sion des Farbstoffsoles". As evidence for this, the author gives the results of measurements of the binding capacity of albumin and fibrinogen for five dyes. However, a close critical examination of the method followed and of the results fails to substantiate the claim made by the author. In the first place, it is difficult to see how some of the dye in the Gibbs' adsorption layer could be prevented from adhering to the protein when the latter is transferred to the glass slide. The removal of the adhering solution by means of filter paper does not diminish the uncertainty introduced by the method of removing the protein film. On the contrary it introduces a further complication since the equilibrium between solution and protein may be disturbed by the presence of the cellulose of the paper. But even if we neglect these shortcomings in the method, the results themselves are inconclusive. The author seems to base his claim merely on the fact that Congo Red, known to be associated in solution, shows the highest binding power of the dyes tested when expressed as molecules of dye bound per molecule of protein whereas the highly dispersed Naphthol Yellow shows so little affinity that it was not measurable.

Since the structure of Naphthol Yellow is very different from that of Congo Red, the claim that the association of the molecules of Congo Red rather than its structure is responsible for its higher affinity is certainly not justifiable. As to the other dyes tested, the author fails to quote any data on their degree of dispersion and his argument is therefore not very forceful. Moreover he is not on very safe ground when he bases his conclusions on the number of molecules of dye bound by one molecule of protein. The binding of the dyes tested takes place in all probability through the sulphonic groups; that is the dyes are bound to the protein in the form of anions. Therefore the number of equivalents rather than the number of molecules of the dye bound by a given weight of the protein should be the criterion used in comparing affinities. If the data in the article under discussion is recalculated on that basis one obtains the following:

	Milliequivalents of dye bound by 1 g of protein	
	Albumin	Fibrinogen
Evans Blue	0·068	0·110
Trypan Red	0·173	0·255
Trypan Blue.	0·228	0·298
Congo Red	0·130	0·191

When expressed in this way, Congo Red does not give the highest result but it is second in order of increasing affinity. Of the dyes mentioned in the article, two have been studied by RAWSON[1] and it may be noted that she obtained results at variance with those of WUNDERLY. By other methods, RAWSON found that the affinity of Evans Blue for plasma albumin was appreciably higher than that of Trypan Blue. WUNDERLY also remarks that as the acidity of the solution is increased, the binding capacity of the protein for the dye increases. He advances this as another indication that the affinity is determined mainly by the degree of dispersion of the dye. However, it is well known that increasing the acidity of solutions containing anions capable of being bound by the protein will increase the amount of anions so bound. It is not surprising, therefore, that WUNDERLY noted an increased affinity as the pH of the solution was lowered.

P. LAROSE

Division of Chemistry, National Research Council, Ottawa, Canada, October 18, 1951.

[1] RUTH A. RAWSON, Amer. J. Physiol. *138*, 708 (1943).

Über die Farbstoffbindung durch monomolekulare Proteinschichten[1]

Erwiderung auf die vorstehenden Bemerkungen

VON P. LAROSE

Wir bedauern, wenn unsere Mitteilung den Eindruck erweckte, wir wollten mit den paar Messungen die komplexe Frage nach der Eiweiss-Farbstoffbindung abschliessend behandeln. Unsere Absicht war, einen Weg zu zeigen, wie man die Farbstoffbindung an gespreizte Proteinfilme messen kann. Vier der verwendeten sauren Azofarbstoffe gehen als Kolloidelektrolyte in Lösung und zeigen in derselben eine zunehmende Dispersion in der Reihenfolge Kongorot < Trypanblau < Trypanrot < Evans-Blue, wobei beträchtliche Teile der beiden zuletzt genannten Farbstoffe molekulardispers in Lösung gehen (vgl. WUNDERLY[2]); der Nitrofarbstoff Naphtholgelb geht molekulardispers in Lösung (vgl. BENNHOLD[3]). Unsere Versuche ergeben eine Abnahme der Bindung an das gespreizte Protein in der Reihenfolge Kongorot > Trypanblau > Trypanrot > Evans-Blue > Naphtholgelb, wobei die Bindung von Trypanblau zu Trypanrot besonders stark abnimmt (40%) und Naphtholgelb nicht messbar gebunden wird. Stellen wir dieser kolloidchemischen Betrachtung die strukturchemische gegenüber, so ergeben die von P. LAROSE auf Grund der Sulfogruppen errechneten Milliäquivalente, in der Reihenfolge abnehmender Bindung, das Folgende: Trypanblau (4 Sulfogruppen) > Trypanrot (5) > Kongorot (2) > Evans-Blue (4, isomer mit Trypanblau). Da diese Reihenfolge offensichtlich stark abweicht von der experimentell gefundenen (siehe oben), müssen wir daran festhalten, dass unsere Resultate durch kolloidchemische Überlegungen besser erklärt werden als durch strukturchemische. Unser ursprünglicher Text zeigte, dass wir keinesfalls die Wichtigkeit der Farbstoffstruktur verkennen, nur ist diese mit unseren Ergebnissen nicht in einen kausalen Zusammenhang zu bringen.

CH. WUNDERLY

Medizinische Universitätsklinik, Kantonsspital Zürich, den 8. Dezember 1951.

[1] CH. WUNDERLY, Exper. *7*, 296 (1951).
[2] CH. WUNDERLY, Z. ges. Exp. Med. *110*, 274 (1942).
[3] H. BENNHOLD, E. KYLIN und ST. RUSNYAK, *Die Eiweisskörper des Blutplasmas* (Th. Steinkopff, Dresden 1938), S. 233.

Model Experiments for the Production of Gastric Hydrochloric Acid

Under this title SZABÓ, ORSÓS, and CSÁNYI[1] have recently put forward a hypothesis for the production of gastric hydrochloric acid from a weak acid[1]. This depends on the properties shown by ion-exchange resins. The views that the double decomposition of sodium

[1] Z. G. SZABÓ, S. ORSÓS, and L. CSÁNYI, Exper. *7*, 297 (1951).