ground substance, and it has been known for many years that stress localizes the lesions. Experimentally the lesions of scurvy may be localized by the stress of either compression[12] or stretching.[13] The stretching of the arterial wall by the hydrostatic pressure within its lumen is thus a stress suitable for localizing lesions. Where this stress is excessive the lesions will first appear.

Experimental atherosclerosis in scurvy. — The guinea pig is one of the few animals in which scurvy can be produced.[14] This animal is also acceptable for the study of atherosclerosis.[9] A total of 145 guinea pigs was divided with equal distribution of the sexes into the following dietary groups: (1) Chronic scorbutic diet. (2) Chronic scorbutic diet with oral ascorbic acid. (3) Chronic scorbutic diet with cholesterol and oral ascorbic acid. (4) Chronic scorbutic diet with cholesterol and intra-peritoneal ascorbic acid. (5) Acute scorbutic diet. (6) Acute scorbutic diet with oral ascorbic acid. (7) Acute scorbutic diet with cholesterol. (8) Acute scorbutic diet with oral ascorbic acid and cholesterol.

The chronic scorbutic diet consisted of "Baby Rabbit Pellets". The acute scorbutic diet consisted of "Rabbit Pellets". Both these feeds were obtained from Ogilvie Flour Mills, Montreal, and are known to be effective in producing scurvy.[15] I have produced typical lesions of scurvy in the bones and teeth of guinea pigs fed these diets.

Oral ascorbic acid was given in powder form, liberally sprinkled over the pellets. Intra-peritoneal ascorbic acid in a dose of 25 mgm. of "Redoxon" (Hoffmann LaRoche) was given twice a day for the first 19 days, then gradually increased so that by the end of 41 days, the dose was 100 mgm. twice a day.

Cholesterol dissolved in corn oil was impregnated into the pellets to supply about 500 mgm. of cholesterol per animal per day. All animals received vitamin E in the form of 5 mgm. of alpha tocopherol daily, because there is some evidence that it is deficient in this type of diet.[16] Animals dying of infection were excluded from the series.

The guinea pigs were killed at regular intervals over a period of from 12 to 41 days in each of the groups. After a specimen of blood was obtained by cardiac puncture for cholesterol determination, the animals were sacrificed by a blow on the head. The aorta was removed, fixed in 10% formalin and frozen sections from the arch and ascending portion were stained with Scharlach R for lipid. Sections were also obtained from the spleen as a representative of the reticulo-endothelial system.

The deposit of lipid in the arterial intima and the spleen was graded by an arbitrary system of plus signs:

1+: Earliest appearance of lipid.
2+: Moderate stippling of lipid.
3+: Intermediate between 2+ and 4+.
4+: Solid staining with lipid.

Plasma cholesterol levels were determined by a modification of the Liebermann-Burchard method; ten random samples were checked by the Sperry-Schonheimer technique and found to

TABLE I.

SHOWING THE RESULTS OBTAINED IN EACH OF THE DIETARY GROUPS

Diet	*Number of animals*	*Plasma cholesterol range*	*Average plasma cholesterol*	*Fat staining of spleen*	*Number of animals with atherosclerosis*	*Number of animals without atherosclerosis*	*Average degree† of atherosclerosis in those having it*
Chronic scorbutic	20	23 to 120 mgm. %	80.5 mgm. %	0	9	11	2.5+
Chronic scorbutic with oral ascorbic acid	22	26 to 106 mgm. %	53.5 mgm. %	0	0	22	0
Chronic scorbutic with oral ascorbic acid and cholesterol	18	41 to 270 mgm. %	162.0 mgm. %	3+	16	2	2.5+
Chronic scorbutic with intra-peritoneal ascorbic acid and cholesterol	18	85 to 301 mgm. %	179.4 mgm. %	2+	7	11	1.6+
Acute scorbutic	32	17 to 80 mgm. %	42.0 mgm. %	0*	19	13	2+
Acute scorbutic with oral ascorbic acid	16	23 to 77 mgm. %	40.0 mgm. %	0	0	16	0
Acute scorbutic with cholesterol	11	Not done	Not done	3+	11	0	2.6+
Acute scorbutic with oral ascorbic acid and cholesterol	8	Not done	Not done	3+	4	4	2+

*One animal in this group was found to have 1+ fat staining of the spleen. It is omitted in the representation of the figure as it was a solitary finding.

†Average obtained by dividing total of plus signs by the number of animals having lesions.