Chapter V is devoted to "Cathaysian geosynclines and geanticlines"—the troughs trending northeast-southwest in eastern China. The author discusses a Palaeocathaysian geosyncline, which received the Sinian deposits of late pre-Cambrian time, and was renewed after disturbances until the close of the Permian. The author recognizes "the obscure history of the Mesocathaysian geosyncline," in which he includes late Permian and Triassic marine sediments in South China, "the northern counterpart" of which came "down from the Arctic, past the maritime province of Siberia, and probably joined the Triassic trough in northern Korea." The Neocathaysian geosyncline is taken to include the marginal mediterranean Sea of Japan, the Yellow Sea and the Tunghai. This last is not named on any map in the book; and is not so called in most atlases. It should mean the East China Sea; but the confusion is increased by the author's statement (page 259) that the eastern Tsinling Range "sinks under the Yellow Sea or Tunghai"—whereas elsewhere he distinguishes between these two confluent seas.

He describes an "inner Neocathaysian geosyncline . . . an extensive trough running obliquely across China from northern Manchuria to the central Yangtze province. . . . In the North China Plain the sediments in the geosyncline probably amount to many thousands of feet in thickness." He adds to this bold statement, "Apart from the superficial cover, nothing is known about them at present." The only evidence cited for their great thickness is that borings at Tientsin showed fresh-water deposits 500 feet below sea-level. This fact is offered as evidence of subsidence; but the author disregards the lower sea-levels of the Pleistocene and the fact that delta sediments sink by compaction as the delta grows. The depth of these fresh-water deposits is too moderate to prove geosynclinal sinking.

Chapter VI treats of "east-west tectonic zones" of folded structure. One of these is in the Tannu and Kentai mountains. "The middle part of this zone is obviously disturbed by the Khangai Mountains which more or less follow the 'Irkutsk Amphitheatre' in trend, and which are undoubtedly related to the latter. Because of this powerful disturbance thrusting in from the north, the east-west zone could not have maintained its rectilinear front" (pages 247–248). Apparently the author thinks the Tannu and Kentai ranges were continuous, and that the Khangai is overthrust upon them from the north. No trace of such a structure is known in the field, nor are the rocks of the Tannu and Kentai identical. The inference appears to rest on the author's interpretation of "trends."

Farther south, "the Inshan zone" is made to include the many small short ranges just north of the great bend of the Yellow River. The author extrapolates these folds far to the eastward to account for the node in Hokkaido, where the Tertiary ranges of the Kurile arc and the Sakhalin folds "join and give rise to a great display of vulcanicity" (page 250). This entire thesis is speculative, to say the least. The only physical evidences which the author cites are certain east-west folds in Manchurian coal-basins and a coincidence in the approximate latitude of the node in Hokkaido with that of the Inshan zone. Similar reasoning is done throughout the chapter.

Reference has been made to the still more speculative chapters VII and VIII, respectively on "Shear Forms" and "Tectonic Types and Their Related Earth Movement."

Chapter IX is a review of the evidence bearing on "Pleistocene Climate in China." The author reviews the scattered observations and concludes that in the Lower Yangtze Valley, three successive glaciations took place, separated by interglacial epochs.

Chapter X, on "Regional Stratigraphy," is referred to in the first part of this review as the best and most serviceable chapter in the book. It is a pleasure to close a review that necessarily includes some criticism with a word of well-earned praise.

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SPECIAL ARTICLES

SEROLOGICAL SPECIFICITY OF HEAVY PARTICLES DERIVED FROM NORMAL ORGANS

THE nature of certain particles separable from normal tissue extracts by relatively high centrifugal forces is under investigation in a number of laboratories.[1] In the course of studies of the virus of human influenza in this laboratory, it was found that particles of similar chemical composition could be separated from the lungs of normal, healthy mice and from the lungs of mice in the final stages of influenzal pneumonia. It has been suggested that such "high-speed sedimentable" cell components may correspond with histologically recognizable mitochondria,[2] and further,

[1] A. Claude, SCIENCE, 91: 77, 1940; K. G. Stern and F. Duran-Reynals, SCIENCE, 89: 609, 1939; C. R. Amies and J. G. Carr, *Jour. Path. and Bact.*, 49: 497, 1939; J. Furth and E. A. Kabat, SCIENCE, 91: 483, 1940; D. G. Sharp, A. R. Taylor, H. Finkelstein and J. W. Beard, *Proc. Soc. Exp. Biol. and Med.*, 42: 459, 1939.

[2] A. Claude, *op. cit.*

that they may be related with the pathogenic agent in certain virus diseases.

The question of the possible relation between these normal particles and the various infectious processes necessarily has led to an investigation of their serological specificity.

Healthy Swiss mice were dissected after death by ether, and the several organs were collected in jars submerged in an alcohol-dry ice bath. After storage at $-7°$ to $-10°$ C., the organs were ground with sand to form 10 to 20 per cent. suspensions in saline. After low-speed centrifugation the suspension was passed through a medium Mandler filter. This was followed by repeated alternate centrifugation at 25,000 RPM for 20 minutes and at 1,500 RPM for 5 minutes. The materials used for inoculation were washed three times, those for agglutination, only twice. Suspensions of particles from the following organs were prepared: liver, lung, kidney, spleen, pancreas, testicle, muscle and brain.

The material sedimentable from Mandler filtrates in each case formed a translucent, yellowish to reddish-brown pellet of gelatinous consistency, which could be resuspended only by very vigorous manipulation with a rubber-tipped plunger. Dark-field examination showed the particles to be of fairly uniform size about 0.1 μ to 0.3 μ in diameter, as might have been expected from consideration of the filter pore size and the centrifuge constants. The small bodies did not stain typically with the usual nuclear or acidophilic dyes, but were blackened by osmic acid and absorbed Janus Green B strongly, a fact which may support Claude's suggestion of a mitochondrial origin. Analyses of the sediments are not yet complete, but they appear to conform with the data of Claude,[3] *i.e.,* they contain nucleoprotein, a large proportion of ether extractable material and a high total ash.

When injected into mice intravenously, the suspended particles produced rapid death characterized by coagulation of the blood in the venous system and emptying of the left heart and arteries. In one instance (brain) the toxicity could be eliminated by suspension of the particles in antisera against any one of the organ particles, but usually not in normal serum. Preparations, other than from brain, have not yet been studied in this respect.

Antisera against each of the washed organ sediments were prepared by 7 intravenous injections into rabbits of 2 cc volumes at two- or three-day intervals. Nine days after the last injection, the animals were bled and the serum recovered. Normal serum from the same rabbits was kept in the frozen state for reference.

The following properties of the antisera have been found:

(1) Precipitins for mouse serum were usually entirely absent. In a few instances a slight precipitate was detected after preliminary incubation at 37° C. and overnight refrigeration and centrifugation, and only one of the antisera showed a slight ring formation with mouse serum diluted 1:100 on standing for 20 minutes.

(2) In half of the sera, there was an increase in mouse red cell agglutinins over that observed in the serum from the same animals before injection. In only three instances did the increase appear to be significant (10 to 20 times).

(3) Sheep cell hemolysins were present in all the antisera, with titers up to 1:5,000 with a 5 per cent. cell suspension. This observation is a confirmation and extension of that of Furth and Kabat[4] with respect to the presence of Forssman antigen in preparations from normal spleen of the chicken.

(4) A positive Kahn test was obtained with most of the antisera, but also with the normal sera.

Of the eight different types of antiserum, four (anti-brain, liver, kidney and testicle) showed reactions definitely specific for the homologous antigen. In slide agglutinations, the antigens were specifically agglutinated, *i.e.,* the reactions first became apparent (sometimes within one minute) in the homologous antiserum, although cross-reactions appeared later with some of the other antisera. The homologous reaction was usually stronger than the ultimate cross-reactions. Brain particle suspensions were agglutinated *only* by the homologous antiserum. Muscle, spleen, lung and pancreas particles have given indefinite or negative results thus far, although it is possible that the antisera in these cases were inadequate. Further investigation of this possibility is in progress. Table I summarizes the relationships encountered in our experiments.

TABLE I

HOMOLOGOUS AND HETEROLOGOUS AGGLUTINATION (SLIDE) OBTAINED WITH PARTICLES FROM VARIOUS MOUSE ORGANS

Particulate antigen	Rabbit serum *vs.* mouse organ particles from: Brain	Kidney	Liver	Lung	Muscle	Pancreas	Spleen	Testicle	Saline	Normal sera
Brain	2	0	0	0	0	0	0	0	0	0
Kidney	0	4	3	1	2	0	0	0	0	0
Liver	0	1	3	1	1	0	0	0	0	0
Lung	0	1	1	1	1	0	0	0	0	0
Muscle	0	1	3	0	3	0	0	0	0	0
Pancreas ...	1	1	1	1	1	1	1	1	1	x
Spleen	0	2	2	2	1	2	2	2	0	0
Testicle	0	1	1	1	1	0	0	2	0	0

4 = all particles in a few large masses.
0 = no reaction.
1 to 3 = various degrees of agglutination.

Since cross-reactions appeared in a number of the cases, confirmation of the apparent specificity was

[3] *Ibid.*

[4] J. Furth and E. A. Kabat, *op. cit.*

sought through absorption experiments. Definite proof of specific antibodies in sera against kidney, liver, testicle and possibly muscle particles was obtained, as shown in Table II.

TABLE II

EFFECT OF ABSORPTION ON SPECIFICITY OF SLIDE AGGLUTINATION

Antigen	Serum absorbed with	Rabbit serum *vs.* mouse organ particles from: Lung	Kidney	Muscle	Liver	Testicle	Saline
Kidney particles	.....	1	4	1	2	0	0
	Kidney	0	0	0	0		
	Muscle	0	4	0	0		
	Liver	0	4	0	0		
	Sheep red cells	1	4	1	2		
Liver particles	.....	1	1	2	4	0	0
	Kidney	0	0	0	3		
	Muscle	0	0	0	4		
	Liver	0	0	0	0		
	Sheep cells	1	1	2	4		
Muscle particles	.....	1	1	3	3	0	0
	Kidney	0	0	±	0		
	Muscle	0	0	0	0		
	Liver	0	0	2*	0		
	Sheep cells	..	..	..	..		
Testicle particles	.....	1	1	1	2	2	0
	Liver	0	0	0	0	2	

* Apparently some specificity in this experiment, but not observed in other muscle preparations.

It is obvious from these experiments that the antibodies can be absorbed completely only by the homologous antigen, while cross-reactions apparently disappear upon absorption with any one of the heterologous antigens. The Forssman antibodies are not concerned with these cross-reactions, since no change occurs upon complete absorption with sheep cells. There was no definite relation between the mouse serum precipitins or mouse red cell agglutinins and these cross-reactions.

Using particles derived from another species—the ferret—we have observed agglutination of liver only, by mouse liver antiserum, and of brain only by mouse brain antiserum, while kidney particles were not agglutinated by any one of the sera. Ferret muscle antigen cross-reacted with several antisera, other than anti-muscle.

These experiments prove that particles derived from some normal mouse organs by high-speed centrifugation (25,000 RPM) show, in addition to the Forssman antigen, organ specific differentiation. The question of organ specific structures in tissues and cells has been studied repeatedly (*cf.* Landsteiner[5]). While in certain instances (*e.g.,* lens, brain and others) organ specificity is demonstrable without great difficulty, in other cases (kidney, liver) the results have been more or less indefinite.

[5] K. Landsteiner, "The Specificity of Serological Reactions," C C Thomas, Springfield, Ill., 1936.

As a result of these various studies, different types of organ-specific antigens have been identified.[6] One group is characterized by the fact that the same antigen is present in the homologous organ of many different species. Our results show that liver as well as brain particles conform with this type.

The kidney particle preparations employed in our experiments belong to another group of organ specific antigens which are found in one organ from one species only. However, since we have used only two species, it is obvious that these observations must be extended.

In a number of instances, it has been possible to ascribe organ specific reactions to alcohol extractable material.[7] The particles used in this study contained high percentages of lipoids, but the relation of these fractions to the specificity is still under investigation.

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STABILIZATION OF IODINE IN SALT AND FEEDSTUFFS

ON the Industrial Fellowship on iodine at Mellon Institute we have had occasion to investigate broadly the factors responsible for the loss of iodine from iodized salt and iodized mineral feeds. These mixtures may contain any or all of the following substances: ferric oxide, copper sulfate, cobaltous nitrate, sodium chloride, manganese sulfate, calcium carbonate, calcium phosphate, sodium sulfate, sulfur, potassium iodide, volatile flavors, organic meals and vitamin concentrates. Potassium iodide is furnished to the feed manufacturer in the form of either an iodized mineral mixture, a concentrated iodized pre-mix containing the essential minerals or an iodized salt. The primary cause of loss of iodine is through oxidation of the iodide to free iodine with subsequent volatilization. Another important factor is the absorption of potassium iodide by the fabric or cardboard containers. The formation of free iodine not only results in a loss of iodine but also causes a decrease in the vitamin C content of the feed.

Iodized mineral feed mixtures lose between 9 per cent. and 20 per cent. of their iodine content during four months' storage under ordinary conditions. Oxidation occurs mainly through the catalytic action of iron, copper and manganese compounds present in the mixtures. These reactions take place only in the presence of moisture and are accelerated by the action of light. An important synergism is observable in this catalytic action. Ferric oxide becomes appreciably

[6] E. Witebsky, Report of Proceedings, 2nd Intern. Congress of Microbiol., London, 1937.

[7] E. Witebsky, *Zeitschr. f. Immunitätsf.*, 62: 3, 1929.

[8] Nemours Foundation Fellow.