TABLE II. Comparative Features of Vial and Beaker Counting Methods.

Excretion in 24 hr urine sample*	0.5%		5.0%	
	Vial	Beaker	Vial	Beaker
Dose of $B_{12}Co^{60}$ administered (μc)	.5	.25	.5	.25
Max permissible No. of doses/patient	6	12	6	12
Degree of concentration	10	None	10	None
Vol counted (ml)	4	1000	4	1000
C.P.M. corrected for background	49	97	490	970
Counting time† (min.)	20	9	1	1

* Assuming the 24 hr urinary vol to be 1 liter.
† Minimum necessary time so as not to exceed 5% stand. error of counting and assuming a constant background rate of 110 cpm.

the fecal excretion technic for the estimation of intrinsic factor activity(7).

Summary. Measurement of gamma radiation of low specific activity contained in relatively large volumes can be adequately performed with the use of a specially designed beaker which fits into the well and covers the cross section of a well-type scintillation counter. The increase in sensitivity obtained with this beaker allows the administration of smaller oral doses of vit. $B_{12}Co^{60}$ for additional assays using the same patient for the urinary excretion tests for intrinsic factor. In addition, no concentration of the urine sample is necessary and less counting time is required.

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Effect of Nalorphine on Gastric Emptying in Man. (22350)

EDWARD J. VAN LIERE AND DAVID W. NORTHUP.
Department of Physiology, School of Medicine, W. Virgina University, Morgantown.

The consensus of most authorities is that morphine noticeably retards the emptying of the stomach in the human(1-3), as well as in the dog(4). Nalorphine, which antagonizes the narcotic effect of morphine when both are present, has certain actions when given by itself similar to morphine, but less intense. It is, therefore, of interest to determine the effect of nalorphine alone on gastric emptying.

Methods. The experiments were performed on 7 healthy medical students, 5 males and 2 females. The test meal consisted of 15 g of farina, cooked to a volume of 200 cc. One hundred g of barium sulfate were added so that the meal could be seen with the fluoroscope. The subjects ate this meal about 8:30 A.M. No food had been eaten since the previous evening. Determinations were made at weekly intervals. Fifteen minutes before they ate the meal, the subjects were given a subcutaneous injection of either saline (controls) or 5 mg of nalorphine hydrochloride* in saline. The time it took the meal to leave the stomach was determined fluoroscopically to the nearest 15 minutes.

Results. Table I shows that nalorphine delayed gastric emptying in all subjects, and more than 4 hours in 2. Only two showed a delay of less than 2 hours. All subjects, ex-

* We wish to thank Merck and Co. for the gift of nalorphine hydrochloride used.

TABLE I. Effect of Nalorphine on Gastric Emptying Time of 7 Subjects.

Controls		Experimental			
No. of trials	Avg emptying time, hr	No. of trials	Avg emptying time, hr	Diff.	p*
3	2.67	3	6.83	4.16	.03
4	2.44	3	5.17	2.73	<.01
4	2.25	3	2.83	.58	.10
4	2.06	4	2.81	.75	.05
3	2.08	3	6.42	4.34	.02
3	2.00	2	5.25	3.25	.09
3	3.08	3	6.00	2.92	.01
Avg	2.37		5.04	2.67	<.01

* p according to the Fisher t test.

cept No. 3 and 6, showed a statistically significant delay, and in No. 6 lack of significance is possibly due to the small number of trials since he showed a large difference. The average delay for the series as a whole is significant at the one per cent level.

Discussion. Initially, a dose of 10 mg was tried on 4 of the subjects, but this produced severe malaise, and since at the end of 4 hours practically none of the meal had left the stomach, the experiment was discontinued. The dosage was reduced to 5 mg for all subsequent work, and the results reported here are based entirely on this dose.

According to a recent textbook of pharmacology(5), the effects of nalorphine in man, when morphine or other narcotic has not been given previously, are similar to those of morphine but less intense. The delay in gastric emptying reported here is at least as great as that produced by morphine, and possibly greater. There is some disagreement among various workers about the magnitude of the morphine effect on the stomach(6).

Summary. Five mg of nalorphine administered subcutaneously caused an average delay of over 2½ hours in the emptying time of the stomach of 7 human subjects.

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Effect of Growth Hormone and Testosterone on Induction of Cardiovascular Changes in Choline-Deficient Rats.* (22351)

GEORGE F. WILGRAM,† CHARLES H. BEST, AND J. BLUMENSTEIN.
Banting and Best Department of Medical Research, University of Toronto, Canada

Severe choline deficiency may induce fatty and necrotic changes in cardiac muscle fibres, medial coronary lipoidosis and medial sclerosis of the Moenckeberg type in aortas of rats fed a high fat hypolipotropic diet(1-3). It is not known whether those changes are primarily due to choline deficiency or are secondary phenomena associated with the haemorrhagic renal cortical necrosis (HKL). Evidence in favor of the latter explanation is accumulating.

We have found that growth hormone and testosterone administered either alone or together to choline-deficient rats greatly enhances occurrence of HKL in animals which are in a borderline state of choline deficiency. Cardiovascular disease is increased in hormone-treated animals.

Methods. In a pilot experiment using 80 animals, Hall and Bieri's findings(4) were confirmed and borderline conditions for our final experiment were delineated. This re-

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† Research Fellow of Canadian Life Ins. Officers' Assn.