trimester(18), does not resolve any of the uncertainties which have been cited, since (a) the rise in protein-bound iodine can be demonstrated in the first trimester(1) and (b) euthyroid protein-bound iodine values have been recorded in our series during the last trimester. It is obvious that these questions can probably be answered by studies which define the rates of production, release, and degradation of thyroxin and related compounds. In conducting such studies with radioactive tracers it must be kept in mind that the fetal thyroid in humans assimilates iodide from the 12 to 16 week point onward (19). Finally, though it is not apparent which of the above factors are present in the observed findings, it seems reasonable to suspect that they are mediated through hormonal changes occurring during pregnancy.

Summary and conclusions. The rises in protein-bound iodine which usually occur in uncomplicated pregnancy in human subjects are associated with an increase in the thyroxin fraction of the protein-bound iodine.

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Differentiation between Bacterial and Tryptic Gelatin Liquefaction as Aid to Diagnosis of Fibrosis of Pancreas. (17893)

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The failure of fecal specimens from patients with cystic fibrosis of the pancreas to cause liquefaction of the gelatin coating on x-ray film, in contrast to specimens from normal children or patients suffering from other maladies, has been shown by Schwachman(1,2) to be a useful aid to the diagnosis of this pancreatic disease. The test is based on the fact that in cystic fibrosis of the pancreas trypsin is absent or present in subnormal amounts in the feces. As shown by Johnstone(3), cultures of certain bacterial species, particularly members of the genera *Proteus* and *Pseudomonas*, may also cause a positive x-ray film test. These microorganisms are not rarely encountered in the feces of infants and young children(4) and their presence may be the cause of false positive x-ray film liquefaction tests. An attempt was made, therefore, to develop a test which may differentiate between gelatin liquefaction due to pancreatic trypsin and that due to bacterial enzyme.

Material and methods. The x-ray film liquefaction test as used for the diagnosis of cystic fibrosis of the pancreas has been previously described(2,3). Since Eastman Kodak "Blue Brand" x-ray film proved to be more sensitive than either Dupont "Xtra Fast Medical" x-ray film or Hammer panchromatic portrait photographic film for this test, the former was used throughout this investigation. Soybean trypsin inhibitor was procured from Worthington Biochemical Laboratory (Freehold, N. J.) and was dis-

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TABLE I.
Comparative Effects of Enzyme Inhibitors on X-ray Film Liquefaction by Feces and Broth Cultures of Gelatin-liquefying Bacteria.*

	Broth cultures			Feces		
		No. of strains tested			No. of specimens tested	
Inhibitor	Dilution	Inhibited	Not inhib.	Dilution	Inhibited	Not inhib.
Soybean trypsin inhibitor (2 mg/ml)	1:5	0	69	1:25	41	3
	1:50	0	69	1:50	107	0
Zinc oxide (2% suspension)	1:5	25	15	1:25	0	43
	1:50	39	1	1:50	0	43
	1:100	40	0			
Zinc peroxide (3% suspen.)	1:5	32	0	1:5	1	32
	1:50	32	0	1:25	21	7
	1:100	32	0	1:50	21	7
Sodium perborate (4% sol.)	1:5	18	19	1:5	0	43
	1:50	32	5	1:25	0	43
	1:100	37	0	1:50	0	43

* 38 strains of *Pseudomonas aeruginosa*, 26 strains of *Proteus ammoniae*, 2 strains of *Proteus morganii*, and 3 strains of other pseudomonas.

solved in physiological saline. Various freshly isolated strains of *Proteus ammoniae*, *Proteus morganii*, and *Pseudomonas aeruginosa* were grown in brain heart infusion for 24 hours. Fecal specimens were obtained from healthy children and adults as well as from children suffering from diseases other than cystic fibrosis of the pancreas.

Results. On the assumption that gelatin liquefaction by the above mentioned bacteria is due to an enzyme or enzyme system other than trypsin, an attempt was made to differentiate between this bacterial enzyme and pancreatic trypsin by the use of a trypsin inhibitor. The action of soybean trypsin inhibitor on 69 strains of x-ray film-liquefying bacteria was tested. Serial dilutions of 24-hour broth cultures of these microörganisms (vol. 0.2 ml) were mixed with equal amounts of (a) soybean trypsin inhibitor containing 2 mg per ml in one series and (b) physiological saline solution in the other series serving as controls. A drop of each mixture was then placed on x-ray film, incubated, and, one hour later, the presence or absence of gelatin liquefaction was noted. The results are summarized in Table I and indicate that soybean trypsin inhibitor regularly failed to prevent x-ray film liquefaction by the strains tested. In contrast, as may be seen from this table, when 107 fecal specimens obtained from both children and adults were properly diluted (1:50) in physiological saline and mixed with soybean trypsin inhibitor in concentrations of 2 mg per ml, inhibition of gelatin liquefaction occurred without exception, indicating that the gelatin liquefaction in this latter group was due to the presence of trypsin.

A search for a compound which inhibits the gelatin liquefying enzyme of bacteria to a greater extent than pancreatic trypsin was made among compounds which are oxidizing agents, contain heavy metal ions, or which are known to inhibit certain enzymes. The following compounds were tested: potassium permanganate, BAL (2, 3 dithiopropanol), Lugol's solution, potassium ferricyanide, sodium perborate, zinc oxide, zinc peroxide, ammonium perchlorate, boric acid, potassium persulfate, oxalic acid, sodium arsinate, strontium bromide, bismuth subiodide, mercury oxycyanide, mercury potassium iodide, hydrogen peroxide, methylene blue, iodoacetic acid, merthiolate, mercurochrome, zephiran, mercresin, sodium fluoride, metaphen, argyrol and neosylvol.

As may be seen from Table I, a 2% suspension of zinc oxide, 3% suspension of zinc peroxide, and 4% solution of sodium perborate, all in physiological saline, inhibit gelatin liquefaction by the above strains of microörganisms far more effectively than gelatin liquefaction resulting from the action of fecal specimens in suitable dilutions. Similarly, these chemical compounds failed to inhibit gelatin liquefaction by a 1:50 saline solution of crystalline trypsin, whereas the soybean trypsin inhibitor completely inhibited this solution. The other compounds tested were less satisfactory for the differentiation between bacterial and pancreatic gelatin liquefying enzymes.

Discussion and summary. In order to render the x-ray film liquefaction test by fecal specimens more informative it is highly desirable to be able to differentiate between gelatin liquefaction due to the activity of pancreatic trypsin and that due to the action of bacterial enzyme. Soybean trypsin inhibitor, which prevents the liquefaction of gelatin (x-ray film) by crystalline trypsin and trypsin in feces, fails to inhibit gelatin liquefaction by various bacteria, including *Proteus ammoniae, Proteus morganii,* and *Pseudomonas aeruginosa.* Suitable preparations of zinc oxide, zinc peroxide, and sodium perborate have no or only a slight effect on trypsin in feces but markedly inhibit the bacterial enzyme responsible for gelatin liquefaction.

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Relative Efficacy upon *Pasteurella multocida* of Various Antibiotics Aureomycin, Terramycin, Bacitracin, and Polymyxin B. (17894)

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Recently a strain of *Pasteurella multocida* was isolated from an abscess at the nose of a boy 15 years of age. The infection developed subsequent to a plastic operation undertaken to correct a deformity resulting from "a kick of a horse to the nose". Since this pathogen could be demonstrated repeatedly over a period of 6 months and other disease-producing microörganisms were not recovered, the conclusions are drawn that the infection was caused by the pasteurella organism, was of animal origin, and had remained latent until activated by the operation. That human infections with this microörganism have been reported only infrequently is evident from a review of the world literature by Schipper(1), who collected but 39 authentic cases described between 1930 and 1947. Because of the lack of data on the effectiveness of some of the newer antibiotics upon this microbe, a study was undertaken to determine the relative efficacy of 7 antibiotics upon 8 strains of *P. multocida,* including the one isolated from the above patient. The results are embodied in this report.

Materials and methods. The following strains of *P. multocida* were employed:

No.	Strain	Source
200	*P. avicida*	*
1	Bovine	†
2	Unknown	†
3	Canine	†
9656	*P. oviseptica*	‡
9658	" "	‡
10544	From sputum	‡
4392	" abscess	§

* Cornell University (Dr. Brunner).
† Iowa State College (Dr. Merchant).
‡ American Type Culture Collection.
§ Children's Hospital, Buffalo.

The strains were maintained on blood agar and were transplanted twice a week. Six antibiotics were employed. Penicillin-G, crys-

1. Schipper, G. J., *Johns Hopkins Hosp. Bull.,* 1947, v81, 333.