

بعض الدراسات على الكفاءة الوظيفية للبنكرياس
فى الأبقار والجاموس
٢- التهاب البنكرياس الحاد التجريبي

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شملت هذه الدراسة حقن الكلورفورم فى نسيج البنكرياس لثلاث عجول حاموس وعجلين بقرى وقد جمعت عينات من سيرم وبراز والعصارة الهضمية من أمعاء هذه الحيوانات بعد ١ ، ٤ ، ٧ ، ١٥ يوم من بداية حقن الكلورفورم وتم الحصول على النتائج التالية :-

- ١- اصبحت الحيوانات بهيجان مؤقت بعد حقن الكلورفورم فى نسيج البنكرياس استمر لمدة ١/٤ ساعة بدأت بعده الحيوانات تعود تدريجيا الى حالتها الطبيعية .
- ٢- ارتفع مستوى الاميليز والليباز فى السيرم وظل مستواها مرتفعا حتى اليوم الخامس عشر بعد حقن الكلورفورم .
- ٣- انخفض مستوى الترسين فى السائل المعوى بصورة ملحوظة طوال مدة التجربة الذى ادى بدوره الى عدم ظهور أية كميات منه فى البراز .
- ٤- لم يتغير مستوى انزيمات الكبد طوال مدة التجربة .
- ٥- نقص مستوى البروتين الكلى والدهنيات فى السيرم بينما ارتفع الجلوسيرايدات والكوليسترول .
- ٦- ظل مستوى الجلوكوز طبيعيا طوال فترة الحقن .

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SOME STUDIES ON PANCREATIC FUNCTION IN CATTLE AND BUFFALOES

2. INDUCED ACUTE PANCREATITIS

(With 3 Tables and 14 Figures)

By

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SUMMARY

Acute pancreatitis was induced experimentally in buffaloes and cattle by injection of chloroform in the pancreatic tissue. Blood, fecal and duodenal samples were taken from the animals 1,2,4,7 and 15 days post-injection. The results are summarized as:-

- 1- Immediately after chloroform injection all animals showed signs of excitation for about 30 minutes followed by returning to their normal status later on.
- 2- Serum amylase and lipase levels were greatly increased while trypsin level in duodenal fluid was sharply decreased. Failure of gelatin digestion by fecal suspension was noticed.
- 3- Liver enzymes were not affected.
- 4- Decreased levels of total serum protein and lipids while triglycerides and cholesterol levels, on the contrary, were slightly increased.
- 5- Glucose level was not affected by chloroform injection.

INTRODUCTION

In a previous study (HASSAN et al., 1980) some of the normal pancreatic functions were evaluated in cattle and buffaloes with regard to age, species and sex. Obtained results interpreted the possible changes that may follow diseased conditions of such in cattle and buffaloes. The present study was dedicated to follow up the clinical signs and body fluid changes through induced experimental acute pancreatitis in large ruminants.

M.S. HASSAN, *et al.*

MATERIALS AND METHODS

Three male buffaloes and two male cattle were used in this experiment. These animals were put under clinical observation 15 days before experimentation. Blood smears and faecal samples proved to be negative for parasitic infestation. Maintenance ration was given daily for the animals while water was offered ad lib.

Acute pancreatitis was induced by injection of chloroform (25 ml) in different sites in the area of pancreatic parenchyma that was exposed surgically* as reported by BROBST et al. (1970). About one millimeter was injected in every site. Daily clinical observation of the animals was recorded post operation. Blood, faecal and duodenal fluid samples were taken in the following manner:-

No of the animal	Species	Age (years)	Time of sampling post operation (in days)					
1	Cattle	2.0	1	2	4	7	15	-----
2	Buffaloes	3.0	1	2	4	7	-----	-----
3	Cattle	1.0	1	2	4	-----	-----	-----
4	Buffaloes	2.5	1	2	-----	-----	-----	-----
5	Buffaloes	2.0	1	-----	-----	-----	-----	-----

-----= Slaughtered

Blood samples were analysed for amylase; lipase, GOT, GPT, alkaline and acid phosphatase enzymes and organic constituents (total protein, total lipids, glucose, cholesterol and triglycerides). Faecal samples were used for microscopic examination of fat and trypsin gelatin digestion. In duodenal fluid samples trypsin was determined. Blood analysis was conducted on the same basis previously stated by HASSAN et al. (1980).

* Kindly performed at the Dept. of Surgery, Faculty of Vet. Med. Assiut University.

INDUCED ACUTE PANCREATITIS

RESULTS AND DISCUSSION

Clinical Manifestation:

Immediately after injection of chloroform all animals showed signs of excitation manifested by arching of the back, kicking at the belly and muscle tremors. The animals attempted to jump and drag their hind limbs. This period of excitation extended for about 5 minutes, followed by lying on the ground with an increasing rate of the heart (120/m) and respiratory rates (35/m) for about 30 minutes. The animals returned gradually to their normal state within the elapse of 24 hours. The above mentioned signs may reflect a nervous excitation that followed chloroform injection, since this drug is considered to be an irritant material to pancreatic acinar cells.

Pancreatic Enzymes (Table 1 and Fig. 1-3).

Transient increased serum amylase level was evident 24 hrs. post chloroform injection followed by gradual decreased values till the 15th day post-injection. The later, however was still high, about twofolds than the pre-injection level. The behaviour of amylase enzyme in such cases may be attributed to the inflammatory processes following chloroform injection which probably interferred with the normal relase of pancreatic secretion in pancreatic duct system and to absorption by blood. In addition of acinar cells made them another source for increased enzyme activity in serum. The literatare lacks any informations about the examined species, however, the results agree with recorded ones in canines (ZIEVE et al. 1963, BROBST et al. 1970, MAHEFFEY and ANDERSON, 1976 and MIA et al., 1978). FINCO and STEVENS, (1969) recorded 7 Fold increased serum amylase activity following actue pancreatitis in dogs while GAGE and ANDERSON, (1967), on the opposite side, recorded no detectable alterations in such cases. Similar pattern, resembling that for amylase, was exhibited by serum lipase. Concering the trypsin enzymes, a sharp decreased activity, was ecident both in duodenal fluid and

M.S. HASSAN, *et al.*

faecal samples, at the 24 hrs. post-injection. At the fourth day post injection and onward, it began to increase gradually. At the 15th day the trypsin enzyme activity was still twofolds below the pre-injection level. This behaviour may be attributed to the damage of pancreatic acinar cells, which is responsible for the secretion of the enzyme trypsin and fibrosis observed at the end of the experiment (Fig. 12) which probably caused constriction or even complete occlusion of some pancreatic ducts. Recorded results were in agreement with that reported in dogs with acute pancreatitis either in natural affection or after experimentation (GROSSMAN, 1962, ANDERSON and STRAFUSE, 1971 and ETTINGER, 1975).

Liver enzymes (Table 2 and Fig. 4-7):

The liver enzymes (GPT, GOT, alkaline and acid phosphatase) fluctuated upward and downwards post chloroform injection in the pancreas. This behaviour indicates that the liver is not harmfully affected and was proved by the absence of any micromorphological lesions of the liver specimens, taken after slaughtering of the experimental animals.

Organic Constituents of Serum (Table 3 and Fig. 8-12):

Slightly decreased total serum protein level (from 8.46 to 6.16 gm/100 ml) was recorded at the 4th day post injection. At the 7th day and onwards it increased gradually till it reached (7.5 gm/100 ml); however, these changes were within the physiological normal levels. The insignificant hepatic cell changes, observed following chloroform injection may be responsible for such fluctuations since liver is considered the main site for protein metabolism.

Total serum lipids exhibited the same pattern. Recorded changes in agreement with those observed by BOSS *et al.* (1976) in dogs with induced pancreatitis. Contrary to this was reported by ANDERSON (1965), ANDERSON and STRAFUSS (1971) and ROGER'S *et al.*, (1975). They reported hyperlipaemia following acute pancreatitis in dogs. They added that induced acute pancreatitis did not result in a visual lipaemia as that

INDUCED ACUTE PANCREATITIS

observed in clinical occurrence of the disease. The condition resulted also in the appearance of fat globules in faecal samples. This could be explained on the basis that acute pancreatitis interferes with fat digestion and absorption through decreased pancreatic enzymes secretion. COFFIN and THRODAL-CHRISTENSEN, (1953) similarly, detected fat globules in canine stools following acute pancreatitis.

Serum triglycerides were increased greatly post chloroform injection, then began to decrease until it reached 0.78 gm/L at the 15th day (Table 3 and Fig. 10). BOSS *et al.* (1975), on the contrary, recorded no significant changes in serum triglycerides in acute pancreatitis in canines. In our view these differences, are certainly based on the extent of morphological changes in the organ in one part and the response to inflammation on the other.

With regard to total serum cholesterol, in buffaloes and cattle, fluctuated levels of serum cholesterol were recorded, however, levels were within the physiological limits. (Table 3). The duration of the experiment, perhaps, did not permit immediate serious changes in cholesterol metabolism.

Serum glucose level was not similarly seriously affected indicating that the endocrine part of the pancreas (Islets of Langerhans) did not fall under the stress of chloroform injection, a fact which has been assessed by histopathological examination of pancreatic samples collected from the experimental animals (Fig. 12).

Lastly one concludes that injection of chloroform in pancreatic tissue of buffaloes and cattle resulted in valuable changes in the pancreatic enzymes. Liver enzymes, on the contrary exhibited, somewhat, normal behaviour. Fat digestion and absorption in experimental animals was seriously disturbed. Total serum cholesterol level, on the contrary exhibited indefinite changes, a manner which needs further investigations.

M.S. HASSAN, *et al.*

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INDUCED ACUTE PANCREATITIS

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PROCEEDINGS

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Table (1) : Changes In Pancreatic Enzyme-Lipase And Amylase-In Serum, And Trypsin In Duodenal Fluid And Faeces Before And After Induced Pancreatitis.

Time of specimen	Before operation	After 1 day	After 2 days	After 4-days	After 7 days	After 15 days
No. of Cases	5 cases	5 cases	4 cases	3 cases	2 cases	One case
Amylase ^o u/100 ml.	67-60 (40-90)	149.40 (120-160)	120.00 (100-150)	110.00 (100-120)	108.00 (108-108)	100.00
Trypsin ^o in duodenal fluid u/Lit.	16.00	5.70	2.50	3.20	5.70	6.90
Trypsin [*] In faeces.	+++++	+ve	-ve	+ve	+ve	++++

- ° Quantitative determination.
- + Qualitative determination.

Assiut Vet.Med.J.Vol. 7, No. 13614, 1980.

INDUCED ACUTE PANCREATITIS

Table (2): Changes In Liver Enzymes (GOT, GPT, Alkaline Phosphatase And Acid Phosphatase) Before and After Induced Pancreatitis.

Time of specimen	Before Operation					
	5 cases	After 1 day	After 2 days	After 4 days	After 7 days	After 15 days
No. of cases	5 cases	5 cases	4 cases	3 cases	2 cases	One case
GPT	10.20	12.20	10.30	9.70	11.50	10.00
U/Lit.	(8-13)	(9-16)	(8-13)	(8-12)	(10-13)	
GOT	37.40	39.80	43.80	31.30	39.30	40.00
U/Lit.	(34-48)	(36-48)	(28-57)	(20-40)	(37-42)	
Alkaline Phosphatase U/Lit.	6.80	18.60	16.50	22.00	11.00	22.00
	(11-22)	(11-31)	(11-33)	(22-22)	(11-11)	
Acid Phosphatase U/Lit.	2.60	3.00	2.50	2.50	2.50	2.00
	(2.0-3.0)	(2.0-3.5)	(2.0-3.0)	(1.8-3)	(2.5-2.5)	

Table (3) : Changes In Serum Organic Constituents (Total Protein, Total Lipids, Triglycerides, Cholesterol And Glucose), And Fat In Faeces Before And After Induced Pancreatitis.

Time of specimen	Before operation						After 1 day		After 2 days		After 4 days		After 7 days		After 15 days	
	No. of cases		5 cases		5 cases		4 cases		3 cases		2 cases		One case			
Total Protein	8.46	(6.5-9.5)	6.88	(5.6-8.4)	6.60	(5.7-7)	6.18	(6-8)	7.40	(6.5-8.4)	7.50					
g/100 ml																
Total Lipids	624	(320-840)	540	(200-600)	450	(400-560)	467	(400-520)	400	(320-480)	440					
mg/100 ml.																
Triglycerides	0.54	(0.5-0.6)	1.44	(1.0-2)	2.20	(1.5-3.0)	1.17	(1.0-1.5)	0.85	(0.7-1)	0.78					
g/Lit.																
Cholesterol	146.60	(100-190)	155.00	(90-190)	171.30	(150-190)	143.00	(121-155)	142.50	(100-175)	108.00					
mg/100 ml.																
Glucose	54.40	(42-65)	59.60	(46-70)	60.00	(50-69)	58.10	(50-58.5)	62.70	(62.5-63)	60.00					
mg/100 ml.																
Fat In Faeces	-ve		+ve		+ve		+ve		+ve		+ve		+ve		+ve	

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The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry should be supported by a valid receipt or invoice. This ensures transparency and allows for easy verification of the data.

In the second section, the author details the various methods used to collect and analyze the data. This includes both manual and automated processes. The goal is to ensure that the information is both reliable and comprehensive.

The third part of the document focuses on the results of the analysis. It shows that there is a clear trend in the data, which is consistent with the initial hypothesis. This finding is significant as it provides strong evidence for the proposed model.

Finally, the document concludes with a summary of the key findings and a list of recommendations for future research. It suggests that further studies should be conducted to explore the underlying causes of the observed trends.

Fig. 1

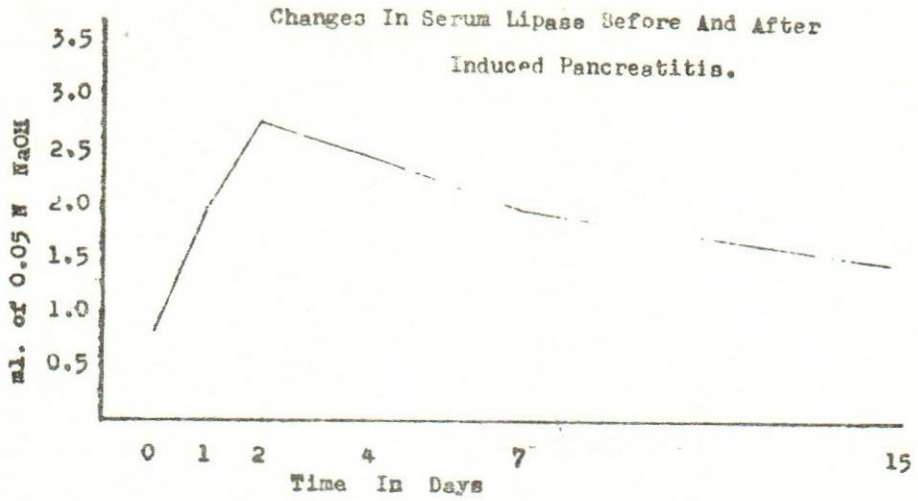


Fig. 2,

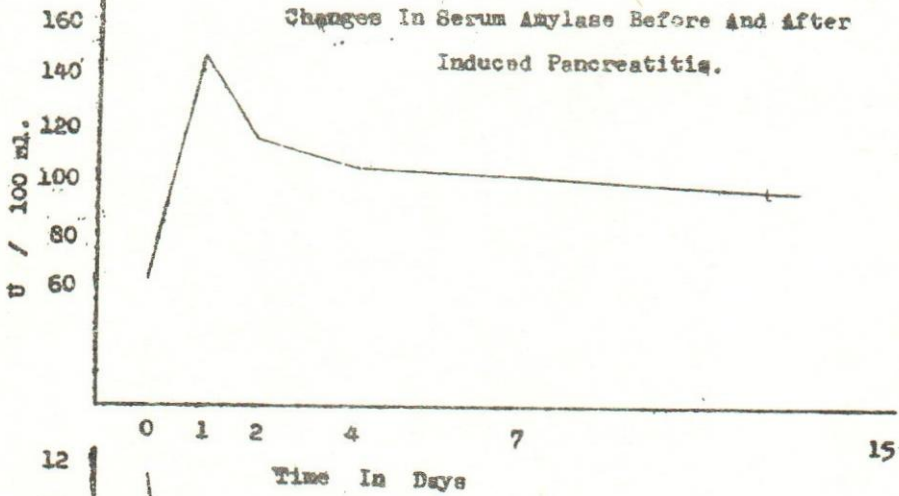
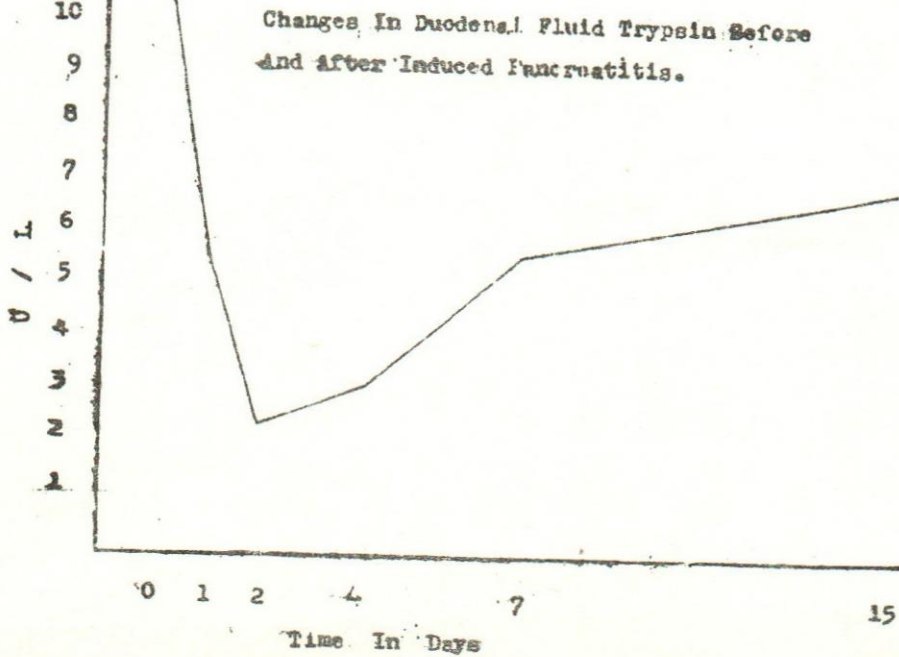


Fig. 3



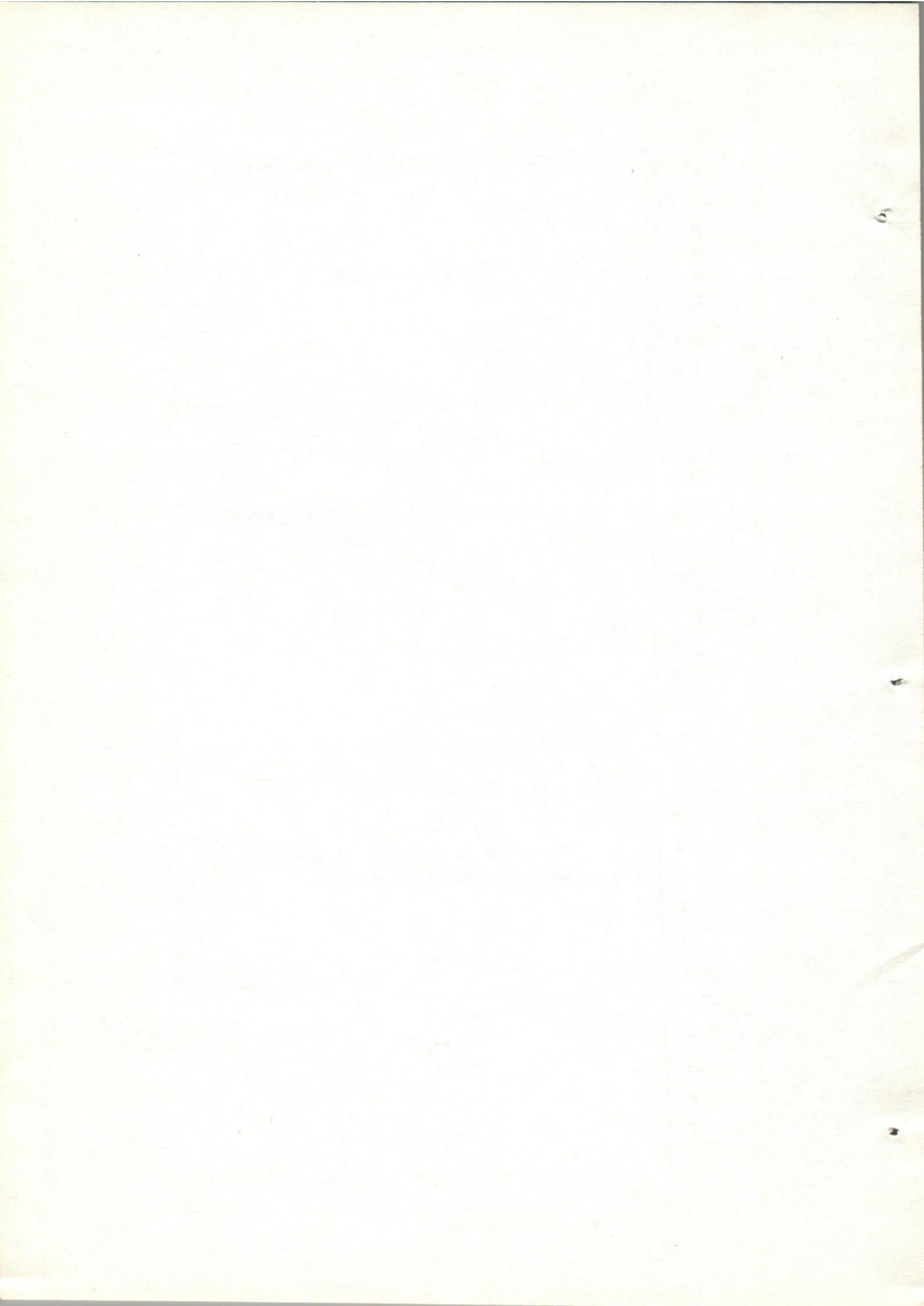


Fig. 4
Changes In GOT Before And After
Induced Pancreatitis.

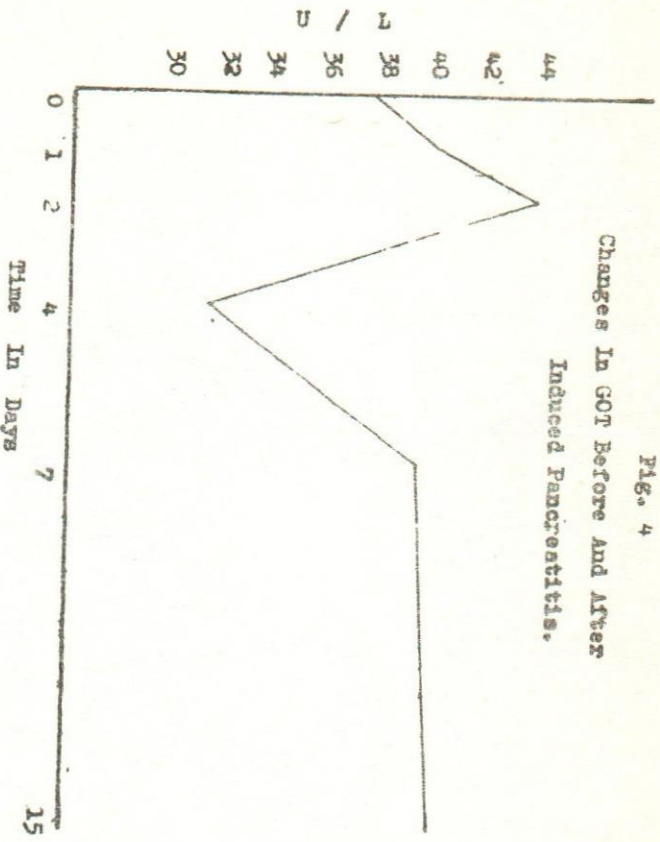


Fig. 5
Changes In GPT Before And After
Induced Pancreatitis.

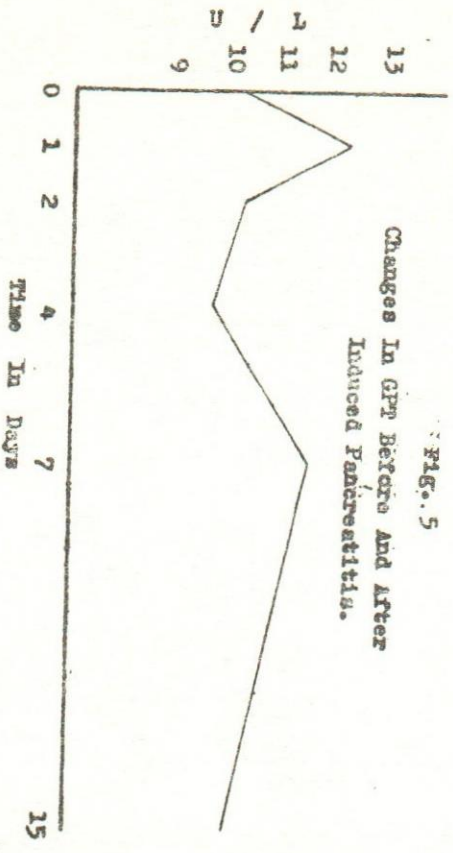


Fig. 6
Changes In Acid Phosphatase Before And
After Induced Pancreatitis.

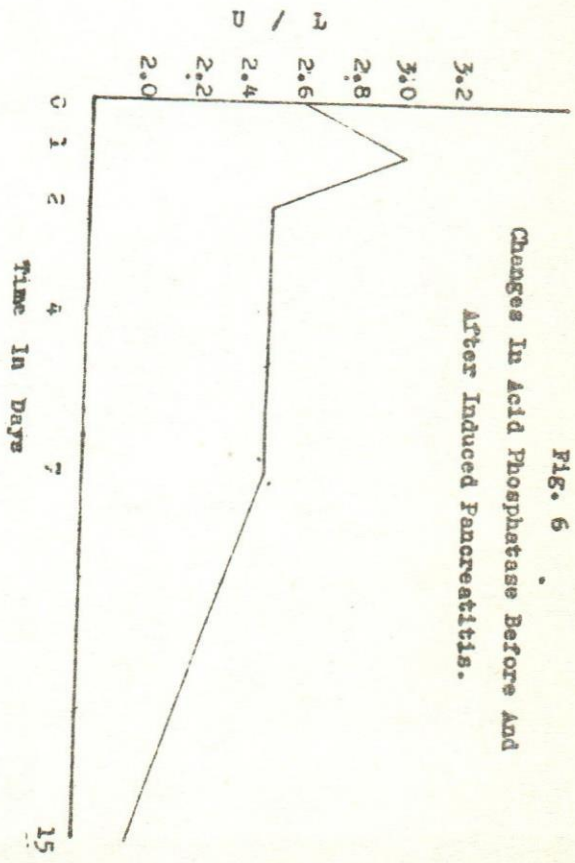


Fig. 7
Changes In Alkaline Phosphatase
Before And After Induced
Pancreatitis.

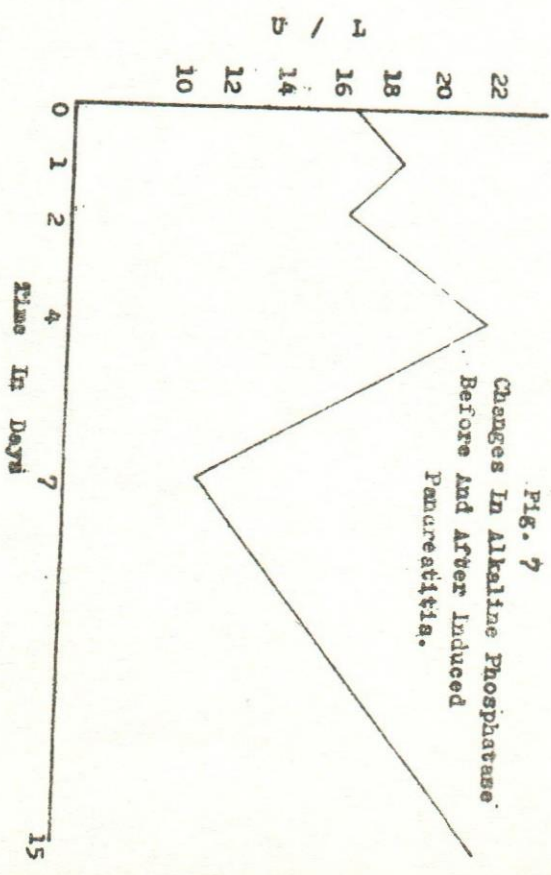




Fig. 8
Changes In Total Proteins Before And
After Induced Pancreatitis

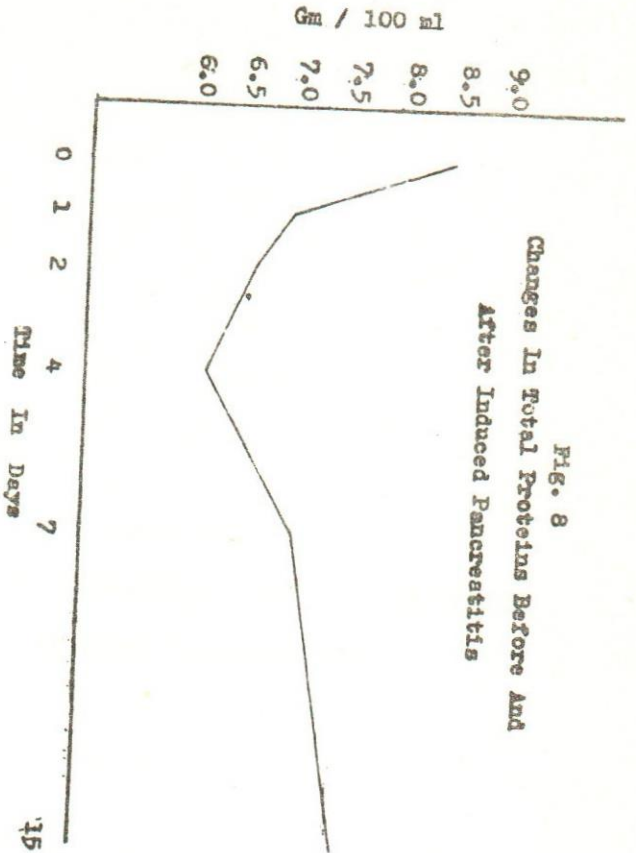


Fig. 9
Changes In Total Lipids Before And After
Induced Pancreatitis.

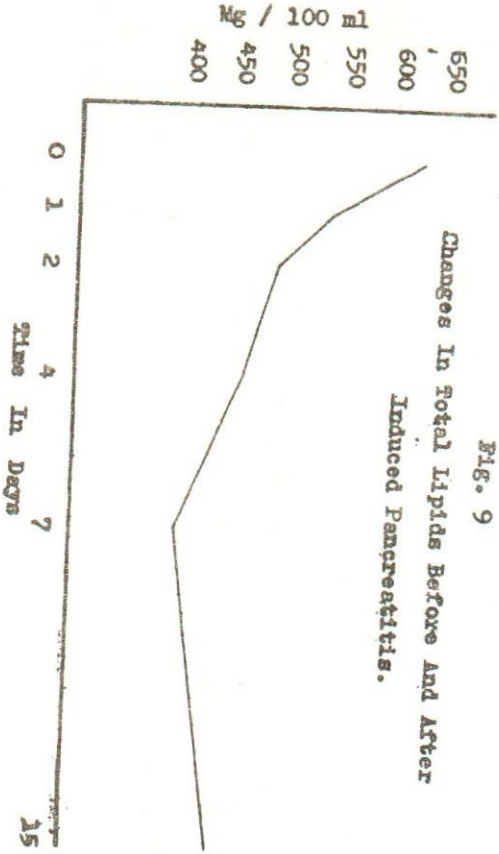


Fig. 10
Changes In Triglycerides Before And
After Induced Pancreatitis .

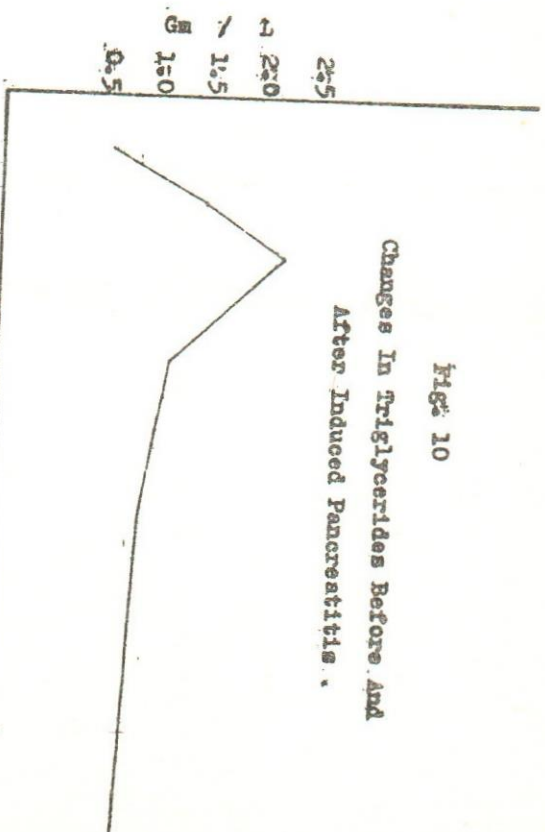
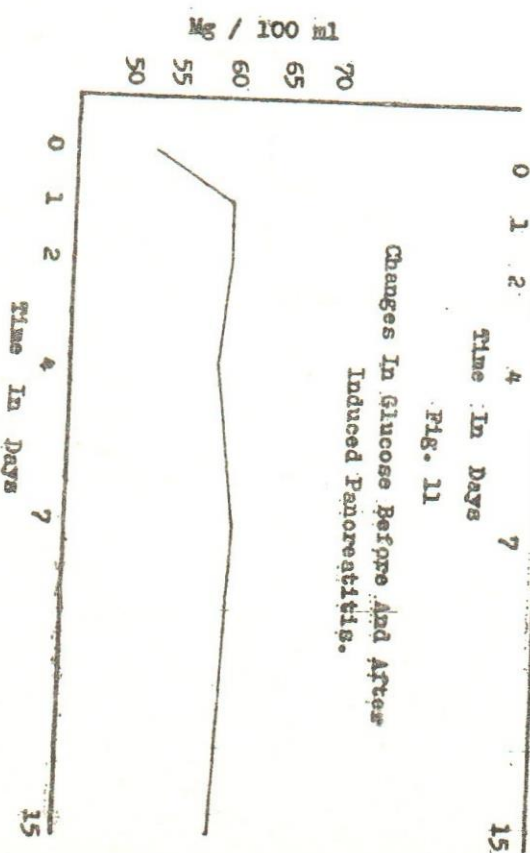


Fig. 11
Changes In Glucose Before And After
Induced Pancreatitis.



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The following table shows the results of the experiments conducted on the 10th of August 1900.



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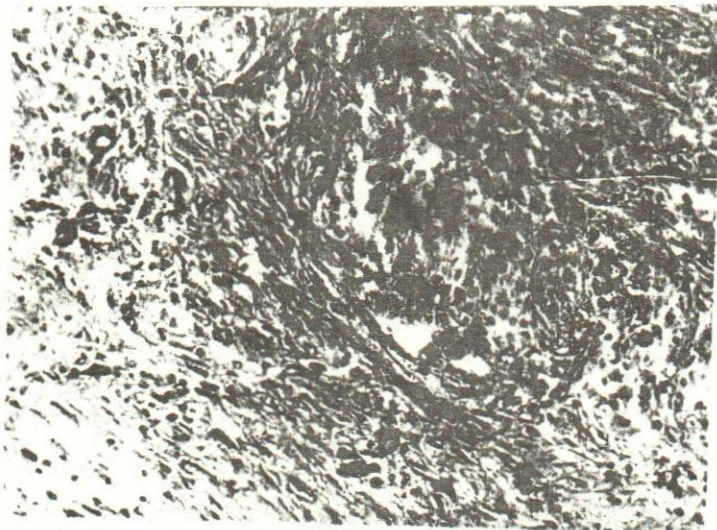


Fig. 13: Pancreas Showing Complete Fibrosis
H&E. (X 16. 12.5).

