

The English Mechanic and World of Science

A history of the publication, taken from articles published in its pages.

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An article on the beginnings of “English Mechanics” from the time of the “Mechanics Magazine” started in 1823 (from issue 3069, January 18th, 1924)

An old and esteemed contributor deals with some of the more interesting phases in the history of this Journal. (from issue 3066, December 28th 1923)

Some old controversies in the “English Mechanics” (from issue 3118, December 26th 1924 and issue 3119, January 2nd 1925)

A History of "English Mechanics"

By Lt.-Col D. J. SMITH

[Supplementing the account given in the E.M. for December 28 last, but written from a different viewpoint, the following notes complete the historical survey undertaken.]

It is necessary, in writing the history of the ENGLISH MECHANICS, to start with the "Mechanics Magazine" for although these two journals really had nothing to do with each other, they were connected by a most important link, the late Mr. Passmore Edwards, whose name and memory cannot be held in higher esteem than it is by the older readers of the ENGLISH MECHANICS. Mr. Passmore Edwards bought a seven years' lease of the "Mechanics Magazine" from its then owners, a firm of patent agents in Fleet Street, who were unable to make it pay. Under Mr. Passmore Edwards' management, it once more paid its way and became again the flourishing journal it had previously been. Changes in its form and policy were however demanded by the times if it was to continue a successful undertaking, and these Mr. Passmore Edwards could not get permission to carry out, so he gave the paper back to its owners and, no doubt having by his experience proved how useful a properly run paper of this type could be, turned his attention to the ENGLISH MECHANICS, which he purchased during its first year of publication in 1865, of which more details will be given later. It will be seen, therefore, that had the owners of the "Mechanics Magazine" come to terms with Mr. Passmore Edwards, it would have been running to-day in the place of the ENGLISH MECHANICS, as it is clear for several reasons that the ENGLISH MECHANICS could not have carried on without Mr. Passmore Edwards' genius in handling it, and incorporating the features in it which he was not allowed to apply to the "Mechanics Magazine." It can therefore fairly be taken that the history of the ENGLISH MECHANICS starts with the "Mechanics Magazine," and an outline of the life of that journal will be given before passing on to the ENGLISH MECHANICS. A reference to the "Mechanics Magazine" was given in ENGLISH MECHANICS for October 19, 1923, which gave details of the form and contents of the sixth number. The "Mechanics Magazine" was published by Knight & Lacey, 24 Paternoster Row, London. The first number appeared on Saturday, August 30, 1823, and was undoubtedly the first mechanical paper worthy of the name published in Great Britain. Dr. George Birkbeck, the President of the Mechanics' Institution, in his inaugural address to that Institution, described the "Mechanics Magazine" as the most valuable gift which the hand of science has yet offered to the artisan. It had a very successful career until about 1850, when it became the property of the firm of patent agents already mentioned, who could not make it pay. This is not surprising when the volumes of about that date are examined, as they were not nearly so valuable as the earlier volumes, the subjects dealt with being much restricted in number, and with no contributions from the readers in the form of letters to the Editor, Queries and Answers, &c. The Magazine had evidently, before being leased by Mr. Passmore Edwards, got quite out of touch with its readers, a hopeless position for any scientific journal, as the progress of scientific knowledge is rapid and continuous, and can only be kept in touch with by allowing those who are actually carrying out research work, or are interested in the various scientific fields, to give their results and interchange their ideas—the foundation on which the ENGLISH MECHANICS was so firmly erected. From what can be gathered the owners of the "Mechanics Magazine" after it had been handed back to them by Mr. Passmore Edwards sold it to the "Engineer," the proprietors of which sold it in turn to the publishers of a new paper called "Iron," which after some initial success collapsed. This now brings the history up to the ENGLISH MECHANICS, purchased as previously mentioned by Mr. Passmore Edwards in the first year of its publication.

The first number of the ENGLISH MECHANICS, or to give it its full title, THE ENGLISH MECHANIC. A RECORD OF MECHANICAL INVENTIONS, SCIENTIFIC AND INDUSTRIAL PROGRESS, BUILDING, ENGINEERING, MANUFACTURES, AND ARTS, appeared on Friday, March 31, 1865, a most vital period in British industrial development. The railway share boom was over and the railways had settled down to that steady extension and development which was to have such an important bearing on making Great Britain the workshop of the world. Manufacture, especially engineering, began to develop in a way which would a few years before have been deemed impossible, and the whole country was rapidly changing over from agriculture to industrial pursuits. Many of the most important manufacturing firms of to-day were established during the sixties, which has been termed a period of mad industrialism, which, while it may have laid the foundations of Great Britain's industrial supremacy, also is responsible for the terrible housing conditions, slums, &c., found in most of our large manufacturing towns. With such rapid and enormous expansion of industries directly dependent on mechanical progress, the want of a journal dealing with engineering matters in all its ramifications was acutely felt, and at that time there was no journal which adequately covered the ground. The appearance of the ENGLISH MECHANICS was hailed with enthusiasm by all interested in mechanical and scientific pursuits, and a large circulation was soon built up. Published at 1d. weekly by G. Maddick, of 162 Fleet Street, London, E.C., the first numbers must have been a wonderful journalistic feat at that period regarded quite apart from the merit of the contents which was very high. This combination of low purchase price and high quality of contents had much to do, no doubt, with its very rapid success, and the rallying of a band of workers drawn

from all grades and classes of society which have never left it through the many years of its existence. Contributions from working men, noblemen, and the greatest living scientists appeared side by side in the same issue, all men bound together in a brotherhood of mutual help as fellow readers and contributors to "Ours," as the ENGLISH MECHANICS was soon affectionately termed by its ever growing circle of readers. But to return to the earlier issues. The first number had only a very short introductory article on page 2, chiefly to impress the reader that the journal would disclaim all political matters, its policy being the reverse of what seems unfortunately to prevail in this country to-day, where so many are for the party and few for the State.

The subjects dealt with covered a wide scope, and the great feature which really assured the success of the paper, and rendered it of outstanding value to all its readers, that of Letters to the Editor, soon assumed a leading place. By No. 10, the number of letters had grown to a marked extent, and these letters, under this title, also included Queries. It was therefore necessary to increase the size of the paper at a very early period of its existence, and No. 41 marked the last issue at the old price and size, No. 42 appearing on January 12, 1866, being increased to twopence and practically doubled in size, with a new pictorial heading to the title page more in keeping with the scope of the journal. The title was also shortened to THE ENGLISH MECHANIC AND MIRROR OF SCIENCE AND ART.

In this issue also a new feature was incorporated termed the Subscribers' Exchange Club. No charge was made for inserting announcements of readers who wished to exchange any article, but for sales the articles had to be advertised at a low rate, and this started another valuable feature of the ENGLISH MECHANICS which is still incorporated, the Sale Columns. For many years these columns were the only cheap means of buying and selling engineering and scientific apparatus, and many large businesses flourishing to-day were built up on the results obtained from advertising in these columns. By the time Vol. IV appeared, the readers had "taken charge," the Letters to the Editor had greatly expanded. Queries had a separate heading and column, as also had Replies to Queries. Vol. XI, the first number of which appeared on March 25, 1870, saw the ENGLISH MECHANICS enlarged, extended, and published in the form it retained until its change of title and arrangement of a few weeks ago. During this run, in this form, of over fifty years, the ENGLISH MECHANICS wielded an influence on the engineering and scientific world the extent of which to-day it is hard to realise. In these days, when journals dealing with every branch of engineering, science, &c., can be bought in numbers, it is difficult to grasp that not very many years ago the ENGLISH MECHANICS was the only journal available to readers wishing to exchange views and get information on a wide range of subjects. How much this was appreciated may be judged by the fact that the Letters to the Editor, Replies, and Queries frequently occupied over sixteen pages weekly, each number being a perfect mine of information on a variety of subjects too wide to detail. Men often give of their best in voluntary labour, and this is so with regard to the many hundreds of readers who have spent their time in helping others and exchanging views in the ENGLISH MECHANICS. Help and advice could be got gratis in the ENGLISH MECHANICS which a hundred guineas could not purchase ordinarily, and while the *nom-de-plume* of many of the late contributors must still be respected, the names of the late Lords Grimthorpe and Rayleigh can be taken as cases in point, while many of the leading scientists and engineers of to-day acknowledge their debt to the ENGLISH MECHANICS from an educational point of view.

To attract such giants to the repast, however, the fare provided had to be good, and it was good. The Editor of the ENGLISH MECHANICS had a wide view of the subjects to be dealt with, but a close view of the quality of any matter accepted, and the result is that many of the subjects published in the ENGLISH MECHANICS years ago are standard works of reference to-day, and each back volume is worth many pounds to anyone interested in scientific or engineering pursuits. These subjects are too numerous to particularise, but there is another range which can be dealt with in rather more detail, the part played by the ENGLISH MECHANICS in developing many of the great industries of to-day. Not to go too far back, the cycle industry can be first considered. The fine series of illustrated articles by "Derwent" were the first to appear on how to build cycles, and at a price which brought them within the reach of anyone. Then came the motor-car and the ENGLISH MECHANICS was *again* first in the field, and the first real working instructions on building a motor vehicle given in any journal were given by Mr. F. C. Blake, now one of the leading automobile engineers of to-day, as early as April, 1896, some months before the Act of Parliament allowing the vehicles to run on the roads came into force. Then followed the extended series of articles by the late T. Hyler White, which served as an education to many of the automobile engineers of to-day, and were the direct means of starting a good many firms in automobile construction. The development of wireless telegraphy and telephony is so recent that it is hardly necessary to deal with the part played by the ENGLISH MECHANICS in this subject, but the

volumes of a few years ago will convince ; the ENGLISH MECHANICS being the only journal in which the subject was discussed freely and experimenters could air their views and exchange experiences. In the "World of Science," the ENGLISH MECHANICS fully justified its title, and it has always been regarded as the leading journal for astronomical and microscopical matters, to take only two of the subjects from the many covered in the purely scientific side of the paper.

A feature of the ENGLISH MECHANICS which was discontinued some years ago was the Prize Competitions in which valuable prizes were offered for short series of illustrated papers on how to make various scientific and mechanical apparatus, which led to many valuable designs appearing in the ENGLISH MECHANICS, these designs frequently being the means of starting a new branch of industry, as witness the articles on building a 1 h.p. oil engine, the first of their type, and which led to dozens of firms either manufacturing small oil engines or offering sets of castings for doing so. It would not be right to neglect the subject of advertisements in any history of the ENGLISH MECHANICS. An examination of the advertisement pages in the pre-war issues shows that the leading firms in all engineering and scientific trades advertised regularly in the paper, and found it a very valuable medium, but from the average reader's point of view the most interesting part of the advertisement pages were those known as the Sale, Wanted, and Exchange columns. Here readers disposed of their surplus plant, instruments, &c, and firms offered various material and services. A perusal of the multifarious and widely differing announcements was most interesting, and the results obtained from even a single insertion in these columns was, generally, surprisingly good, as can be proved to-day by making use of this feature, still incorporated in ENGLISH MECHANICS. It was often said that if one half of the subscribers of the ENGLISH MECHANICS were not abroad, then quite one half of the copies published must be sent to friends abroad by readers in this country, so great were the number of inquiries from all parts of the world received by advertisers. During its long existence the offices of the ENGLISH MECHANICS have had several changes of address. The address when the writer first came in touch with the ENGLISH MECHANICS was 31 Tavistock Street, Covent Garden, W.C. Soon afterwards the offices were removed to 382 Strand, W.C., where they remained many years before removing to Clement's House, 6 Clement's Inn Passage, Strand W.C. After a comparatively short sojourn at this address the offices were removed to Effingham House. During the greater part of its existence the ENGLISH MECHANICS was printed by Messrs. Bradley & Co., of Fetter Lane, and when the difficulties of producing a paper like the ENGLISH MECHANICS with its varied matter, astronomical, mathematical, and other symbols, are considered, it is wonderful how few mistakes ever occurred and reflects great credit on the printers, who must have possessed some remarkable founts of type. The printing of the paper was taken over from Messrs. Bradley by the St. Clement's Press, Ltd. Up to early in the late war, the ENGLISH MECHANICS retained its full size and activity, but like all other publications it was seriously affected in the later stages of the war by the shortage and high price of paper, and the many other restrictions, &c, prevailing at that time. This will be gathered from the fact that the volumes for 1916 had under 300 pages as compared with the 600 odd of the usual volumes. Recovery from the war was necessarily slower in the case of a paper like the ENGLISH MECHANICS than in one of the usual type. The readers who formed most of the contributors of the paper also had been in most cases entirely disorganised by the war, some had been killed or died, and this resulted in the loss of a large number of readers who would, in the ordinary course of events, have contributed to the paper. All scientific and technical institutions have suffered in the same way, and are only just beginning to recover from what was, practically, a four years' hiatus. ENGLISH MECHANICS with its new features and its old and new band of helpers will rapidly wipe out all traces of the havoc caused by the war and recover its old place and influence.

Notes on the "English Mechanic and Mirror of Science and Art."

[In the following account an old and esteemed contributor deals with some of the more interesting phases in the history of this Journal.]

It is a great pleasure to look back on my first introduction to this paper, just fifty-seven years ago, when I came over from Ireland to commence a public school education in England. I had never heard of it in Ireland, but my uncle—a good amateur painter and exhibitor, cricketer, racquet and billiard-player—had a penchant for the stars also, so took it in along with the *Times* and the *Field*—both very good company. Soon I was shown the notes on astronomy, contributed by able pens, such as those of "A Fellow of the Royal Astronomical Society" and others. He was the late Captain Noble, J.P., of Uckfield, Sussex, a glutton for the heavens and all that was displayed in them, but my wandering eyes preferred the articles and illustrations of the lathe and general mechanics (inherited from my father, a turner before me), from which I gained much during the years that it was posted to me from time to time.

But the first number of THE ENGLISH MECHANIC appeared in March, 1865, two years before it came before me, when the Editor headed his pithy introduction "To the Reader," and explained the vanishing of the oft-repeated reproach, that though we lived even then in an age of change and cheap literature, no one could purchase a journal devoted to the nature and advancement of science and art at a price sufficient to recommend it to the sympathy and support of the public and "to the brain and pocket of the bone and sinew of the land, our great 'workers.'" The stress laid on the barring of politics and on the fact that the paper would be devoted solely to the worker's interests, intensified by the personal pronoun "his" in italics, must have led to the grateful recognition of the fulfilment of the promise when the contributors and readers adopted and the Editor admitted that cryptic word "Ours." Personal interest was fostered by the reference to poor inventors, to whom the pages of "Ours" were thrown open, whereby the world might hear of and adopt such things as would prove useful and financially sound. The appeal for support was worded in the manner most likely to reach the brains of the public; it has proved successful, for contributions from all parts of the world have appeared in its pages, coupled with the best engravings of the day, so that those who perchance dropped on an odd copy in the furthest parts of the Earth have seen their own letters and articles published, while the proprietors and readers have derived supreme satisfaction from the fulfilment of the motto printed at the end of the introduction: "The Intellectual and [Social Welfare of All]" and "Success to THE ENGLISH MECHANIC." And so say all of us still!

The article in the first number, headed "A Born Mechanic," brings back to us the wonderful genius of Henry Maudsley, the inventor of many things, but, from the point of view of all users of the lathe, the greatest of all was the slide-rest. The "workshop" was brought before those who previously depended on any odd bit of machinery or a tool that they might catch sight of with the village pianoforte builder, shoeing-smith, plumber, or any other artisan, which must have led to many an improvement in the position of those who had a real aptitude and ability for work, that had been undeveloped, if not smothered, by the absence of any source of information. At one penny a copy, the Journal penetrated to the room of the poorest apprentice, if he had the proper spirit, while the public derived much assistance in the care of their

houses, inside and out, their furniture, and a thousand-and-one things that call for repair or replacement cheaply.

Besides Captain Noble, amongst the earliest contributors were Mr. C. T. Whitmell and Mr. W. Taylor, of Driffield, the latter the inventor of a sewing-machine, an adjustable toolpost, etc., and the winner of a gold medal up there, if my memory serves me right. He died recently at an advanced age. Mr. H. Hurst gave very comprehensive "Lists of Books on Turning" up to that date in Vol. II., while "The Lathe and Its Uses" was mostly, if not all, the work of the late Rev. James Lukin, who also reached more than ninety years of age after writing often over the initials "O. J. L.," for the "Original J. L." His works covered every subject of mechanics almost, including lathes, chucks, screws, tools, wooden gates and fences, translations from Bergeron, from M. Caillard's pamphlet on the finest spherical slide-rest ever devised, and entirely the work of his own hands in his spare time at Nantes, etc. Someone mentioned the Ross-Winans cigar-ship, that I saw off Ryde in 1873.

"Sigma" (Mr. Sprague) wrote from 1867 till his death on many scientific subjects, including the cure of rheumatism, a most comprehensive system. He had the courage of his opinions, and excelled in chemistry and electricity, after having been a master mariner for some years! "Seconds Practical Watchmaker" contributed most comprehensive and instructive articles on watches and their construction; but, unfortunately, he died early, like the lamented Mr. Hyler White, who wrote more about motor-cars than anyone else except our kind friend. Colonel D. J. Smith, who is hale and hearty still.

Mr. D. G. Haydon, of Guildford, first appears in Vol. VIII., when he began with the graver as a hand-turning tool over the pen-name of "D. H." (changed later to "D. H. G."), and expanded into his wonderfully successful contrivance for cutting screws of all pitches with a slide-rest, pulleys, and gut bands on any lathe. He was credited with the invention of Haydon's cutter-bar, that enabled his collaborator, if I may so style him (Major J. K. Peile, R.E.Vol.), to develop much useful information for "Ours." "J. K. P." was a giant at all mechanical work, but died a good many years ago, before I spent some time at Swiss Cottage, North London, close to his former residence in Adelaide Road. I often passed the house sorrowfully in 1906, for I would have valued meeting him. "D. H. G." had a paralytic stroke that deprived him of his memory completely, so that he had to learn the alphabet again and gradually work back to his cherished hobbies, but he wrote well after his recovery and died full of years and honours!

"The Harmonious Blacksmith" I cannot recall the proper name of, although an obituary notice appeared in these pages, but he knew much about the Patent Laws, organs, pianos, etc., etc., and wrote copiously from about Vol. IX.

I almost forgot to say that "J. K. P." worked hard in the early days of the Volunteers after taking his degree as a civil engineer, but he never followed that profession. He had in his house what he styled "a hospital for diseased lathes," in which those of friends were treated and restored to good health!

The chuck invented by the Major and described in Vol. X., p. 132—of which I am lucky enough to possess one—is a marvel of strength and accuracy for all metals of small diameter (up to 1½ in.), and it is quite the model-maker's best tool.

Dr. A. Wolseley Blacklock, of Ipswich, commenced to contribute about the same time, I gather from our pages, on "Speculum Casting and Grinding," and we have him with us still. Later, Dr. James Edmunds, of Grafton

Street, Piccadilly, took up the question of mandrel-noses and screw-cutting, carrying on a long correspondence, in which "J. K. P.," Mr. John Holtzapffel, and Mr. J. H. Evans took part. The latter was practically the Professor of Ornamental Turning and the Construction of Lathes and Apparatus, although he was tied to *geometrical* patterns rather, that did not do justice to his skill. He certainly knew and wrote more on his subjects than anyone I ever heard of, but he did not cover the enormous extent of ground in the mechanical arts that the family of Holtzapffel has. He died during the Great War or immediately after it, and has left a gap that will be hard to fill.

About a year ago I met the nephew of "G. C. C." (Major-General George Calvert Clarke, C.B.), a cavalry man, who had carried his ornamental lathe about with him during thirty years' service. He gave much good advice and sketches of lathe apparatus, but he complained of the irritation to his nose from the fine dust of the box-wood he turned a good deal in.

Much was contributed by Mr. Richard Inwards, who explored in South America in early days, and exhibited, personally, some of his maps and sketches thereof at a meeting in the Royal Institution of Great Britain, 21, Albemarle Street, W.1, last year, where I had the pleasure of meeting him. His hints and devices were always most labour-saving, accurate, and deserving the attention of everyone connected with the finest work in wood and metal.

Ornamental turning was supported also by the late Rev. C. C. Ellison, a giant in physique and constitution, who developed his lathe, with the aid of the Birch brothers, into an absolutely complete machine, on which he expended upwards of £2,500! His work is illustrated in the book "Ornamental Turning Design," published by the Rev. G. A. Grace, M.A., last year, and full of the best procurable photographs of specimens; Mr. Ellison's show to what extent he had advanced the art, but he was also a great sportsman. His lathe is working for some very fortunate possessor still, I hear.

Practical work in metals has been dealt with by Mr. Walter May, Mr. Owen Linley, Mr. Fred Homer, and others, while there is no subject connected with engineering and mechanics that our valued contributor, Colonel David J. Smith, has not enlightened us on.

It is impossible to enumerate the numerous contributions on astronomy, but the Rev. Wm. F. A. Ellison, Mr. H. P. Hollis, Dr. A. Wolseley Blacklock, Mr. A. A. C. Elliot Merlin, Mr. D. W. Horner, F.R.A.S., are all well known. I know the village of Fothard, whence Rev. Wm. Ellison used to write, and I think I saw him at a bazaar in Gorey some years ago! Mr. Fred. Horner has many articles on engineers' fittings, etc., while Mr. Clement Stretton, told us all about railways, curves, and *accidents*. "Glatton" still writes, and the late Sir Wm. Boord, of Ightham Moat, near Sevenoaks, occasionally contributed, but the best illustration was that of his Grecian vase, for which he gained the Turners' Company's silver medal. During the war I was at Sevenoaks a good deal, but "Oldbury," as he wrote under, had passed away two years earlier, I regret to say. In the same village of Ightham lived the celebrated grocer-antiquarian, of the name of Lawrence Richards, I think, who discovered thousands of the very earliest flint implements on the Downs between the village and Chatham.

"Eos" (Major-General Lowther) gave us all sorts of information, from how to make chutnee, canoes, hernia trusses, tools, carborundum grinders, *et hoc genus omne*, down to the descriptions of the various races he met in the jungles. I suppose he had as large a fund of knowledge as can fall to the lot of any man. I missed meeting him at Jubbulpore, C.P., India, by not going there till *twenty years after he had left!*

A few years ago passed away at over ninety years of age, Mr. John Hollingsworth (hope I have spelt the surname correctly), known to the readers of "Ours" for over half a century as "Jack of all Trades," a name he fully deserved. He seems to have been at sea in his early days, but latterly was in Sheerness Dockyard, I heard. During his leisure time he introduced us to many good tools and methods, engines and appliances, whilst his Letters to the

Editor and Replies to Queries would fill a volume as large as that one might compile from those of Captain Noble. Often he fell on hard times and ill health, but to the last he was a game Englishman and worked at *something*, even a little garden. His photograph was reproduced, but we all miss his cheery, inspiring words.

Messrs. C. T. Whitmell, D. W. Horner, Clough Taylor (New Zealand), Wm. Godden, Colonel H. Watson, Stanley Bailey, S. Bottone, G. Calver, Hyler White, "Carfax," "Tredagh," "M.D.," "Charge Hand," "Lesoir," "N. E. B.," "Derwent," "Spenn Valley," and many others, have found time to write to let us know all about *it*, whatever that pronoun may possibly denote, and the Editors—especially Mr. Kibblewhite—have given us the scientific news of the day and all the matter obtainable that would be of interest to some of us in every issue.

Taking the 117 volumes printed up to date it may truly be said that they form quite the best encyclopaedia for astronomers, mechanics, and all others who have hobbies of the scientific, artistic, and practical nature. I cannot recall a single subject that is not dealt with somewhere within these covers, so that I look forward to passing some happy hours still in perusing them again and again, if I am spared a few more years on this present much-disturbed planet.

To those still living whom I have not mentioned I apologise; I have not the time to hunt through the many volumes. To the proprietors of "Ours" I venture to offer the warmest thanks for all that they have provided during his life to

K. C. A. J.

Some Old Controversies in the "English Mechanics."

[An old and esteemed correspondent gives, in this article, a somewhat graphic account of the controversies which raged in the earlier numbers of this Journal.]

I. SOMETIMES, in an idle hour, of which few fall to my lot, turn over the pages of the old encyclopaedic volumes of the ENGLISH MECHANIC. Always when I do I derive much and varied knowledge, combined with interest and entertainment therefrom. Among my favourite books the old volumes of the ENGLISH MECHANICS take a foremost place. When tired of set reading I have in these a source of relief that never fails, relaxation that the "latest novel" could not afford. It may seem strange to some that these sets of old, and now somewhat musty and faded bound periodicals, should possess so permanent a charm. The explanation lies in their "infinite variety." The letters—chiefly controversial—afford the never failing source of interest that is enshrined in these precious volumes. The serial articles are mostly excellent; many of them are of higher value than some more pretentious but shallower volumes of later dates. The replies to correspondents are useful, too. But for sustained interest, the letters render the old volumes instinct with human interests, tintured with human passions.

SOME EARLY CONTRIBUTORS.

My series begins with the fourth volume, at which period I was an apprentice. Very, very few, alas, of the old guard who were writing then, and in the years immediately succeeding, remain with us now. There were giants in debate, writers of renown in the early volumes, whose names, *noms-de-plume*, or initials, became familiar as household words. "Richard A. Proctor," "Sigma," "The Harmonious Blacksmith," "Seconds Practical Watchmaker," "D. H. G.," "C. J. L.," "F. Carre," "F. A. M.," "J. K. P.," "Eos," "Major Battersby," "Saul Rymea," "Samuel Ray," "Jack of All Trades," "Henry Ussher," "James Edmunds," "Dr. Allison," "Alfred H. Allen," "F. Wetherfield," "F. W. Webb," "W. P. Denning," "G. Calver," "Mr. Bottone," "G. Bonney," "F. Dennett," "Clement E. Stretton," "Anglo-Dane," "Sunlight," "Orderic Vital," "Dr. Aveling," "W. F. A. Ellison," "Edwin Holmes," "James Evans," "Hyler White," are names among many others of lesser note that have become very familiar to old readers—inseparably associated in thought with the ENGLISH MECHANICS, but only a very, very small minority of these remain. At different periods some writers stand out prominently and live for a season in its pages, and then pass from ken, too many, alas, into the Silent Land. The entertaining part of the ENGLISH MECHANICS—the controversies which have raged therein—remind one much of the "apostolic blows and knocks" of the Hudibrastic saints. And what mighty blows some of them dealt! Until even the patient and long forbearing Editor deemed it necessary to part the combatants. And how strange and curious were some of the occasions which gave rise to such heated arguments, Poor John Hampden was a great sinner, perhaps the chief of sinners in this respect, and all over the silly proposition on which he wagered his cash, that the earth was flat. But others ran him pretty closely in strength of language, greatly it must be confessed to the intense amusement of the bystanders in the ring, who found so much lively reading in the ENGLISH MECHANICS.

THE SUBJECTS OF DISCUSSION.

The charm of this correspondence lies not alone in its vast variety of subjects, but also in the freedom of expression which has always been permitted. To be tedious, or to be too personal, have been the two unpardonable sins which would inevitably abridge or terminate a correspondence. And as concerns subjects themselves—well, almost any crank might air his views, and bring scathing criticism down on his or her devoted head without let or hindrance. John Hampden, Lady Blount, E. L. Garbett, to wit. Matters concerning religion, occult studies, orthodoxy, heterodoxy, and absolute agnosticism jostle discussions on tool edges. Gregorian telescopes, the ever recurring, and never determined controversy concerning refractors v. reflectors, microscope matters, problems of matter and mind, of the star spaces, the resolution of diatoms, the cure of rheumatism, and all the other ailments to which flesh is subject, the extirpation of slugs and cockroaches, vivisection, the Deluge, mathematics, and hundreds and hundreds more. I suppose this is the reason why old contributors long since dubbed the magazine "Ours," a name which has stuck, though some wag remarked that the Editor didn't see what right they had to the claim.

Vol. 4 is the beginning of my set. It bears an old-fashioned appearance, almost venerable in character. Then, and for many years to come, the illustrations—wood blocks, process methods being of much later date—were all heavily shaded to enable readers to distinguish circular and curved

portions from plane surfaces. The same practice was even adopted very frequently in the workshop drawings of that period, especially so in the general drawings. It is understood now that a drawing, if correctly made, is not rendered any the more clear by shading, cross sectional lines of course being always excepted, which is an entirely different matter. Circular shading only confuses the essential outlines, unless it is used very sparingly, and is well done. Besides, it occupies much time which is better spent in increasing the number of detailed illustrations, and dimensions.

LATHE ARTICLES.

A series was going through this volume, begun in a previous one, and continued in subsequent issues, on "The Lathe and its Uses," afterwards republished. It was a very comprehensive series, and was much appreciated by the readers of that early period.

"A Fellow of the Royal Astronomical Society" was contributing valuable letters even then (1866). So were Philip Vallance, William Tonkes, and Hermann Smith. The latter was also writing a series which brought him much kudos, "A Practical Treatise on the Harmonium," that was continued in subsequent volumes.

The 5th volume contained the names of two contributors who wrote largely in later ones, "Edwin Holmes," and "Seconds Practical Watchmaker." The first of the many books republished from the ENGLISH MECHANICS was announced in this volume, "The Lathe and its Uses."

In the 6th volume (1867), "Seconds Practical Watchmaker," "William Tonkes," "Hermann Smith," "A Fellow of the Royal Astronomical Society," "Henry Ussher," "D. H. G.," and the anonymous author of the series on "The Lathe and its Uses" (James Cukui, "O. J. L."), were the most active contributors. No important controversies appear here, but just solid, steady records of work done, and helpful observations offered by men who knew things. The same may be said of the 7th and 8th volumes.

The 9th volume is a landmark and a treasure. A landmark, because the ENGLISH MECHANICS was enlarged in the next one. Also after the 10th volume the original small quarto form of the first ten volumes, 11 in. by 9 in., was abandoned for its present size. Vol. 9 is a treasure, because it is a record in the development of the present-day cycles. It might be dubbed "the velocipede volume," for there were several dozens of these old transition machines illustrated and described here. Hardly ever a number came out without them, and much discussion and controversy arose in consequence. It is a veritable museum, and record of bizarre and outer forms and designs, a fair example of which is the balloon velocipede (page 380). Several road locomotives were shown, too. "The safety bicycle was even then early in evidence, but most of the machines shown were of the large wheel, un-gear type. And the artists seldom thought their drawings complete, unless the riders were included. And such funny folk, especially the girls in their pork pie hats, and cycling with a parasol. The "girls of the period" they, who roused the ire of, and were castigated by dear kind-hearted Mrs. Lynn Lynton. Yet those girls were demure by comparison with their more athletic daughters and grand-daughters now on the road, in munition works, and at the war hospitals. And the men, too, have an odd appearance to the present generation, heavy bearded, or with mutton chop whiskers, or moustachoed, and clean chinned, and with bowler hats, or sometimes stovepipe hats.

A CONTROVERSY VOLUME.

This 9th volume bristled with controversy. "Sigma" was then well on the war path, and there were besides "The Harmonious Blacksmith" and "William Tonkes," "Richard A. Proctor," "A Fellow of the Royal Astronomical Society," "Dr. Allison," "Henry Ussher," James Edmunds—a galaxy of strong men destined to make their mark in succeeding volumes.

VEGETARIANISM.

A vegetarian controversy was initiated by an article by Joseph Wallace (page 48), suggested by what he termed "Professor Huxley's erroneous doctrine," that the white blood corpuscles are the protoplasm or physical basis of life. But his tedious lucubration was really made an occasion for the advocacy of vegetarianism. He concludes in a passage that is not marked by an excess of modesty. "It strikes me forcibly that if microscopists or philosophers had turned their minds into my groove—viz., that of trying to account for the awful and deplorable, change, that has come over the real protoplasm or red blood of man, which has reduced his

span of life from nearly 1,000 years (as in the times of the patriarchs) to *twenty-eight years, our present average mortality*—and instituted a series of observations and experiments such as I have done, the physical basis of both life and death would have been known long ago," and so on.

That threw down the glove. "Sigma" retorted (page 113), "You gave your readers a treat," he says, "in Mr. Wallace's paper on Professor Huxley's doctrine at p. 48, at all events it furnished me with ample amusement." And "Sigma" asks, "Have you not all suffered from the feebleness and general prostration generated by a juicy beefsteak, followed by, say, a pint of porter, as contrasted with the generous exhilaration produced by a nice basin of warm cheery water gruel." (Mr. Wallace had sneered at "nourishing food—beef tea (it contains 1 per cent. of blood poison and the rest water).") Says "Sigma" again, "The terrible ferocity of some of these gentle vegetarians" is a psychological study. While reading Mr. Wallace's paper one can conceive him ordering to his own gridiron the wretch who prefers beefsteak to gruel. We know that the New Zealanders and South Sea Islanders are inveterate cannibals. They were none the less a very fine race of men, 'till we degraded them, and have nearly destroyed them by a civilisation which they are wholly unable to assimilate to. But their cannibalism has been constantly adduced as a proof of the awful inherent depravity of man. Nothing of the sort—they had no other meat to eat—in all those myriad islands there was not an animal bigger than a mouse. Man was made to eat meat and he was no more intended for a vegetable diet than the lion was meant to nibble grass by the lamb's side instead of eating the lamb itself. Cannibalism in the South Seas was due to Nature's craving for animal food, and has been cured more by Captain Cook turning pigs out upon the Islands than by all the preaching of the missionaries."

Another very bantering and ironical reply by "Savage" (page 159) is worth reading for the fun of it, in which he advocates the application of the proposal of "that plagiarist Dean Swift" to the children who are born without fathers. Again (page 248) "Savage" returns to the subject with the introduction of some side issues concerning patents, which subject was being hotly discussed then. "I am hardly civilised enough," he wrote, "to assert the transition from cannibalism to patents is a very natural one, although it might be to some extent justified by the melancholy fact that patents are hut too frequently obtained for things got only by the cannibalistic process of sucking other men's brains." "Sigma" says "he holds that no inventor has an absolute right to the exclusive use of his own inventions. Most certainly he has not. Nor, I may add, to anything else, except what he can get, and keep. Absolute rights are mere myths."

"SIGMA" AND "THE HARMONIOUS BLACKSMITH."

With "Sigma" hardly excepted, the most prolific correspondent in this volume was "The Harmonious Blacksmith." He was present in most issues, and in several he appeared with two long letters. In one issue, that of July 9th, he had three letters, totalling to nearly ten closely printed columns, for the type was smaller then than it is now. His speciality was musical instruments, but he wrote extensively on patents and other matters. The patent laws were a big controversial subject in this volume, in which several writers joined. "A Fellow of the Royal Astronomical Society" was again a constant contributor. Not with the lengthy articles which he contributed regularly in after years, but with numerous short letters of replies and criticisms.

("R. A. P.")

"Richard A. Proctor," who was to contribute so largely in after years, appears also in this volume in consequence of a controversy between himself and a Dr. Bedford concerning allegations of plagiarism. On page 352 "he says that "but for the letter in which that attack was first made—I might have remained in ignorance of the interest and value of your pages."

AN ENLARGEMENT.

The announcement of the permanent enlargement of the ENGLISH MECHANIC was made in the issue of September 10th, 1869, and was addressed "To our hundred thousand readers." It stated that "Though scarcely five years old it (the ENGLISH MECHANIC) has not only distanced every other scientific journal published in this country, but it actually circulates more than all our other scientific papers put together."

The 10th volume, as mentioned, commenced an enlarged series. In a prefatory note, the Editor stated that "The ENGLISH MECHANIC first consisted of twelve pages weekly for one penny. Then it was increased to twenty pages for two-pence. In the course of a short time it was increased to twenty-four pages weekly. In the course of time it grew to thirty-two pages. This week, and for several weeks to come, it will be forty pages weekly. And if our subscribers and correspondents increase as heretofore, and encourage us in our endeavours, we shall issue a DOUBLE SUPPLEMENT gratis every week."

There was not much that was very startling in controversy

in this volume. There were a very large number of letters of moderate length by correspondents, the names or initials of whom have long since become unfamiliar. But the major contributors of that period were there. "The Harmonious Blacksmith" was the most prolific writer, with "F. R. A. S.," "J. L.," "R. A. Proctor," "Sigma," "Dr. Ussher," following him closely. The new velocipedes occupied a fair amount of space. So did table-turning, spiritualism, mesmerism, and musical instruments of various kinds.

"Henry Ussher, B.A., M.B., surgeon" (as he signed his letters), who was writing a great deal in these pregnant years, was one of the strong and forceful and most readable writers, which included several others whom we have mentioned. He was not on the side of the faddists, but, ranged himself with the moderate men of common-sense. And he did not speak honeyed words, but called a spade a spade.

"SOUND ADVICE."

"D. H. G." was contributing short letters. He had already criticised a cutter bar by "J. K. P.," and now (page 306), illustrated his own design, a bar which has been modified and re-illustrated in subsequent volumes, and around which many columns of criticism and approbation have circled. "Sigma" was writing on electricity, and taking part in various controversies, mesmerism, and others.

VELOCIPEDES.

Funny were some of the discussions on velocipedes. The correspondents would sign "A velocipedian," "Velocipedestrian," "Velocipedestrianisticalistarian" (page 45) > reminds one of Carlyle's crackjaw, "Aldoborontophornoscia." "J. K. P." was contributing now. He never wrote very much, and only when he had some useful facts to communicate, and then with much condensation. A planing machine on page 100 would be hard to improve on now. On page 132 a graduated chuck for cutting nuts, and the teeth of circular saws (to be corrected by a note on page 208), and a two-jaw lathe chuck, and a drilling frame on page 209.

The 11th volume (1870) began the new and enlarged series that has been continued without alteration until the present date. It was a notable volume because it absorbed "The Mechanic," "Scientific Opinion," and the "British and Foreign Mechanic."

THE LATE RICHARD A. PROCTOR, F.R.A.S.

The most voluminous writer at this period was "R. A. Proctor," who contributed articles on the earth, followed by "Comets and Meteors." Mr. Sprague ("Sigma") was an old-established writer now on the journal. So, too, was "The Harmonious Blacksmith," who enriched its pages during many years with his contributions on the harmonium, the piano, and the violin. "J. K. P." was continuing those practical letters on mechanical subjects in which he had become so proficient. Frequent contributors were "A Fellow of the Royal Astronomical Society," "W. H. Denning" and "F. W. Webb," "Saul Rymea" and others.

R. A. Proctor was the subject of some poor, petty jealousy, due apparently to the singularly successful manner in which he was able to handle astronomical subjects. Rarely did a week pass in which he did not find it necessary to reply to ill-natured critics who must have winced under the weight of his mailed fist. A critic had remarked that the astronomer must be thin-skinned. Proctor replied, "I am neither quarrelsome nor thin-skinned, but no one shall make unjust and ill-mannered attacks upon me with impunity." And he kept his promise. Yet none were more courteous or painstaking than he when querists desired genuine scientific information.

Astronomy, electricity, and musical instruments occupied the readers of the ENGLISH MECHANIC very much about this period. And a great controversy, destined to last for many years, arose out of a series of letters commenced by John Beardsley in the issue of April 15th, 1870. This pseudo-scientist undertook the task of combating established theories of the earth's rotation and revolution. In this attitude he followed the lead of "Parallax" in earlier volumes. A terrible hubbub was raised. Proctor had no mercy for the paradoxists of science, to whom he would be decidedly rude, as he was to Mr. B., to some of whose quotations from "R. A. P." the latter was compelled to answer, "I said nothing of the sort." "I made no such remark." "Sigma," too, took up the cudgel, writing in his hard common-sense matter-of-fact way, "We know," etc. The Editor apologised to his readers for the insertion of Mr. B.'s lucubrations, but justified his permission in order that the plane theory might be triumphantly answered. When at last the Editorial judgment decided that this controversy should now cease, and Mr. B.'s contributions were forbidden to waste any more space, then came such a virulently abusive letter from Mr. B. which few would have cared to insert. But in it went, *verbatim*.

The phantom veloce wheel gave rise to much discussion at this time. In fact the early bicycles and tricycles were freely illustrated in this volume. An illustration was given on page 277. Sewing machines were being treated fully.

(To be continued.)

Some Old Controversies in the "English Mechanics."*

[An old and esteemed correspondent gives, in this article, a further account of the controversies which raged in the earlier numbers of this Journal.]

JACK OF ALL TRADES.

In the 12th volume "Jack of All Trades" comes into the field of contributors, one of the very few who still survive. "Seconds Practical Watchmaker" had written so early as Vol. VI., and again in Vol. VIII., and now in Vol. XII. "Eos" appears, too, and "Mr. Wray."

Lathe matters began now to occupy increasing space, due very much to the frequent letters, sketches, and replies of "J. K. P.," which appeared in nearly every issue. Of controversy there is nothing of importance to note in this volume.

In Vol. 13 (1871), "Jack of All Trades" replied to a query by "J. K. P." In that reply he said, "Twenty-six or seven years ago I did many a hard day's work with the tool." (A Whitworth chuck.) And he still writes in this year of Grace 1916! "Sigma" (J. T. Sprague) contributed a series to this volume on electricity. "J. K. P." and others sent a good deal of correspondence concerning the forms of screwing dies. In this and in the succeeding volume the Great Pyramid gave occasion for a good deal of philosophic discussion. "The coming of railway wheels" went on a long while until the Editor put his veto on it.

THE ANTIQUITY OF MAN.

A sharp discussion on the antiquity of man was commenced by Ben Sykes (page 360). It is difficult for the younger race to-day to realise the bitterness of the controversy which then raged in Press and pulpit round the promulgation of the theory of man's high antiquity. At that time, Kent's Cavern was yielding up its bones and flints to the explorers. Lyell had but just been converted to the views of Pengelly and Prestwick, and had embodied his changed views in the famous tenth edition of his "Principles." His "Antiquity of Man," a bombshell in the camp of the orthodox, had not yet been published. These things caused much pain to seekers after truth reared rigidly in the Mosaic cosmogony, who would gladly have reconciled Moses and the records of the caves and river drift.

SCREWING DIES PROBLEMS.

The eternal problem of how best to average the cutting and the grinding action of screwing dies still engaged the pens of "J. K. P.," "D. H. G.," and "The Harmonious Blacksmith," continuing in this and in the succeeding Vol. 14. In this volume again cropped up the problem of the rotundity of the earth, being stimulated by a letter of Alfred R. Wallace. The letters on the subject were so numerous that the Editor decided that Mr. Wallace and "Parallax" should voice the rest, but as Mr. Wallace would only consent to this on condition that "Parallax" kept to the point, this proposal fell through. It is difficult now to realise the depth of abuse which John Hampden and his few followers penned, much of which would have rendered them subject to an action for libel. The Editor averred that he had received "more abuse and more foul language from three or four advocates of the theory of the earth being a plane than from all the other thousands of correspondents who have written us since the ENGLISH MECHANICS was under our control." (Page 263.)

PSYCHIC RESEARCH.

Psychic force engaged Mr. Spiller in opposition to Mr. Crookes and Mr. Horne. After many letters had been printed, the Editor offered to place at the disposal of Mr. Crookes a room where half a dozen Spiritualists and half a dozen scientific men might test the truth or falsehood of psychic force. This candid offer does not appear to have suited the Spiritualist champion. Similar offers were made in later volumes but never accepted.

THE METRIC SYSTEM.

A modest query in Vol. 14 respecting the supposed advantages of the metric system called forth an angry invective against the system of the "wonderful Frenchmen in the days of the Goddess of Reason." Then the fat was in the fire, and Mr. Bottone, who was then contributing "Lessons on Chemistry" to its pages took up the attitude on behalf of the metric system. "The glorious metric system" produced a crop of letters running on into the 15th volume, letters which may be profitably studied now by those who want to read both sides of the subject, and the history thereof.

Before the echoes of this controversy had died away, the Deluge gave occasion to a prolonged and heated controversy, in which "E. L. G." (Garbett), the champion of the Scripture narrative, belaboured "Sigma," Proctor, and others so viciously that the Editor became "heartily sick of the subject" and "declined to insert another line on it, come from what quarter it may." (Page 380.)

(* Continued from, -page 322.)

The discussion of the question of the metric measures was continued and occupied a considerable space in the 15th volume. Two long letters by "E. L. G." appeared in the second issue, pages 36, 37. There was another long one on page 67, and one by "Sigma," page 69, who advocated the French metre. What he wrote in 1872 holds good to-day: "E. L. G." is really a very clever fellow, and one of wide, if rather superficial, information; but I must submit that his style of scientific argument is only fitted for a circle of ancient maidens enjoying their tea flavoured with brandy instead of milk. It is pure childishness to rave and foam in this fashion, and to suppose that mere contemptuous reviling will prove a system to be absurd which has gained the approval of the great majority of scientific men. and is steadily forcing its way into practical adoption in commerce, notwithstanding the serious objections to a change which must cause great temporary inconvenience."

THE DELUGE.

Simultaneously a warm controversy was going on concerning the Deluge. This was one of those subjects which crop up perennially. "E. L. G.," as usual, wrote several very long letters, the gist of which was that the Deluge, was caused by a comet! Then "Sigma" wanted to know where the water had gone to. Says he (page 252), "Whether there was a deluge 5,000 years ago or no, there is a deluge of words now. Four columns of 'E. L. G.'" Another asks (page 256), "What proof is there that comets are composed of water at all?" "E. L. G." was a good second John Hampden in regard to his illogical unproved assertions. Says "Sigma," (page 303), "I have just measured the space he has taken up—just 11.5 columns—and having given us one evidence (as he considers it, but no one else), viz., the rounded form of hills and 'sweep vales,' he again tells us that 'there is abundant evidence of a steam comet fall 50 centuries ago, but not one of gas, for at least many thousands.' Now, if there is any evidence either of the occurrence or the period, let us have it, in as few words, and as plain a statement as 'E. L. G.'s' peculiarities will permit, but let us have nothing else." Reiterated abuse, assertion but not argument, on the part of "E. L. G." provoked the Editor to close this almost fruitless controversy (page 353). One more letter, however, was published, a reply by "Sigma" (page 380), in which an unfair attack was made on Bradlaugh, but that was the last. The Editor said, "After 'E. L. G.'s' attack on 'Sigma' we feel bound to insert the above letter. We are, however, so heartily sick of the subject, and the manner in which it has been discussed, that we will not insert another line on it, come from what quarter it may." But in the next issue "E. L. G." bobbed up again, page 405, but this time in a discussion on the giant planet Jupiter, and again (page 407), in a solid two columns, on the origin of the negro, appealing, as was his wont, to Scripture. And once more (page 411), in a tile at R. A. Proctor concerning the ancient constellations, finishing with a small paragraph on co-operative stores (page 413).

Richard A. Proctor and "The Harmonious Blacksmith" were lavish in their contributions to this volume. Each would frequently have two or three letters in a single issue, besides writing set articles. Bottone was still writing on chemistry. "A Fellow of the Royal Astronomical Society" wrote many letters, and two valuable articles on the Equatorial (pages 551, 629).

WILLIAM TONKES.

In the first issue of Vol. 16 the death of William Tonkes, one of the first correspondents in the ENGLISH MECHANICS, was announced. He had been in the employ of the South Western Railway Co. and was a clever self-taught mathematician and electrician. "Seconds Practical Watchmaker" was continuing his series on "The Watch and How to Repair It," from the previous volume. Richard A. Proctor was still a busy correspondent. Saul Rymea wrote largely on coals and coal prices, and on the potato disease. It was a solid volume, if not so lively as some.

A COLUMN OF PARADOXES.

There was a rather remarkable column started (page 294) under the editorship of Richard A. Proctor entitled "A Column of Paradoxes." The object was to show how insidiously error creeps into science, and how it is to be avoided in general science teaching. The Editor invited help from contributors who possessed sound special knowledge of subjects which may be treated of by paradoxes. Some very ingenious presentations were made by Mr. Proctor of the views held by certain writers whose books he reviewed in this column. Very clever, but somehow the section aroused little interest. John Hampden, however, could not be kept out. He sent two letters from "Enthusiastic Paradoxist":

"Sir,—I have seen ten thousand of the most outrageous lies of yours in the columns of the ENGLISH MECHANIC. Will you try, and for once in your life, write a few words of truth in answer to this paper?—Yours obediently (!), JOHN HAMPDEN."

"Our Mathematical Column" and "Our Microscopical Column" were features also of this and later volumes.

E. L. G.

"E. L. G." became a veritable thorn in the side to all and sundry in matters sacred and profane, astronomical and economical. Proctor and "Sigma" and many others tilted at him in return. He spared none, but often sent two and three lengthy letters in a single week of from one to two columns' length each. Clearly he was not of opinion that "silence is golden." At last, in the 16th volume (October, 1872), "E. L. G." retired in a huff, saying, "The gibbers may gibe on now unanswered. They may have their own way in the ENGLISH MECHANIC, and London and Manchester be burnt ere I again touch therein these subjects." (Page 144.) But though he retired to sulk in his tent, the ENGLISH MECHANIC saw him again ere long in fighting form.

THE DELUGE AGAIN.

Volume 17 contains much controversial matter. A discussion on the Deluge was continued from the previous one. The fact that the Bible account could be defended as being the record of a literal fact is an indication of how far we have travelled since that period (1873). "Sigma" (page 37) contributed to the controversy, but his strong common-sense deprecated it because, he said, "It is impossible to discuss it apart from theological digressions, because the sole ground of the opinion that a deluge ever occurred, largely fatal to the human race, to say nothing of the other inhabitants of the earth, is a purely theological one; in fact, the occurrence or not of the universal Deluge, and its character, inevitably become test questions as to the authority of Scripture, and the nature of inspiration." And he asks "how quadrupeds, birds, reptiles, and insects were stored; the conditions under which they were lighted, and ventilated in a vessel having one window, and that shut up; and how eight people managed to avoid poisoning themselves with their own dirt in the prolonged seclusion."

In a later four column letter, H. C. Key (page 123), favoured readers with a sectional drawing of the Ark as designed by that persistent controversialist on the side of orthodoxy, "E. L. G." It was like a house, with floors and galleries, and louvre windows under the ridge roof! The discussion dragged a weary length along, several correspondents writing two and three-column letters on the subject, and the Editor closed it on page 278.

OCCULT SUBJECTS.

During this period "Eos" was contributing his unique Indian experiences on occult subjects: He had witnessed many severe surgical operations performed on Hindoos by a Dr. Esdaile, a mesmerist, and expressed his full belief in the phenomena. But he states (page 63), "His (Dr. Esdaile's) health was completely undermined (as in the case of every assiduous devotee to mesmerism of my acquaintance, and which warned me to shun the practice), and he was forced to quit India. Since his time I have witnessed such strange things as would not be credited by the non-initiated. His next letter, on the same page, "Some Curious Facts," is packed with questionings based on his own remarkable observations of animal life and animal antipathies. In another letter (page 93), he endorsed the often disputed fact that peas and wheat have been grown from seeds taken from mummy cases. He had seen them, and knew they had been taken therefrom.

TELESCOPES.

Philip Vallance was very much to the fore at this period, explaining and illustrating the mechanical contrivances which he was perpetually scheming for the operation of his numerous telescopes. Richard A. Proctor was still a voluminous letter writer. "The Harmonious Blacksmith" continued to write much, too, on pianos and other musical instruments. Saul Rymea on natural history studies, and gardening, and potato culture. S. Bottone was writing in this volume. "Seconds Practical Watchmaker" was carrying through the series on "The watch and how to repair it."

BELTS AND INDIGESTION.

An odd, and one would have thought an unmasculine sort of controversy arose here out of a letter by "Experience" (page 225), who had cured his indigestion by wearing a belt round the waist. It was a belt of thin steel, leather-lined, and was laced up tightly. Another correspondent (page 248), stated that his experience was identical, only that he wore stays like those which ladies wear, and he knew several cases of "gentlemen of sedentary employment who had derived benefit from the use of stays." Of course the idea was ridiculed. It was suggested (page 355) that "the best cure would be to eat less, and take exercise, and not pinch up our wondrous mechanism in less space than nature intend it to occupy." The controversy ran through the volume, and spread over into the "Medical Column" which, was then running and conducted by W. H. Stone, M.B.

(To be continued.)