr. Haddon, and to which papers are to be contributed by a number of distinguished foreign guests of the section, including Dr. Kohler, Prof. Graebner, M. A. Van Gennep, Prof. Hutton Webster, and Dr. Goldweiser; among the English anthropologists who hope to be able to contribute papers or to take part in the discussion are Prof. Frazer, Mr. Hartland, Dr. C. G. Seligmann, and Mr. R. R. Marett. Archaeological papers will cover a wide field. Miss Adela C. Breton will exhibit paintings and frescoes from the Temple of the Tiger, Chichen Itza, and other ruins in Mexico and Yucatan, and will describe some recently discovered Costa Rican and Peruvian painted vases. She will also give an account of the present position of archaeological study in Peru. European archaeology will be covered by an important paper on the recent discovery of pleistocene man in Jersey by Mr. R. R. Marett, who has been in charge of the excavations of the caves in which the remains have been discovered; Dr. A. Keith, in a series of papers on palæolithic man will describe a second skull recently discovered in the same locality, and said to be from the same level as the well-known Galley Hill skull, a skull of Magdon type from Dartford, and remains of a pygmy race from Spain. Among papers dealing with the Mediterranean and Egyptian area may be mentioned Prof. G. Elliot Smith's paper on the foreign relations and influence of the Egyptians under the Ancient Empire, and Prof. Flinders Petrie's account of the Roman portraits discovered by him in Egypt during the last season's excavations. In ethnography and the study of religions, the papers to be contributed by Mr. W. Crooke on the cow and the milk, Major A. J. Tremearne's notes on Hausa folklore, M. Malinowski on the economic functions of magic, and Dr. C. G. Seligmann on the divine kings of the Shilluk, are of interest and importance. Mr. J. Gray will bring before the section the important question of the

institution of an imperial bureau of anthropology, while a cognate matter will be discussed in a paper by Mr. H. Peake, in which the author urges the desirability of instituting an anthropometric survey of Great Britain.

SECTION I (PHYSIOLOGY).—Presidential address, Prof. J. S. Macdonald; discussion on ventilation in confined quarters, especially in relation to ships, Dr. L. Hill, Prof. N. Zuntz, Mr. L. Woolhard; discussion on inhibition, opened by Prof. C. S. Sherrington, followed by Mr. Keith Lucas, conduction between muscle and nerve, with special reference to inhibition, and Prof. J. S. Macdonald; frequency of colour-blindness in males, Dr. Edridge-Green; heat production and body temperature during rest and work, Prof. J. S. Macdonald and Dr. J. E. Chapman; rhythmical stimulation of cooled frog's nerve, Dr. J. Tait; electrical stimulation of the frog's heart, Dr. J. Tait; photochemical changes in yohimbine solutions, Dr. J. Tait and Dr. J. A. Hewitt; some considerations on the influence of hæmoglobin in the hæmolysis of red blood corpuscles, Dr. H. E. Roaf; the chemistry of heat coagulation of proteins, Dr. Harriette Chick and Dr. C. J. Martin; new researches on phagocytosis, Prof. H. J. Hamburger; a photometer for heterochromatic photometry, Prof. C. S. Sherrington; model to illustrate Listing's law of the movements of the eyeball, Prof. C. S. Sherrington; comparison between the nervous taxis of the cat's knee and that of the arthropod claw, Miss S. C. M. Sowton and Prof. C. S. Sherrington.

SECTION K (BOTANY).—Presidential address, Prof. F. E. Weiss. Joint meeting with Sections C and E on the relation of the present plant population of the British Isles to the Glacial period, opened by Mr. Clement Reid. Discussion on the principles of constructing phyto-geographical maps. Semi-popular lecture, by Mr. Francis Darwin. *Papers:* Some petrified Jurassic plants from Scotland, Prof. A. C. Seward; recent work on the Jurassic plants of Yorkshire, H. H. Thomas; the structure of the oldest known synangium, and its bearing on the origin of the seed, Dr. M. Benson; on the mode of formation of the Pettycur material as gathered from internal evidence; a fifteen-year study of advancing sand-dunes, Prof. H. C. Cowles; new proposals in ecology, Prof. F. E. Clements; phytogeography as an experimental science, Prof. Massart; the vegetation of pebble beaches, Prof. F. W. Oliver; the brown seaweeds of a salt-marsh, Miss S. M. Baker; the Swiss National Park and its flora, Prof. C. Schröter; the water-content of acidic peats, W. B. Crump; the wilting of moorland plants, W. B. Crump; the presumptive hybrid *Anagallis carnea*, Prof. F. E. Weiss; the morphology of leguminous nodules, Prof. Bottomley; nuclear osmosis as a factor in mitosis, A. A. Lawson; nuclear division in *Spongopora*, A. S. Horne; the polyphyletic origin of the Cornaceæ, A. S. Horne; the transference of sugar from the host plant to a parasitic *Cuscuta*, S. Mangham.

SUBSECTION AGRICULTURE.—Presidential address, Prof. W. Bateson; cider sickness, B. T. P. Barker and Mr. Hillier; the effect of grass on apple trees, S. U. Pickering; the inheritance of strength in wheat, Prof. T. B. Wood; crystalline nitrogenous constituents of mangolds, Prof. T. B. Wood; suggestions relating to the existing system of imperial avoirdupois weights, J. Porter. Discussion on bacterial diseases of plants, opened by Prof. M. C. Potter; bacterial diseases of the celery and swede, J. H. Priestley; bacterial gum diseases, F. T. Brooks; bacterial diseases of the potato plant in Ireland, Dr. G. H. Pethybridge; experiments on the wart disease of potatoes, G. T. Malthouse; potato disease, A. S. Horne. *Discussion:* How best may the university agricultural departments come into contact with the farmer, Principal Ainsworth Davis; the American and Canadian systems, R. Hart-Synnot; the place of the agricultural instructor, J. H. Burton. Joint discussion with the Chemical Section. The part played by enzymes in the economy of plants and animals. Popular lecture by Mr. A. D. Hall, the soils and farming of the Southdowns; commercial ovariectomy in pigs, F. H. A. Marshall and K. J. J. Mackenzie; temperature variations during the oestrous cycle in cows, F. H. A. Marshall and K. J. J. Mackenzie; the effects of ventilation on the temperature and carbon dioxide of the air of byres, J. Hendrick; the effect of minute electrical currents on the growth and metabolism of bacteria, Prof. J. H. Priestley and Miss E. M. Lee; the effect

of high tension electric discharges and current electricity on plant respiration, Prof. J. H. Priestley and Mr. R. C. Knight; the effect of pyrophosphates on animals, Dr. J. A. Gardner; application of genetics to horse-breeding, C. C. Hurst; the inheritance of milk yield in cattle, J. Wilson. *The chief features of the programme are:* Discussions on problems at present of great importance in agriculture: (1) Bacterial diseases of plants; (2) the University Agricultural Departments and the practical farmer; (3) the rôle of enzymes in the economy of plants and animals; (4) some important live stock questions; (5) semi-popular lecture: a scientific study of the local agriculture.

NOTES.

THE Brussels correspondent of *The Times* announces that Prof. W. Spring, professor of general chemistry in the University of Liège, died on July 17 after an operation on the throat.

THE Council of the Royal Society of Arts attended at Clarence House on Friday, July 14, when the Duke of Connaught, president of the society, presented its Albert Medal to the Hon. Sir C. A. Parsons, F.R.S., "for his experimental researches into the laws governing the efficient action of steam in engines of the turbine type and for his invention of the reaction type of steam turbine and its practical application to the generation of electricity and other purposes."

A MEETING of the Institution of Mechanical Engineers will be held on July 25 and 26, at Zürich. The meetings will be held in the Swiss Polytechnikum. Among the papers to be read may be mentioned:—Electric traction in Switzerland, by Mr. E. Huber-Stockar, of Zürich; results of experiments with Francis turbines and tangential (Pelton) turbines, by Prof. Franz Präsil, of Zürich; some new types of dynamometers, by Dr. Alfred Amsler, of Schaffhausen; rack-railway locomotives of the Swiss mountain railways, by Mr. T. Weber and Mr. S. Abt, of Winterthur; high-pressure water-power works, by Mr. L. Zodel, of Zürich.

THE annual general meeting of the Society of Chemical Industry was held last week in Sheffield, under the presidency of Mr. Walter F. Reid, a summary of whose address appears elsewhere in this issue. Dr. Rudolf Messel, of London, was elected president for the ensuing year. The applied science department of the University was visited, and in an address given to the visitors, Prof. Arnold said that for the future students of the Royal School of Mines, if they wish to obtain the School of Mines diploma for iron and steel metallurgy, must take their fourth year of study in the metallurgical department of the University of Sheffield, and must pass its examination. Numerous visits were made to factories in and near Sheffield, and the visitors were entertained at several receptions.

AN important Act has been adopted by the New York legislature dealing with the sale in New York State of wild American game. Owing to the efforts of Senator H. R. Bayne to secure the passing of the Bill, the new Act is often called the Bayne law. Stated briefly, the new law prohibits in New York State, at all seasons, the sale, or importation for sale, of any species of American wild game, save hares and rabbits. These rodents have been declared a pest to fruit-growers. No longer will it be possible for ruffed grouse, pinnated grouse, any American quail, woodcock, snipe, or any American shore-bird, wild goose, brant, or wild ducks of any species, to be sold in the State of New York, no matter where they may have been killed. The Bayne law provides, however, that certain species of game that can be reared successfully in captivity, and killed by hand, may be sold and consumed, under certain restrictions.