"Register", February 7th 1908.

laboratory is a fairy tale of science. The most momentous of his discoveries were those relating to electricity and magnetism. In 1831 Faraday found that a wire conveying an electric current produced momentarily a current in an opposite direction in an adjacent unelectrified wire. When the current in the first wire stopped a momentary current in its original direction was induced in the other wire. This and many confirmatory experiments he followed up by others, which showed that not only could magnetism be produced by electricity, but also electricity by magnetism. From the first experiments he got the theory of "induced currents," and from the second "magneto-electricity." From these results Clerk Maxwell, pursuing similar ideas, has built up the modern theory of electricity, while their practical applications by many inventors have given us the dynamo and electric power. Tyndall considered these discoveries, dating from 1831 onwards, as "unparalleled in the history of pure experimental science." They were all achieved in the laboratory of the Royal Institution. But these triumphs were long ago, what of recent times? The record has never been long interrupted. We might mention many advances made by Tyndall, Odling, Gladstone, Frankland, and others, but two instances must suffice—Lord Rayleigh's discovery of argon and Sir James Dewar's researches into low temperatures.

—Discovery of Argon.—

In 1895 Lord Rayleigh surprised the scientific world by the announcement that he had found a new gas in the atmosphere, which he called argon—"the inert." The thing was astounding, because so much was known of the air, of all things, that a new constituent seemed impossible. The discovery was confirmed, however. It resulted from exceedingly minute estimations of the weight of nitrogen gas. This gas forms about four-fifths of the air we breathe, and Lord Rayleigh found that when he obtained the nitrogen from the atmosphere it was about one-half per cent—one part in 200—heavier than when he obtained it chemically from other substances. By a series of refined researches Lord Rayleigh, with the assistance of Professor Sir W. Ramsay, proved that the difference in weight was caused by argon—a new element. Since then, following out the same kind of enquiry, Sir W. Ramsay has revealed the presence in the air of helium, neon krypton, and xenon—all new elements—in exceedingly minute quantities. Lord Rayleigh was, at the time, Professor of Natural Philosophy at the Royal Institution.

—Frozen Air and Solid Hydrogen.—

Professor Sir James Dewar's classic experiments, by which he reached hitherto hardly dreamt of degrees of cold, and thereby produced liquid air, solid air, liquid hydrogen, and solid hydrogen—the last result in 1899—have attracted universal attention. They have carried refrigeration down to the lowest point ever reached. To take away all the heat in any form of matter—solid, liquid, or gaseous—we must produce absolute zero, which would mean 273 deg. Centigrade, or 460 deg. Fahrenheit of frost. Sir James Dewar came within about 11 deg. of this absolute zero, opened a fresh chapter in physics, and provided new means of research. These are some of the conquests of Nature made at the laboratory of the Royal Institution. Parliament has made no grant to it. It is supported by the subscriptions and donations of its members. The Court of the Goldsmiths' Company contributed £2,000 towards Professor Dewar's work, and thereby made British science their debtor for all time. Dr. Ludwig Mond, F.R.S., has also munificently equipped the Davy-Faraday Research Laboratory at the Royal Institution, which largely augments its resources. At the present moment the professors are as follow:—Honorary Professor of Natural Philosophy, Lord Rayleigh, F.R.S.; Professor of Natural Philosophy, Dr. Joseph John Thomson, F.R.S.; Fullerian Professor of Chemistry, Sir James Dewar, F.R.S.; Fullerian Professor of Physiology, William Stirling, M.D., D.Sc.; Hon. Secretary, Sir William Crookes, F.R.S.

THE EVERGREEN SCHOOLBOY.

EXAMINATION HOWLERS.

UNIVERSITY BOARD'S REPORTS.

A witty American recently defined history as "the evil that men do." That is probably truer than the other definition which occurs to one—the evil that schoolboys do. On the whole, perhaps, it were well that the history book should not be taken out of the school, but at the same time it is an undeniable fact—obviously from the University examiners' reports—that in too many schools its real value is not recognised. Of course, some schoolboys regard as its chief attribute its handy size for throwing clandestinely at Bill Jones, who sits at the other end of the form. To many the inside of it is an unsavoury conglomeration of kings and dates and idiotic questions about Domesday Book, Empson and Dudley, the Declaration of Indulgence, and the Pragmatic Sanction. He may enjoy the battles, and especially the naval fights, but they have the disagreeable habit of bringing treaties in their train. Wellington was a fine fellow, but he spoiled his reputation in the schoolboy's eyes by the Convention of Cintra. The whole of the story of King John's murders and skylarkings is ruined because of that detestable Magna Charta, with its list of clauses. So the schoolboy generally hates history, and hates it the more because the demon inside him makes him write such amusing answers to examination questions. Every year the University examiners' reports make good reading, particularly in the history section. One grows to look for what the latest generation thinks of Pitt's reforms, what new atrocities or graces it attributes to Titus Oates (Titus lived for examiners, did he not?), and what new reason it will assign for Napoleon's invasion of Egypt. How the pupils loathe the Tudor period and dynasty! The worrying stories of Henry the Eighth's favourites takes away all appetite for the enjoyment of the exploits of Drake and the Invisible Armada. And why did William Rufus want to go and sign the Declaration of Right?

—Last Year's History "Howlers."—

The University examiners this year do not seem to find so much fault, on the whole, as they have found in previous years. In the remarks on the primary history it is noted that "the most serious deficiency in the papers was the absence of historical perspective. . . . The question concerning the rise of the labourers in the fourteenth century was frequently dealt with as if the religious revival of the eighteenth century were part of the movement. "The names of Wycliffe, Whitfield, and Wesley were mingled in the same sentence, and Wilberforce was credited by many with relieving the oppressed villeins." Marlborough was given credit for some of the victories in the Peninsular war. Question 4 was—"What do you know about (a) Sir Walter Raleigh; (b) John Milton (c) Robert Walpole; (d) Capt. Cook?" Here were chances, indeed. "Capt. Cook was very generous and kind, and was liked by all who knew him." "Milton is sometimes referred to as one of the lake poets because he visited Coleridge, in the lake district, so often." "An unconscious humorist affirmed that 'Walter Raleigh croqueted with Queen Elizabeth;' and a careless candidate said—'Sir Walter Raleigh fought 53 Spanish ships in the Revenge, and when he was taken prisoner said—"Here die I Sir Richard Grenville."'" All that one could say of Walpole was—"Walpole was not afraid to face the fiery eyes of death;" and another—"Walpole lifted England from a small island up into a large one." "A little reflection on such answers," comments the examiner, "will serve to show that the written work of the candidates needs more supervision. If they wrote less and thought more carefully there would not be so many blue pencil marks to lower the percentage in the final estimate of the papers." Concerning the junior questions candidates' knowledge was again uncertain. One boy wrote that "during Cromwell's reign the British Navy was established on firm ground." Another stated of the Lord Protector that "in 1651 he gained the battle of Worcester, in which the Royalists received their deathblow for a time." One candidate, after writing a single line on the Seven Years' War, concluded—"I know all about this Seven Years' War, but it has slipped my memory for the minute." Of even a senior examination candidate the professor comments:—"If a candidate is unable to write anything about the causes which led to the Civil War it will not avail him to describe the chief battles of that war, or the events after the death of Charles I., or to give an account of the early years of James the First's reign instead; yet this was frequently done." Again, of Wolsey—"Whatever details were left out the candidate rarely spared the examiner the anecdote of Wolsey's dying remarks." One writing on improvements in the streets of London in Charles the Second's reign wound up with "Young gentlemen of rank when drunk could knock down men and women in the streets." Few seemed to have any but the haziest notion of constitutional government. "The Parliament of Charles II. was a body of five advisers." "He summoned a Tory Parliament." By the importation of just one letter one candidate reduced fact to ludicrous absurdity. The textbook said that Henry VIII. was fond of making scapegoats of his Ministers. The candidate trying to reproduce the sentence remarked that the King delighted to make his Ministers scrape goats.

One can scarcely believe that of some higher public candidates it was necessary to state:—"Question 5 asked for a sketch map showing the countries that touched India, and for our relations to them. . . . Some candidates showed Russia lying all along the northern slope of the Himalayas, and one candidate even placed Roumelia on the western frontier. It was comforting to find this candidate giving the assurance that 'at present we are safe from Roumelia.' The second part of the question was as unsatisfactorily answered. Instead of writing two or three lines on our relation to each country, many candidates gave a long account of the first Afghan war, did not in any way connect that with our present relation with Afghanistan, and then considered the question finished. Others, again, wrote vaguely about the Black Hole of Calcutta. There was still a want of proportion in many of the answers. A few lines of introduction often increase the value of an answer, but when giving Irish events in the reign of William and Mary it is quite unnecessary to devote three pages to an account of the settlement of the crown on William and Mary and the pacification of Scotland."

—Geography, English, Spelling.—

Geography appears generally to be second only to history in pitfalls for the examination student. The report on the primary papers states that in one case the rivers of Australia were shown in correct sequence, but in inverse order. "Some stated that the reason New South Wales had a predominant population was because it 'began with a convict stock.' Others erroneously regarded the population of Victoria as in excess of that of New South Wales, at the same time ascribing this to 'the number of politicians frequenting the Federal capital.'" It is surprising to hear that "from year to year half the candidates spell Glasgow as Glascow." This year one declared that "Glascow was a town noted for its glass industry." In the junior commercial geography paper "no less than three candidates informed the examiner that quinine was used in the manufacture of carpets. Platinum was confused with aluminium, and uses were found for it which proved amusing in view of the fact that platinum costs nearly £6 per oz. Only two or three candidates mentioned that Japan as owner of Formosa has virtually a monopoly of the camphor industry." In English the examiners report that spelling and punctuation are weak almost throughout the papers. "In many instances," in the primary answers, "commas were put between a preposition and its case or a verb and its object." In criticising certain metaphors in "Julius Caesar" nearly half of the junior candidates condemned Shakspeare for bad grammar. A few excused him on the ground that grammar was not formed in his day. Some did not know what a metaphor was. Macaulay's name was printed on the paper set to senior students, yet it was spelt in no fewer than six different ways. How often students of literature catch not even a glimpse of the realms of gold is shown by an answer to one question in the higher public paper on the poetic value of adjectives in "The Seasons":—"His choice of adjectives in this passage merits great praise, and gives a high colour and poetic beauty to the lines." The spelling, too, was in many cases shocking: "wip," "faired," "acensitive," "genative," and "talents" (for talons) are cases in point. The examiners report that the handwriting was better, on the whole, than that of last year, but in many cases it was bad, and in two instances was almost unreadable.