OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN OCTOBER:—

October 7. 10h. 18m. Minimum of Algol (β Persei).
9. 14h. Saturn in conjunction with the moon (h 1° 27′ N.).
10. 7h. 7m. Minimum of Algol (β Persei).
10. 7h. 3m. to 8h. 10m. Occultation of 4 Sagittarii (mag. 4·6) by the moon.
11. 5h. Mars in conjunction with Jupiter, δ 1° 11′ S.
14. Vesta (mag. 6·5) in opposition to the sun.
15. Venus. Illumination portion of disc 0·991; Mars, 0·981.
16. 6h. 3m. to 7h. 2m. Occultation of 16 Piscium (mag. 5·6) by the moon.
16. 11h. 53m. to 13h. Occultation of 19 Piscium (mag. 5·2) by the moon.
18–20. Epoch of the October Meteors (Radiant, 91°+15°).
21. 8h. 37m. to 9h. 35m. Occultation of K^1 Tauri (mag. 4·6) by the moon.
21. 8h. 38m. to 9h. 34m. Occultation of K^2 Tauri (mag. 5·5) by the moon.
26. 6h. Venus in conjunction with α Libræ. ♀ 0° 6′ N.
29. 13h. Venus in conjunction with Jupiter. ♀ 0° 33′ S.
30. 8h. 50m. Minimum of Algol (β Persei).

COMET E. GIACOBINI.—A telegram has been received from the Centralstelle at Kiel announcing the detection of this comet at the Nice Observatory for the first time during the present apparition. The observation was as follows:—

1899. Sept. 29d. 8h. Nice Mean Time. { R.A. 16h. 26m. 32s. / Decl. −5° 10′

The daily motion in right ascension is + 2m. and in north polar distance − 10′, so that the comet is moving slowly in a north-easterly direction. The position at the time of discovery on September 29 was about 3° north of the 5th magnitude star, v Ophiuchi. The comet is merely described as "faint." Previous appearances of this visitor took place in September 1896 and June 1898.

A later telegram from Kiel announces that the comet has been observed at the Konigsberg Observatory, the measured position being:—

1899. Oct. 1d. 8h. 0·5m. { R.A. 16h. 31m. 0·7s. / Decl. −4° 39′ 50″

TWO NEW VARIABLE STARS.—Dr. T. D. Anderson, of Edinburgh, announces in *Astr. Nach.* (Bd. 150, No. 3594) his discovery of two new variables.

(1) *In Hercules.*—A star, not mentioned in the B.D., whose position is

R.A. = 17h. 53m. 27s. / Decl. = +19° 30′ } (1855)

was found in August to have a variation amounting to about 0·9 of a magnitude. The star is about 2′ or 3′ *north preceding* the 9·2 magnitude star B.D. +19°·3489.

(2) *In Cygnus.*—A star, not mentioned in the B.D., whose position is

R.A. = 20h. 9m. 44s. / Decl. = +30° 37′ } (1855)

is at present (September 21) rapidly diminishing in brightness. Comparisons with the neighbouring stars B.D. +30°·3958, 3963, 3964 showed the variation in magnitude to be from 8·5 to 9·2.

THE MELBOURNE OBSERVATORY.—The thirty-third report of Mr. P. Barrachi, the Government Astronomer at the Melbourne Observatory, Victoria, has recently been distributed, showing the work undertaken and the progress made during the period July 1, 1898, to February 28, 1899. The observatory is reported in good order, the instruments well cared for and in good working condition.

With the 8-inch transit circle 1571 observations have been made in right ascension, for determinations of azimuth, clock corrections and catalogue stars; also 1017 observations in north polar distance have been made in connection with latitude determination, catalogue stars and special zodiac stars, The catalogue stars were intended chiefly to be used in the reduction of the plates for the astrophotographic catalogue. The zodiacal stars have been observed at the request of Dr. Gill, of the Cape Observatory, in connection with his heliometer observations of Neptune and the other major planets at opposition. All the reductions are well in hand.

Astrophotographic Catalogue.—The series of plates for the catalogue is now completed, and 387 plates for the Chart have been passed as satisfactory. Special series have been taken for the region round the South Pole, and seven plates have been exposed for the Oxford chart type. The measurement of the plates is being undertaken by six young ladies, using three micrometers. The probable error of a measured coordinate is now no more than 0″·1, which is within the prescribed limit. The progress of this part of the work is rather slow, but trials with Prof. Turner's scale, as adopted at Greenwich and Oxford, although permitting of much greater speed, showed the error to be as great as 0″·5, and therefore all the measurements are to be made with the filar micrometer. A new instrument, similar to that designed by Dr. Gill for the Cape, has been ordered from Messrs. Repsold and Söhne.

The various operations connected with the time service, meteorological observations, and inspection of outlying depôts have been carried out as in previous years.

Terrestrial Magnetism.—The photographic registration of the horizontal and vertical components and of the magnetic declination have been continued, absolute measurements and redeterminations of scale zeros being made *five* times. The measurement and reduction of the curves obtained since 1867, numbering some 30,000, have been commenced.

The photo-heliograph has been employed on sixteen days for solar pictures; 264 pairs of cloud photographs have been obtained with cameras placed at different points round the observatory buildings.

The great telescope and south equatorial have been used for comet and planetary observation, and for the use of visitors, 189 persons being admitted on Wednesday afternoons and 195 at night during the year.

SIR ANDREW NOBLE ON THE BEST EDUCATION FOR ENGINEERS.[1]

WHEN your Dean first did me the honour to ask me to address you on the opening of your session, I had grave doubts as to whether I was a proper person to accept the invitation. On the one hand, I have had little or nothing to do with the education of others, and in some points my views, at all events so far as regards primary education, are at variance with much that is being done at the present day, but as, on the other hand, I have had exceptional opportunities of observing, both in this and other countries, certain points which seem to me to be of importance to those who propose to uphold the industrial supremacy of this country in the struggle which year by year other countries are rendering more and more severe, you therefore see me here to-day, and I shall consider myself amply rewarded if I can tempt but one of you to enter, for the sake of knowledge itself, the boundless fields which science day by day is opening up to you. I can promise that the pursuit will give you happiness. I hope it may give you wealth and distinction; but I remember the words of the Preacher, that riches are not always given to men of understanding, nor favour to men of skill, but that time and chance happen to us all.

Technical education is a phrase that has been so often misused, perhaps so often misunderstood, that many of those who, like myself, are engaged chiefly in trying to solve the practical problems of engineering are in the habit of hearing it either with impatience or of regarding it as a fad of lay theorists, or sometimes, I fear, as a cloak for educational shortcomings in other directions. And I am bound to confess, if their experience has been the same as mine, that there is some excuse for them. You can form but little idea of the number of persons of both sexes who have assured me that their sons had no taste for books, but had shown a marvellous talent for engineering. I need hardly tell you that the marvellous talent generally turns out to be an incapacity, possibly from defective education, for seriously applying the mind to any subject whatever.

But technical education, properly considered, is of the highest

[1] Inaugural Address of the Session 1899–1900 of the City and Guilds Central Technical College, given at the College, Exhibition Road, by Sir Andrew Noble, K.C.B., F.R.S., on Tuesday, October 3.

importance both to you and to England. It is only its abuse that we have to guard against.

Now one of the great abuses I take to be that technical education is often begun too early in life, that is, that it is substituted for a general education, and a boy attempts to put his knowledge to practical use before he has learnt how to learn.

Another abuse is the divorcing of practice from theory, and the danger of elevating practical application above scientific knowledge.

I shall try, therefore, to-day to say a few words, firstly, about the necessity of acquiring a sound general education before any special work is attacked, and, secondly, about the necessity of basing all practical work on theoretic knowledge.

I attribute the compliment which has been paid me in the invitation to speak at the opening of the present session to the fact of my having been connected, for many years past, with the management of probably the largest engineering firm in England. That position has afforded me exceptional opportunities for observing what educational antecedents are likely to produce the best results in the engineering field. I say "exceptional opportunities" advisedly, for we at present employ in our various works not far removed from 30,000 hands. Of these a large number are youths; often sons of workmen, but not unfrequently drawn from the class which I see represented before me.

I am continually asked what education I should recommend for a lad entering Elswick. I always say, "Send your son to as good a school as you can, keep him there as long as you can, do not curtail his time of schooling, do not stunt his early intellectual growth by narrowing it down to any special study as taught at elementary schools."

Science, mechanical drawing, and such like are no doubt very useful (as all knowledge is useful) in their way. These studies may prove an irresistible attraction to minds with a strong bent towards scientific subjects, but I would fancy most employers would rather that a lad came to us blankly ignorant of both, so long as he had had a good education, had been taught, and had ability to think, and to concentrate his attention on any subject brought to his notice.

Some of you may have heard, no doubt, the answer of the Duke of Wellington to a father who asked him what was the best education for his son, preparatory to his joining the army: "The best education you can give him."

It was a very pregnant utterance, terse and to the point, as nearly all the great Duke's were; and it remains as true for any other profession as for the army.

In nine cases out of ten, I should say, any knowledge acquired by a boy before he is sixteen can have but a slight intrinsic value. Up to that age, it is not *what* he learns that we have to look at, but *how* he learns; it is the habit of discipline, of mental application, of power in attacking a subject, that are so valuable; not, generally, any definite piece of knowledge he may have gained.

According to my experience, the most valuable knowledge that a man has at his disposal is that which he has taught himself. That a special technical education is not an absolute necessity is not difficult of proof. My own chief, Lord Armstrong, commenced life as a solicitor; James Watt was an instrument maker, and was prevented from opening a shop in Glasgow because he had not served a full apprenticeship. George Stephenson was an assistant fireman to his father at Killingworth Colliery. Faraday was brought up as a bookbinder. I cite the cases of these great men simply to show how men without trained assistance have taught themselves, and what can be done by the dauntless energy, untiring industry and patient search after truth which were the great characteristics of all of them, and which enabled them to do such great things.

My own impression with regard to early education is that, as a sharpener of the young intellect, and as a mental discipline, it would be difficult to improve upon the curriculum which is now in force at our public schools, and which, in the main, has been in force for so many centuries.

I am not in accord with those who think that modern languages should supersede the classics as a means of education, and I should regret more than I do the attempts which have been made in this direction, did I think that these attempts were likely to be successful. Men of science will remember that practically the whole of our scientific nomenclature is borrowed from the Greek and Latin languages; and, personally, I have found my own knowledge of the classics—which represents, no doubt, that of a very ordinary schoolboy—stand by me, and enable me to enjoy, as I would not otherwise have done, that noble literature, which, as Lord Macaulay says, is the most splendid and perhaps the most durable of the many glories of England.

But, whatever may be the fate of the classics as a means, I must take up my parable against a course of education I have seen in several primary schools where an attempt is made to teach boys, often little better than children, rudimentary chemistry, rudimentary geology, also physiology and electricity.

Occasional popular lectures on these sciences may be of very great value to some boys in interesting them in these great subjects, and in leading them, at some later date, seriously to study them, but these sciences as taught in the schools I refer to can have but little value in encouraging habits of thought, of application, and of mental discipline; and to knowledge so acquired the words of Pope are peculiarly applicable:—

> "A little knowledge is a dangerous thing,
> Drink deep or taste not the Pierian spring,
> There shallow draughts intoxicate the brain,
> And drinking deeply sobers it again."

I am aware that many people say that the years a boy wastes on Greek and Latin might be better employed in learning German and French. It may be so, but it is not difficult to teach these most important languages colloquially at a very early age; and with regard to technical subjects, speaking from my own observation, I may say that I do not think I have known any man at twenty-eight or thirty who was the better for having abandoned his general education for technical subjects at too early an age.

Those men who, with fair abilities, have received a really good education, have been taught to use their minds, and who, by contact with other students, have acquired habits of application, amply make up for their late start by the power of mind and grip that they bring to their work. They are fresh and keen when others, who have been hammering away at semi-technical work from early boyhood, have become stale and are less vigorous, and that reflection moves me to deprecate strongly any attempt to teach seriously practical or electrical engineering in preparatory or elementary schools. As an excellent recreation, such studies are no doubt to be encouraged, but to make them a systematic part of education, to the exclusion of studies which have a more direct effect in developing the understanding, seems to me to be entirely wrong. I would go further and say that even in public schools, and their equivalents, for older boys, what are termed engineering shops are generally a failure, so far as any efficient knowledge to be gained in them is concerned. Except as a reasonable diversion for recreation hours, such "shops" have, I fear, but little value, and in nine cases out of ten the hours spent in them are subtracted from the time due to more valuable studies.

In my judgment, the age at which a boy should seriously begin any special studies, with a view to fit him technically for the profession he may have decided to follow, should not be earlier than seventeen or eighteen.

And in any discussion as to the age at which a boy should leave school, the great incidental advantages that he gains from a reasonable prolongation of his schooldays must never be lost sight of. A stricter discipline, a wiser supervision, a more authoritative yet sympathetic advice as to conduct, are more possible at school than can ever be the case in after life, and a more constant and generous association with his equals rubs off angularities and leads to amenity of disposition. It is seldom, indeed, that one cannot trace the difference between a lad who has had a full public school training and another who has been less fortunate. Speaking as an employer of labour, I should say that we find a pleasant speech and manner, tact in dealing with others, and some power of organisation of the utmost value; and it is precisely those qualities which a boy acquires, or ought to acquire, in his *later* years at a public school. Without such qualities even the highest scientific attainments will never make a captain of industry, and in selecting candidates for appointments the man-of-business distinctly prefers a youth who has had the benefit of some years at a good school.

So much for the necessity of grounding technical studies on the basis of a sound general education.

The next point I should like to urge is that any practical technical instruction and any practical knowledge acquired in the

workshop should be based upon sound theoretic knowledge. I am driven to enforce this question because (speaking again from my own observation) I find that in this country far too much weight is given to practical skill and what is called the "rule of thumb"; far too little to sound theoretic knowledge.

In the middle of this century English machinery was immeasurably superior to any other. To our remaining content with this state of things, and to our seriously neglecting technical instruction, I attribute the very much greater comparative progress that Germany, the United States and Switzerland have made in the last fifty years, and, if I am not very greatly mistaken, we shall have before many years, in the East, an important commercial rival in Japan, since that country is developing its manufacturing powers with an energy that is as remarkable as it is unexampled.

Turning to other departments of industry, no Englishman can observe without regret how certain branches have almost altogether abandoned this country, and been in a great measure left to those who have paid more attention to technical instruction.

Nearly every requirement of a drawing office can be better and more economically obtained from Germany. From what source do all our pure chemicals come, our filter papers and most of our glass apparatus? I admit that the workmanship of many articles made in England cannot be surpassed, but if we require any original or special piece of apparatus we are frequently compelled, as I have been, to go to Germany or France for their manufacture.

I do not desire to press my point too far, and admit that a portion of this transference of work, which I so much regret, may be due to cheaper labour. But the English mechanic is second to none, and if that false trade unionism, which endeavours to prevent the most intelligent and skilled from reaping the full benefit of their abilities, be abandoned, I do not despair of seeing this country regain much that it has now lost.

But it is to theoretic and technical knowledge that we must chiefly look. Consider, as an illustration, electricity in the service of man. Think of its innumerable applications, and of the number of hands dependent upon its industries. But for one man capable of designing or improving these powerful machines or delicate instruments, there are a thousand ready and able to carry out their designs. But it is the former who are the salt of the earth, and those who have the management of large concerns know well how to value them.

It was to meet the want that I am referring to that your Technical College was founded. Its objects are admirably stated in its programme, and your attention is drawn to the undoubted fact that no theoretic or technical instruction can supersede the necessity of obtaining practical experience in the workshop and factory. But, on the other hand, I believe that no genuine success in the higher walks of industry is probable without thorough theoretic or technical knowledge.

In my experience I do not think I have ever known a man rise to the top of the tree without it. I may, perhaps, be forgiven if I refer to one great engineering genius, Lord Armstrong, with whom it has been my privilege to be so long and so intimately connected. In whatever investigation he was engaged, he added to sound theoretic knowledge an intensity of application and an apparently intuitive perception of the results to be expected that I have rarely seen equalled.

Of him it may be truly said that "whatever his hand found to do, he did it with his might."

Sir William Harcourt, speaking a fortnight ago, attributed the immense commercial advance which has recently been made by Germany to the better teaching of languages, and to the German merchant being able to speak to the English buyer in a tongue which he can understand. I very much doubt if that has much to do with the matter, and I am sure that houses where business is done on a large scale very much prefer that all letters should be in the languages of the respective writers, and not in the doubtful English that is not unfrequently thrust upon us. There is no doubt that Germany is competing with us, as she has a right to do, successfully; and, so far as I am aware, with respect to her manufactures, perfectly honestly.

I say "honestly," because I do not believe in any attempt to enhance the value of one's own wares by depreciating those of other people; and I entirely differ from those who would attribute the success of our German competitors to their putting on the market inferior goods specially got up to imitate those of a superior class. It was some idea of this kind, no doubt, that led to the most ill-advised regulation that foreign-made goods should be stamped so as to show their origin. It doubtless does this, but its effect is, I believe, in the direction of an advertisement for foreign goods, and there is some danger that if our own manufacturers relax their efforts the "made in Germany," which was, I think, meant to be a reproach, should become, on the contrary, a hall-mark of excellence, as when the *Wilhelm der Grösse*, one of the finest steamships afloat, steamed into Southampton water with a facetious placard, "Made in Germany," hanging on her side.

In many articles, and especially with the apparatus of scientific research to which I have referred, this is already the case.

Manufacturing progress has in Germany gone hand in hand with material progress, and any one who has travelled much must be astounded with the extraordinary improvement which has been going on in recent years, not only in German railways, shipbuilding and steel-working, but also in the buildings, order and general amenities of life of the great German cities, such as Berlin, Frankfurt and Cologne. In the competition of manufacture we are pressed very hard from steel to watches, from marine engines to scientific instruments. In nothing, indeed, have German manufacturers made more progress than in the making of all exact instruments. In these departments Germany certainly excels us, so far as original and inventive improvement is concerned.

Now, all this improvement, I feel inclined to attribute, not, with Sir William Harcourt, to any linguistic superiority, but to the far greater opportunities of technical study which are afforded in Germany. If we are to hold our own, we older men must try to multiply these opportunities of study in our own country, and you younger men must do your part by seeking to avail yourselves to the uttermost of any such opportunities provided.

To you, gentlemen, who are about to commence the studies which will be useful to you in your future career, I venture to say a few words. Consider the marvellous progress that has been made in the physical and practical sciences during the century now rapidly drawing to a close. At the commencement of the century steam navigation and railways were unknown and unachieved. Our knowledge of the science of electricity was confined to a few isolated phenomena, and chemistry was in its infancy. Now the latter science has spread its branches until it seems likely it may bring into a common brotherhood the whole of the physical sciences. Consider, further, that knowledge and progress appear to be increasing in a geometric ratio; who then can predict what will be the progress made at the conclusion of the twentieth century, or even during the first half of it? In forwarding that progress I sincerely trust that many of those whom I now address may be prominent workers. We have never wanted in this country the men whom I would call the captains of the scientific army, but I think we are much inferior to Germany in the rank and file, in the number of men who are willing to follow particular lines of investigation, and who thus do invaluable service to science.

We older men, whose careers are approaching their termination, cannot but look with envy on the career which may be open to some of you. It was said of the telescope, which opened to our vision infinite space, that it was balanced by the microscope, which showed us the infinitely small; but small as are these objects, the kinetic theory of gases opens up to our appreciation, I had almost said to our view, molecules whose dimensions are inconceivably smaller. It would be vain to name to you the limiting dimensions of these molecules which have been revealed to us by the labours of Maxwell, Lord Kelvin, Clausius and others, but I have seen somewhere, possibly in the columns of NATURE, a statement which may be more intelligible. It was something like this:—That though the molecules of hydrogen gas are so small that it would take about 50 millions touching one another to make an inch, they are so numerous in a cubic inch of gas at 0° Centigrade and atmospheric pressure, that if the whole of them were formed into a row, they would go round the circumference of the earth more than a thousand times. The molecules also, as you probably know, are in violent motion. The highest velocity I have obtained with a projectile nearly reached 5000 f.s., but the average velocity of the hydrogen molecules at the temperature and pressure I have named is somewhat more. I once calculated that a few molecules, I forget in how many millions, might exceed 50,000 f.s.

We smile, and justly smile, at the seekers after what was

called perpetual motion. Modern science seems to show that it is equally vain to seek for anything that is perpetually and absolutely at rest.

I have alluded to the kinetic theory of gases because we know more of the constitution of that form of matter than we do of any other, but having regard to the progress of science to which I have referred, is it too much to hope that some of you will live to see a second Newton, who will give you a second Principia, which shall clear away the difficulties which surround the constitution of matter whether ponderable or imponderable?

One word more, bring enthusiasm to your studies; without it the best instruction (this you will have) and the best apparatus will do nothing for you. Make your work the first aim, and do not let athletics, or anything else, take precedence of it. Here, again, I cannot help thinking that the Germans get a little the better of us. With them work is absolutely in the forefront; I am not at all sure that it is so with the average young Englishman of to-day. No one appreciates the value of athletics, when kept in their proper place, more keenly than I do. But against the substitution of athletics for the more serious objects of life, I should like to enter my strongest protest, and it will be a sorry day for England if such a change ever takes place.

Lastly, I would say to you, while giving the acquiring of knowledge that may assist your own business or profession the first place, not be too utilitarian, do not narrow the search for knowledge down to a search for utilitarian knowledge, for knowledge that you think will pay. I remember a strong protest of De Morgan's against the number of men who take their station in the business of life without ever having known real mental exertion; he put it that knowledge which ought to open the mind was decided on solely by its fitness to manure the money tree.

Therefore, above all things, pursue knowledge. It is that pursuit which will stand by you to the end as at once the greatest and the most enduring of pleasures. Friends may die; the most tender attachments must be severed; advancing years will very soon debar you from any serious pursuit of athletics; the acquisition of wealth will take away from you the pleasure of "making a position," which is probably the keenest, and surely the most legitimate, incentive of middle life; but the pleasure of acquiring knowledge will console you to the last, so long as you have strength to open a book, or to hold a test-tube. Cry after knowledge; seek for her as silver; and search for her as for hidden treasure.

THE BRITISH ASSOCIATION.

SECTION H.

ANTHROPOLOGY.

OPENING ADDRESS BY C. H. READ, PRESIDENT OF THE SECTION.

THE difficulties that beset the President of this Section in preparing an address are chiefly such as arise from the great breadth of our subject. It is thought by some, on the one hand, to comprehend every phase of human activity, so that if a communication does not fall within the scope of any other of the Sections into which the British Association is divided, it must of necessity belong to that of anthropology. On the other hand, there are many men, wanting neither in intelligence nor education, who seem incapable of grasping its general extent, but, mistaking a part for the whole, are fully content with the conclusions that naturally result from such a parochial method of reasoning. The Oxford don who stated, a year or two ago, his belief that anthropology rested on a foundation of romance can only have arrived at this opinion by some such inadequate process, and the conclusion necessarily fails to carry conviction. The statement was, however, singularly ill-advised, for anthropology gives way to no other branch of science in its reliance upon facts for its existence and its conclusions. Had the reproach been that the facts were often of a dry and repellent character we might have pleaded extenuating circumstances, but I fear it must have been admitted that there was some justice in the complaint, though we could fairly point to instances where master minds have made even the dry bones of anthropology live, and that without trenching upon the domain of romance.

It is not, however, my purpose to-day to enter upon a general defence of anthropology as a branch of science. It has taken far too firm a hold upon the popular mind to need any such help. I intend rather to treat of one or two special subjects with which I am in daily relation, in order to see whether some practical means cannot be found to bring about a state of things more satisfactory than that at present existing.

The first of these branches is that of the prehistoric antiquities of our own country. It will not be denied that there can be no more legitimate subject of study than the remains of the inhabitants of our islands from the earliest appearance of man up to the time when written history comes to the aid of the archæologist. There is no civilised nation which has not devoted some part of its energies to such studies, and many of them under far less favourable circumstances than ours. The chiefest of our advantages is to be found in the small extent of the area to be explored—an area ridiculously small when compared with that of most of the continental nations, or with the resources at our command for its exploration. The natural attractions of our islands, moreover, have also had a great influence on our continental neighbours, so that their incursions have not been few, and no small number of them decided to remain in a country where the necessaries of life were obtainable under such agreeable conditions. The effect of these incursions, so far as our present subject is concerned, is that there is to be found in the British Islands a greater variety of prehistoric and later remains than is seen in most European countries, a fact which should add considerably to the interest of their exploration. At the same time also it must be borne in mind that it is by such researches alone that we can arrive at any true understanding of the conditions of life, the habits and religious beliefs, or the physical characters of the varied races who inhabited Britain in early times.

It may seem unnecessary to urge, in face of these facts, that all such memorials of the past should be, in the first place, preserved; and, in the second, that any examination of them should be undertaken only by properly qualified persons. Unfortunately, however, it has never been more necessary than it is at the present time to insist upon both points, and the fact that these prehistoric remains are scattered impartially over the whole country, with the exception, perhaps, of the sites of ancient forests, makes it almost impossible to devise any special measures for their preservation. An additional difficulty is to be found in the fact that many ancient remains, such as the barrows of the early Bronze Age, are altogether unrecognised as such, and in the process of cultivation have been ploughed down almost to the level of the surrounding surface, until at last the plough scatters the bones and other relics unnoted over the field, and one more document is gone that might have served in the task of reconstructing the history of early man in Britain.

Such accidental and casual destruction is, however, probably unavoidable, and, being so, it is scarcely profitable to dwell upon it. We can, perhaps, with more advantage protest against wilful destruction, whether it be wanton mischief or misplaced archæological zeal. An enlightened public opinion is our only protection against the first of these, and will avail against the second also, but we are surely entitled to look for more active measures in preventing the destruction of archæological monuments in the name of archæology itself. It is a far more common occurrence than is generally realised for a tumulus to be opened by persons totally unqualified for the task either by experience or reading. An account may then be printed in the local journal or newspaper. When such accounts do appear it is often painfully obvious that an accidental and later burial has been mistaken for the principal interment, while the latter has been altogether overlooked, and no useful record has been kept of the relative positions of the various objects found. The loss that science has suffered by this indiscriminate and ill-judged exploration is difficult to estimate, for it should be borne in mind that an ancient burial, once explored, is destroyed for future searchers—no second examination can produce results of any value, though individual objects overlooked by chance may repay the energy of the later comers. So much varied knowledge is, in fact, required for the proper elucidation of the ordinary contents of a British barrow that it is almost impossible for any single person to perform the task unaided. A wide experience in physical anthropology must be combined with an acquaintance fully as wide with the ordinary conditions of such interments and the nature, material, and relative positions of the accompanying relics, all of which must be brought to bear, with discriminating judgment, on the facts laid bare by the digger's spade. Added to this, the greatest precaution is needed that nothing of value be overlooked. In