here that the entire series was produced as a war emergency measure at the urgent request of a prominent government official. The authors' expenses were paid, but these authors waived all royalty rights in the interest of the war effort. The Macmillan Company cooperated by publishing and distributing the books at phenomenally low prices. Teachers College added its contribution by donating the time of staff members, contributing library service and space, workshop and laboratory quarters, and by carrying the cost of conducting courses in Aviation Education. The books were written in ninety days and published in slightly less than sixty days—five months in all—in order to meet the government's deadline. Prices run from 15 cents to 99 cents for sizable cloth-bound volumes. This breaks all previous records for book production and also for hard work. It was necessary, however, in order to meet the war emergency. The emergency was met and the results have been greater even than anticipated. Education can well be proud of the whole accomplishment. To attempt to smear such an effort can serve no good purpose.

It is to be expected that errors will be found. It is proper and useful that scholars should point them out. Professor Renner, and the other authors of the Air-Age Education Series will correct in future editions mistakes of fact, emphasis or taste. Discussion is welcome; but this does not mean that worthy, industrious, patriotic and informed workers should be subjected to malice and abuse.

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SCIENTIFIC BOOKS

ELECTROPHORESIS OF PROTEINS

Electrophoresis of Proteins and the Chemistry of the Cell Surfaces. By HAROLD A. ABRAMSON, LAWRENCE S. MOYER and MANUEL H. GORIN. 328 pp. Reinhold Publishing Corporation. 1942. $6.

ALTHOUGH the discovery of the electrophoresis of protein-coated particles was made as early as the beginning of the nineteenth century, the application of this important method to the study of proteins was limited owing to its lack of resolving power. Recently, Arne Tiselius introduced great improvements in electrophoretic methods using the moving boundary technique. The most important contribution of his method lies in its ability to resolve a soluble mixture of proteins into separate components. In this way, one or more biologically active protein fractions can be identified, and in many cases, it is possible to isolate them as electrically homogeneous individuals. A well-known example is the identification and isolation of antibody as the gamma globulin fraction in the sera of immune animals. More recently, Longsworth has added other important improvements which further increase the resolving power. During the past few years, many biologically active proteins have been examined by electrophoretic analysis with the moving boundary method to determine electrochemical homogeneity and to obtain information which might facilitate chemical isolation. In fact, the method has become one of the powerful tools in many fields of research.

Therefore, there is a timely need for a book on the electrophoresis of proteins. Abramson, Moyer and Gorin have written such a book with the aim of fitting "the needs of investigators in diverse fields, such as biology, chemistry, medicine and physics."

The text may be divided into four parts, the first of which comprises a brief historical background together with an elementary but adequate presentation of the general principles of electrophoretic migration in liquids. It also includes two chapters (5 and 6) dealing with more theoretical discussion which, however, is inconsequential to biologists interested in using electrophoresis as a tool. These chapters are included apparently for physical chemists. In the second part, both the microscopic method and the moving boundary method are described in great detail. The third section of the book deals essentially with the results of electrophoretic studies on proteins and other colloidal substances. Although the list of proteins examined is rather complete, the authors make no distinction in the text as to which of the above-mentioned methods has been employed. The remaining part of the book (Chapter 14) deals briefly with the "Surface Chemistry of Cells."

It is obvious that in a small volume of three hundred and twenty-eight pages, all these topics can not be treated very critically and precisely. This will not be wholly to the liking of the investigators in specialized fields. A few examples may be mentioned. The phrase "follicle stimulation in the male" (p. 274), would be rejected by endocrinologists as meaningless. The lack of clarification of the terms, "iso-ionic point" and "iso-electric point," would meet the disapproval of physical chemists. The omission of important chemical aspects in the discussion of "Antigen, Antibody, and Their Reactions" (Chapter 8) would be questioned by immunologists. To these criticisms, one might add that there are numerous errors in composition and printing. For example, in the text of page 69 a description of the optical arrangement of Svensson is referred to "28a," which actually is an

electrophoretic pattern of normal human plasma. Svensson's arrangement is apparently missing in the book.

In spite of such errors and oversights, Abramson, Moyer and Gorin's book on the electrophoresis of proteins represents a compilation of data on the electrophoretic analysis of proteins useful to all investigators of proteins.

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CHEMISTRY OF DENTAL MATERIALS

Outline of the Chemistry of Dental Materials. By LAURENCE G. WESSON, research biochemist, Forsyth Dental Infirmary for Children, Boston, Massachusetts. 106 pp. 5×7.5. St. Louis: The C. V. Mosby Company. 1942. $1.50.

THIS book contains a concise review of some of the properties and uses of materials employed in dental practice. The chemical changes which many of these materials undergo and their effects on the oral tissues are clearly, although briefly, described. Such topics as the chemistry of vulcanization, and the formation of polymethyl methacrylate resin, which is used as a substitute for vulcanite in artificial dentures, will be of interest to the dentist. The sections on dentifrices, dental cements, the action of ammoniacal silver solution and photography should prove of value.

The dental section of the book is preceded by an elementary review of some of the principles of chemistry. Although brief, this material should be helpful to the dental practitioner. The descriptions of such topics as the nitrogen cycle and the potential acidity and alkalinity of food, although of general interest, could well have been omitted in a book of this type.

This outline should also prove useful as a supplementary text in courses for dental hygienists.

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SPECIAL ARTICLES

THE EFFECT OF TRYPTOPHANE DEFICIENCY ON REPRODUCTION[1]

PREVIOUS reports from this and other laboratories[2-7] have shown that tryptophane deficiency induces loss of weight, alopecia, cataract formation, corneal vascularization, defective dentition, testicular atrophy, hypoproteinemia and hypochromic anemia.[8] The present report describes observations we have made on the effect of a tryptophane deficient diet on the reproductive function in female rats.

Normal adult male and female rats from a hybrid albino and hooded Norwegian rat colony were maintained on stock diet and mated. As soon as vaginal smears showed the presence of sperm the females were segregated in individual cages and were fed a tryptophane deficient diet[7, 8] *ad libitum*. The data given in Table 1 show that all the rats on the deficient diet failed to cast a litter in contrast to a group of animals continued on the control diet all of which reproduced normally. The animals on the deficient diet were kept on it for 35 to 40 days. All of them lost weight and it was notable that symptoms of tryptophane deficiency developed earlier in these animals than in unmated rats on a tryptophane deficient diet. For example, alopecia, which in our experience is rarely evident before 60 days on the deficient diet, was very evident within 30 days in the present group of animals. Corneal vascularization was likewise well developed early in the deficiency period.

TABLE 1

THE EFFECT OF TRYPTOPHANE DEFICIENCY ON THE WEIGHT AND SIZE OF LITTER OF THE PREGNANT RAT

Group	Animal number	Initial body weight	Weight change for gestation period	Average daily food intake	Gestation period	Size of litter
		gms.	*gms.*	*gms.*	*days*	
Control	PCTH–3	201	+29	9.3	22	9
	PCTH–4	168	+43	7.6	23	6
	PCTH–5	209		7.7	22	7
	PCTH–6	221	+30	6.9	24	6
	PCTH–7	187	+41	9.2	22	8
	PCTH–8	208	+37	10.0	22	10
	PCTH–9	263	+27	10.0	22	10
	PCTH–10	232	+11	9.9	30	4
Deficient*	PTH–2	211	−40	9.1		0
	PTH–3	208	−13	8.0		0
	PTH–6	193	−63	8.0		0
	PTH–7	219	−24	7.6		0
	PTH–8	199	−29	8.9		0
	PTH–11	242	−43	6.9		0
	PTH–12	220	−40	7.0		0
	PTH–13	219	−22	9.7		0
	PTH–15	228	−35	9.6		0

* The weight change determined as of the 22nd day after insemination.

In order to determine the fate of the fetus in these deficient animals a second experiment was carried out similar to the above in which female litter-mates were

[1] This investigation was aided by grants from the Rockefeller Foundation, Merck and Company and E. R. Squibb and Sons.

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[7] A. A. Albanese and W. H. Buschke, SCIENCE, 95: 584, 1942.

[8] A. A. Albanese, L. E. Holt, Jr., C. N. Kajdi and J. E. Frankston. *Jour. Biol. Chem.*, in press.