Magill[14] first isolated this virus during the same season and year in other parts of New York State. A widespread prevalence of influenza, however, was not recognized in this region at that time. According to the study of "excess pneumonia mortality"[4] which is the usual criterion for indicating the prevalence of influenza, the epidemic of 1940 was limited to the South Atlantic and some of the Central States. Clearly these mortality studies do not demonstrate the full extent to which influenza may occur. It is becoming increasingly apparent that influenza may be present in some communities without attracting particular attention.

The association of influenza B with this outbreak of pneumococcus pneumonia raises the possibility that many of such localized epidemics may be secondary manifestations of influenzal infections. This idea is supported by the fact that most of the reported outbreaks of pneumonia have occurred during the years when widespread epidemics of influenza have been known to be present. Other factors also must be considered, such as the prevalence of carriers of type specific pneumococci in the population, the pathogenicity of the particular strains, and the immunity status of the population to such strains. It seems quite possible, however, that the presence of influenzal infection may be one of the determining factors. Whether the influenzal infection may predispose directly to the development of pneumococcal infection in particular cases, or may enhance the transmission of the specific pneumococci among the population, or both, remains to be elucidated.

Epidemics of pneumonia in institutions have usually been as explosive in character as epidemics of influenza. Some rural outbreaks of pneumonia, however, and the Northville outbreak in particular, have been protracted. Cases have occurred over a period of several months or throughout the "respiratory season." It is difficult to reconcile this protracted course with the usual short duration of influenza epidemics. It is possible that (1) the apparent susceptibility to pneumonia which is produced by influenza infection lasts for several months, or (2) in rural areas influenza epidemics may continue for a longer period than has been generally appreciated, or (3) some of the cases of pneumonia may have resulted independently of influenzal infection.

Epidemics of pneumonia have occurred in the absence of known wide-spread influenza. One of these developed in Wyoming County, N. Y. during the winter of 1937–38.[15] Neither influenza A nor B was reported from any part of the country during this period. The sporadic occurrence of single cases and small outbreaks of influenza A and B, however, are now being discovered with increasing frequency.[6, 16, 17, 18, 19, 20] Localized outbreaks of pneumonia in the absence of recognized prevalence of influenza might result: (1) from the occurrence of such small outbreaks of influenza A or B, or (2) from the prevalence of other, as yet unidentified respiratory diseases, or (3) from other causes independent of a preceding or concurrent respiratory infection.

Aside from these hypothetical considerations, the findings in the Northville sera clearly indicate that an increased prevalence of pneumonia may be a useful clue to identifying and studying outbreaks of influenza.

SUMMARY

The presence of influenza B infection during an epidemic of type I pneumococcus pneumonia in Northville, N. Y., in 1940 has been reported. The possibility is discussed that some localized outbreaks of acute bacterial pneumonia are secondary manifestations of influenza epidemics.

COMMISSION ON ACUTE RESPIRATORY DISEASES[21]
FORT BRAGG, N. C.

AND

THE NEW YORK STATE DEPARTMENT OF HEALTH[22]
ALBANY, N. Y.

ON THE IN VITRO PROTEOLYSIS OF EGG WHITE[1]

RECENT investigations on the nutritional value of various proteins have renewed interest in the properties of egg proteins. Murlin[2] has reported high biologic value for egg white in humans and various unpublished experiments on dogs have come to our attention. Since some of this work has involved the use of dried egg white it has seemed worthwhile to

[13] T. Francis, Jr., SCIENCE, 92: 405–408, 1940.
[14] T. P. Magill, *Proc. Soc. Exp. Biol. and Med.*, 45: 162–164, 1940.
[15] New York State Health Department, unpublished studies.
[16] C. Nigg, C. M. Eklund, D. E. Wilson and J. H. Crowley, *Am. Jour. Hyg.*, 35: 265–284, 1942.
[17] F. M. Burnet, *Med. Jour. Australia*, 11: 393–398, 1943.
[18] R. Hare, J. Hamilton and W. R. Feasby, *Can. Jour. Pub. Health*, 34: 453, 1943.
[19] C. H. Stuart-Harris, R. E. Glover and K. C. Mills, *Lancet*, 790, December 25, 1943.
[20] Commission on Acute Respiratory Diseases, unpublished data.
[21] Members and associates of the Commission on Acute Respiratory Diseases are: John H. Dingle, Major, M.C., A.U.S., Director; Theodore J. Abernethy, Major, M.C., A.U.S.; George F. Badger, Major, M.C., A.U.S.; Joseph W. Beard, M.D.; Norman L. Cressy, Major, M.C., A.U.S.; A. E. Feller, M.D.; Irving Gordon, M.D.; Alexander D. Langmuir, Major, M.C., A.U.S.; Charles H. Rammelkamp, Jr., M.D.; Elias Strauss, Captain, M.C., A.U.S.
[22] Division of Communicable Diseases and Division of Laboratories and Research.
[1] These experiments were carried out with the assistance of Miss Jeanne D. Medler.
[2] J. R. Murlin, L. E. Edwards and E. E. Hawley, *Jour. Biol. Chem.*, 156: 785, 1944.

study the *in vitro* digestibility of this protein in comparison with raw (undried) egg white and coagulated egg white.

The existence of an anti-tryptic principle in raw, undried egg white has been conclusively demonstrated[3] and our first experiment was designed to show whether this principle existed in the commercially dried product. Thereafter, comparison of the course of peptic digestion of the dried and undried egg white with that of coagulated egg white was undertaken. Experiments by Frank[4] have shown that the course of peptic digestion is affected by the conditions of coagulation. In the experiments to be described attempts were made to hold this factor constant in successive trials.

All tests were carried out at 37° ± 1° C. using a commercial sample of dried egg white[5] and locally purchased fresh eggs as the source of undried and coagulated egg white. Enzymes were regular commercial samples of hog pancreatin and pepsin, each studied at its respective pH optimum. Criteria of digestion were, for pancreatic digestion, the increase in nitrogen not precipitable in 7.5 per cent. trichloroacetic acid and, for peptic digestion, the increase in nitrogen not coagulable by heat and acid.

Table 1 shows that commercially dried egg white

TABLE 1

PANCREATIC DIGESTION OF VARIOUS EGG WHITE PREPARATIONS

	Raw egg white		Coagulated egg white
	Undried	Dried	
Total N mg/cc	2.78	2.63	2.61
Ratio, substrate N : enzyme N	60	57	57
Time	% total N soluble in 10 per cent. trichloroacetic acid		
0 hr.	4.0	3.8	4.3
2 "	4.0	4.3	20.4
8 "	4.2	4.4	35.4
24 "	4.8	5.1	43.0

All solutions were adjusted to pH 7.3–7.4 and maintained within that range during the experiment.

contains about as much antitryptic principle as fresh (undried) egg white. The data of Table 2 show that, under the conditions studied so far, no real difference exists between the courses of peptic digestion of dried and undried raw egg white, but both are inferior in digestibility to coagulated egg white.

Further experiments are in progress to establish conditions within the physiologic range necessary to inactivate the anti-tryptic principle in raw egg white.

[3] H. A. Balls and G. L. Swenson, *ibid.*, 106: 409, 1934.
[4] P. Frank, *ibid.*, 9: 463, 1911.
[5] The dried egg white preparation was a Swift product used in dog-feeding experiments conducted by Dr. James B. Allison at Rutgers University. Grateful asknowledgment is made to Dr. Allison for this material.

TABLE 2

PEPTIC DIGESTION OF VARIOUS EGG WHITE PREPARATIONS

	Raw egg white		Coagulated egg white
	Undried	Dried	
Time	% increase in non-heat and acid coagulable N		
1 hr.	61	56	98
2 "	88	90	127
4 "	138	143	195

All mixtures were maintained at pH 1.8. Commercial hog pepsin (1 : 10,000) was used in the approximate ratio of 1 part pepsin N to 1,000 parts substrate N.

Haurowitz *et al.*[6] have very recently suggested the possibility that impaired gastric function (achylia) may prevent utilization of undenatured globular proteins by the animal organism. Their experiments, carried out with crystalline trypsin on native and denatured proteins freed of anti-tryptic principles, have interesting theoretical implications. It is desirable to supplement their studies with experiments, such as those recorded here where conditions more nearly simulate those encountered in physiologic digestion.

ROBERT A. HARTE

RESEARCH LABORATORIES,
THE ARLINGTON CHEMICAL COMPANY,
YONKERS 1, N. Y.

EFFECT OF CONCENTRATED UREA SOLUTION ON THE PRECIPITATING POWER OF ANTIOVALBUMIN: SIGNIFICANCE OF FORMATION OF PROTEIN COMPLEXES

IN order to study the effect of protein denaturing agents on antibodies, it is usually necessary to remove such agents before testing the resulting material for antibody activity. Interpretation of the results must take into consideration, therefore, not only the possible destruction of the intrinsic structure of the antibody molecule, but also secondary effects which occur upon removal of the denaturing agent. There is considerable evidence[1] that aggregation or complexing of protein molecules occurs during certain types of denaturation or upon removal of denaturing agents and that aggregates of various dimensions and solubilities are formed. Those aggregates or complexes which are insoluble except in relatively concentrated dispersing solutions such as strong acids, bases, thiocyanates, etc., are referred to as irreversibly denatured, while the relatively soluble materials are designated either as native (unaffected) or "renatured" protein. However, it is generally true that

[6] F. Haurowitz, M. Tunca, P. Schwerin and V. Goksu, *Jour. Biol. Chem.*, 157: 621, 1945.
[1] Discussed in review by Hans Neurath, J. P. Greenstein, F. W. Putnam and J. O. Erickson, *Chem. Rev.*, 34: 157, 1944.