An adequate historical survey of the modern science of tinctorial chemistry has yet to be written. In his address Prof. Meldola supplied one chapter of such history by relating his personal experiences during the fifteen years (1870–85) he was directly connected with the manufacture of synthetical dyestuffs. It is not possible to summarise this historical survey in the space now at disposal, but the hope may be expressed that Prof. Meldola will find opportunity to write the complete story of the art of dyeing. It would be equally as fascinating as his well-known contributions to Darwinism.

Having given his personal reminiscences of the most prolific period during the rapid modern development of the industry, Prof. Meldola reverted to remote antiquity, and summarised the ancient industrial history of dyeing as described by the elder Pliny in his "History of Nature," written about the beginning of the Christian era. Indigo has probably been used by the natives of India for at least 3000 years, and by processes essentially the same as those used to-day; in fact, until Perkin's discovery of the first coal-tar dye in 1856, the art of dyeing has made comparatively little progress since the ancient Briton stained his body with woad.

The most important dye in ancient times was the Tyrian purple, the use of which was at first confined by law to the Imperial House—hence the expression "born in the purple."

"The modern sequel to this ancient chapter of tinctorial art," said Prof. Meldola, "has been supplied by P. Friedländer, who has extracted the colouring matter from the Mediterranean *Murex brandaris*, and has proved it to be dibromindigo.[1] And thus ancient observation, which found practical application in the utilisation of a certain mollusc as a source of colour, has led to a remarkable biochemical discovery; but we have had to wait some 2000 years for the answer to the question, What was the purple dye of the ancients? Shall we have to wait another 2000 years for the answer to the question, How does the living shell-fish synthesise the generator of dibromindigo?"

Much has been written, and many diverse opinions have been expressed, as to the cause or causes of the loss of the coal-tar colour industry to England. This has been variously attributed to defects in our Patent Laws, to our heavy excise duty on alcohol, and to our unsuitable industrial conditions. In this matter Prof. Meldola sounded no uncertain note. "The answer to this last question has been staring us broadly in the face for over thirty years. It is amazing that there should have ever been any doubt about, or any other cause suggested than the true cause, which is *research*—writ large! The foreign manufacturers knew what it meant and realised its importance, and they tapped the universities and technical high schools, and they added research departments and research chemists to their factories, while our manufacturers were taking no steps at all, or were calmly hugging themselves into a state of false security, based on the belief that the old order under which they had been prosperous was imperishable. It is true that when the effects of the new discoveries began to make themselves felt, one or two factories did add a research chemist to the staff, but the number and the means of work were totally inadequate. I happened to be one of them, and so I speak with some practical knowledge of the conditions. We were but as a handful of light skirmishers against an army of trained legionaries. What could three or four—say half a dozen at a liberal estimate—research chemists, working under every disadvantage, do against scores, increasing to hundreds, of highly trained university chemists, equipped with all the facilities for research, encouraged and paid to devote their whole time to research, and backed up by technological skill of the highest order? The cause of the decline of our supremacy in this colour industry is no mystery—it is transparently and painfully obvious. In the early stages of its decadence it had little or nothing to do with faulty patent legislation or excise restrictions with respect to alcohol. The decay of the British industry set in from the time when the Continental factories allied themselves with pure science and the British manufacturers neglected such aid, or secured it to an absurdly inadequate extent in view of the strength of the competing forces."

It still remains to inquire the reason for this different attitude towards chemical research which was, and is still, though in lesser degree, adopted by our manufacturers. At the time we lost the industry the skill of the British workman and the enterprise of the British manufacturer were the admiration of the world, but the colour industry did not develop here because our industrial leaders did not lay the foundation of success by subsidising and cultivating chemical research. Why? The answer to this question is to be ultimately found in the utter lack of appreciation of the value and importance of scientific method which existed at that time amongst the public in this country. It would then have been impossible to convince any body of shareholders that it was a sound business proposition to expend yearly many thousands of pounds in research work the outcome of which was problematical. It would, indeed, not be an easy task even in these more enlightened days.

WALTER M. GARDNER.

[1] *Berl. Ber.*, 1909, vol. xlii., p. 765. For this research 12,000 molluscs were extracted, the total yield of pure colour being 0·4 grms. The dibromindigo is formed from its colourless generator, which is a vital product of the organism, by the action of light. The actual compound is shown to be the 6:6[1]-dibromindigo, but the nature of the intermediate generator has not yet been determined.

THE MEDICAL INSPECTION OF SCHOOL CHILDREN.[1]

LESS than three years ago there did not exist a medical department of the Board of Education. To-day there lies before us a Blue-book, of 170 pages, detailing, with much substance, the work undertaken or done to establish and regulate the vast system of medical inspection of schools and school children now operative over the length and breadth of England. In modern social history no movement has come so rapidly to maturity as the system of inspection here, for the first time, placed in a connected way before the general and official public. In a lucid preliminary section Dr. Newman briefly sketches the relation of our present developments to the efforts, both here and on the Continent, towards a systematic medical supervision of school children. "In the latter year (1865), the report of the School Commission in Norway did something to bring the importance of school hygiene once more before the general public, and in 1866 Hermann Cohn undertook his classic researches into the eyesight of over 10,000 children at Breslau" (p. 2). Cohn, now dead, was one of the venerable figures at the first International Congress of School Hygiene at Nuremberg. He was still full of energy and enthusiasm. Much occasional and disconnected local work followed, but "the Wiesbaden system marks the introduction of a new conception and understanding of the problem. This system, which has been widely adopted in Germany, treats the child as the centre of interest and his well-being as the end of reform, to which even the most satisfactory school environment is only a means. . . . Throughout the German Empire a large number of school doctors have been appointed, and so some 350 towns and communities have undertaken in a greater or less degree the work of medical supervision of school life" (p. 4)—a good result since the first appointments in Wiesbaden in 1896.

The English movement, though prepared for by many workers in personal and public hygiene, dates from the report of the Royal Commission on Physical Training (Scotland) in 1903. Dr. Newman does not make it perfectly clear why, at this particular juncture in British history, such a report should have been called for; but there is no doubt that the Commission arose out of the revelations of physical inefficiency made during the great South African war, particularly at the recruiting stations. There was then a rising wave of opinion on the need for better physical training in the early stages of life. Incidentally, and, as it were, casually, the supreme need for medical inspection was revealed, and, up to date, this

[1] Board of Education. Annual Report for 1908 of the Chief Medical Officer of the Board of Education. Pp. 170. Cd. 4986. (London: Eyre and Spottiswoode, 1910.) Price 8½*d*.

is the chief result of the Scotch Commission and the many further inquiries set going by it. Physical training has shared in the benefits of more scientific direction. The rest of the history is written in the statutes and administrative orders and circulars now current in Great Britain. A movement so wide and so costly could have emerged only from a great national awakening, and this report, the first of the new medical department, shows how far advanced the organisation already is. The report contains all the administrative detail necessary to enable the interested sociologist to grasp the significance of the movement.

Naturally, in a first report, questions of organisation and administration bulk relatively large. Dr. Newman makes very clear the relation of the new school medical officers to the public health service. This was a matter of great concern at the outset, but the solution of difficulties seems to have gone forward smoothly, and to-day any dissociation of services is the exception, not the rule. Subordination of the school medical officer to the medical officer of health, or some definite form of cooperation, seems to have been established practically in every educational area. "There is an interdependence and solidarity in these matters which can only be ignored or neglected at the price of inefficiency and failure" (p. 17).

Whole-time medical assistants are the rule, part-time assistants the exception. "There have been no cases of Authorities commencing with a few whole-time assistants and changing to many part-time assistants" (p. 19). This is a very significant fact. Of the 307 educational areas, 160 have been provided with one school medical officer each—the minimum necessary under the Code. In the other 147 areas, "there are in all 616 assistant medical officers"—122 whole-time, 494 part-time. The arrangements for twenty-one other areas have not yet been finally approved, but, approximately, 1084 medical officers are at work "in the school medical service in England and Wales" (p. 18). This is certainly a splendid record. The qualifications of officers, the part played by the teacher, the school nurse, the general scope of the work, all are discussed with quantitative references. It is estimated that, for England and Wales, not fewer than 1,328,000 children were medically inspected during 1907–8, and when to these are added 250,000 "specials," that is, children specially brought under the medical inspector's notice as needing attention, the total amounts to not less than 1½ million children. The general experience with parents is that they have appreciated the work warmly, and sometimes enthusiastically, there being a few, but only a few, complainers.

As to treatment, the facts are, of course, very meagre as yet, but not discouraging. So far as facts are available, the number medically attended to through the parents themselves runs from 20 to 60 per cent. of those brought to their notice by the education authorities. There is here abundant room for organisation and propaganda. The cost of medical inspection, so far as salaries go, runs from 4·79*d*. per child in average attendance in the counties to 7·64*d*. in the municipal boroughs and 7·56*d*. in the urban districts, or, in the same order, from 0·15*d*. of rate to 0·23*d*. and 0·28*d*.—no great outlay for so great a service.

The rest of the volume is taken up with details of the results of medical inspection in the discovery of defects or diseases. The results are necessarily "tentative and fragmentary" (p. 39), but more than enough to justify the institution of the system and to indicate the immense amount of administrative energy now directed to the amelioration of evil conditions, both environmental and personal. Cleanliness is steadily improving under the pressure of definite administrative direction. For instance, in 124 London schools Dr. Kerr found, of 92,185 children examined, 16,060 verminous, and 2228 were excluded for prosecution—the parents of 255 children being prosecuted, and fined in sums varying from 1*s*. 6*d*. to 20*s*. As a rule, the first "notice" is enough to secure cleansing. Ringworm is diminishing. Teeth are beginning to be treated, as, for instance, in Cambridge. Many other diseases now familiar to the general public are here recorded—adenoidal growths, ear discharges, short sight, &c. There is a good series of paragraphs dealing with tuberculosis, in particular with phthisis. The results in percentages for phthisis vary widely—from well below 1 to well above 4. Obviously there are differences both in the localities and in the methods of diagnosis. This is a disease that has not yet found its "level" in the professional mind. There are sections dealing with the new syllabus of hygiene, with schools for defective children, open-air schools, and many other matters of current importance.

The report, as a whole, reflects every credit on the system of medical inspection and on the Board of Education itself. Only the experienced administrator can read from these records the enormous difficulties to be overcome and the skill shown in overcoming them.

NOTES ON THE ORIGIN OF THE HAUSAS.[1]

NEXT to the Filani, the most important race in northern Nigeria is the Hausa, whose origin is undetermined. These people occupy at present most of the land between the ninth and fourteenth parallels north latitude, and the fourteenth and eleventh meridians east longitude. Their number is variously estimated; perhaps 4,000,000 is fairly accurate. They are the traders and soldiers of West Africa, and are very good agriculturists, and workers in brass and leather, but seem to have been unable to conquer under their own leaders.

The Hausas have not the fine features of the Filani, nor yet the very thick lips and flat noses of the coast negro; they are rather short and stumpy, with woolly hair. Their original country in northern Nigeria consisted of seven States, the "Hausa Bokkoi," to which an equal number, "Banza Bokkoi," were afterwards added. These States were independent of—though dependent on—one another. There are two principal theories as to their origin, viz. (1) that they were indigenous, and (2) that they came from Egypt or Ethiopia. I cannot see why these two apparently opposite ideas cannot be modified and reconciled.

It would seem that the following statements are permissible:—

(1) The religion is in too many points similar to that of the ancient Egyptians to imagine that it was formed quite independently.

(2) The Hausas have the trading and wandering instincts of the Semites, and have travelled voluntarily and without external pressure, whereas the people of most West African negro tribes have kept together, unless conquered and driven out of their country.

(3) The cephalic index is one which we would naturally expect in the descendants of a mixture of races, some having a greater, some a less, index. Because the Arabic element was in the minority, and because of the influence of environment, the Hausa cephalic index is nearer to that of the Egyptian Copts and mixed races than to that of the Arabs. The present Hausa race is a further mixture of the people who came, in A.D. 1000, with the aborigines.

(4) Arabic has had some influence in the formation of the Hausa grammar, as well as supplying about one-third of the words, and so some of the people who formed the Hausa vocabulary must have known Arabic. Again, since two-thirds of the words present no similarity to any Semitic language, it is evident that other elements are present, and some of these are related to Coptic. The word Habeshi was a term of contempt applied by Arabs to mixed races, and Hausa (Ba-haushe) is a modification.

(5) The people came from the East (ancient Ethiopia) and brought the horse. Arabs had horses at this time (1000 A.D.), and the mixture which arrived no doubt spoke a certain amount of Arabic. They may have been Hamites, but it is much more likely that they were a mixture of Hamites and Semites, together with elements of local populations encountered *en route*, and the original inhabitants of the country now forming the Hausa States. There is probably a little Berber blood also, and even a further addition of Arabic. Being ashamed of their humble origin, they invented one for themselves, and called their mythical ancestor Babushe, which is really Ba-(ha)beshi and Ba-hab(e)shi or Ba-haushe.

[1] From a paper by Capt. A. J. N. Tremearne in the Journal of the Royal Society of Arts, July 8