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INDUCTION OF STRUCTURAL CHANGES OF ENTERO-URINARY PROSTHESES

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Experimental and clinical findings of this Urological Unit have already been published(BEZZI et al.[1]),which suggest that intestinal epithelium in contact with urine does not undergo but scarce and late structural changes; which seems to be in contrast with a diffusely proposed hypothesis of assimilation to urothelium.An instance of this process,though only partially accomplished as shown in FIG.1,as a matter of fact has been observed in adult mongrel dogs which had been submitted to entero-cystoplasty thirty months before:at hystological control,a completely flattened glandular epithelium appears covered by a multistratified layer(up to 8 to 10 cubic cells), overlapping it (ALBERTI et al.[2,3]).In man,on the contra-

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ry, structural changes do not go beyond the stage of regressive processes(macromicro- and ultrastructural as they may be)which anyhow do not show any shift towards likeness to urothelium.This is to be observed in "sphincterised" procedures as well as in free-flow intestinal conduits.As far as we know, only two instances are recorded in literature, by ROBLEJO et al.[4] and by BRACCI et al.[5],in which a multistratified covering of the original lining has been observed in man;but,with regard to ileocystoplasty,as was performed by these Authors,a cover by overlapping rather than metaplasia can be hypothised,due to the wide contact between vesical and intestinal epithelia.

Among our own clinical cases, in no more than one ileal conduit (cfr.FIG.3) some reduplication of cylindrical cells is shown,as well as some cuticular thickening;which would suggest an attempt to metaplasia due to urinary contact, since a like feature is normally shown in mammalian urothelium (PRETO-PARVIS et al.[6]; BIORKMANN[7]) to which a function of hindrance to absorption has been attributed.

Such rather different findings still leave some questions unanswered:does really any finalised change occur? is contact with urine a fit and specific stimulus to changes?have changes a purposeful significance?

That contact with urine is one of the stimuli to changes seems to be supported by several findings,like those by BEGANI[8]: "in sphincterised procedures changes are more apparent where contact with urine is more prolonged due to the modalities of voiding";or those by STIPA et al.[9]:"changes are more apparent in clean procedures than in uretero-sigmoistomy where urine is mixed with faeces".

The topic of specificity of both stimulus and response reaches back to old experiments by POGGI and coworkers(1888), SCHWARTS(1891-99) and several later ones, in which anyhow not mimetic metaplasia but "regeneration" af vesical wall was concerned.In this connection,CARLI's experiment is paradigmatic:vesical regeneration does not take place unless the cervico-trigonal stump is in contact with urine;on the contrary, if contact is preserved, regeneration(chiefly by epithelial proliferation)occurs even on top of an eterologous frame like rubber balloon, catgut mesh, dacron and so on(PICCINNO;BOHNE:NARIKAVE: TSUDA; SANCHEZ quoted by BIOCCA[10]).Few islets of vesical wall and/or contiguity with ureteral and urethral stumps are enough to start a new covering to unstructed cavities.

In fact,from more recent works it follows that a

prosthetic support with a non-structured or poorly structured surface, like a reversed intestinal loop(SHOEMAKER et al.[11])or de-epithelised loop(SHOEMAKER et al.[11]; MARTIN et al[12];TOBEY et al.[13])is easily overlapped by urothelium.If,vice versa,de-epithelisation is not thorough and the submucosal layer is left in place,a glandular epithelium is likely to grow again(SHOEMAKER et al[11])

It follows, therefore, that proliferation of epithelium with such properties as to contain urine can occur if there is a contact with urine itself and if the anatomical support does not,for some reason,retain its own structural inductive power which counteracts mimetic tendencies.

On this ground is based the rationale of the aforesaid experiments of "modified" intestinal prostheses as well as others which assume hypothetically that a controlled biological damage could favour involution and de-differentiation followed by a finalised new covering(GIULIANI et al.[14]).

As for the specificity of the stimulus, the present contribution consists of a confrontation,in the human, of morphological findings in intestinal prostheses with or without urinary contact.

A young otherwise healthy female with utero-vagi-

nal atresia had been treated by a Baldwin ileal colpo-plasty, with very good results;she has married and carr ies on since a satisfactory sexual life. More than five years after operation, a biopsy of the neo-vagina by means of the CAREY forceps allows us to compare those findinq with those of some ileal prostheses "carrying urine" for a comparable number of years. FIG. 2 and 3 refer to ileotrigonoplasty(since 5 years) and ileal conduit(since 11 years):in the first instance,the single prismatic covering is normal, but for a certain rarefying of calix-like cells;the surface of epithelium is varnished by a thick continuous layer of mucus (FIG.2); in the eleven years ileal conduit, epithelial cells are somewhere ordered in two layers, with surface cuticola thikened and showing marked PAS activity; mucus secretion is preserved(FIG.3).In both cases,flattening of the whole villous architecture is apparent, with obliteration of cryptae and-as a result-a marked reduction of surface development(which,in the normal bowel would reach 8 to 10-fold).

Conversely, the epithelial structure of the intestinal neo-vagina(FIG.4)is preserved, after five years:the villi/cryptae ratio and related surface development are as in the normal bowel,as well as the cytological aspects.On the other hand,the features of inflammation are co-

FIG.1- Adult mongrel dog,submitted 32 months before to ileo-cystoplasty.Histology of neo-bladder shows that villi are fused together,cryptae nearly obliterated.An urothelium-like covering is overlapping the intestinal wall. (ALBERTI & co-w.)

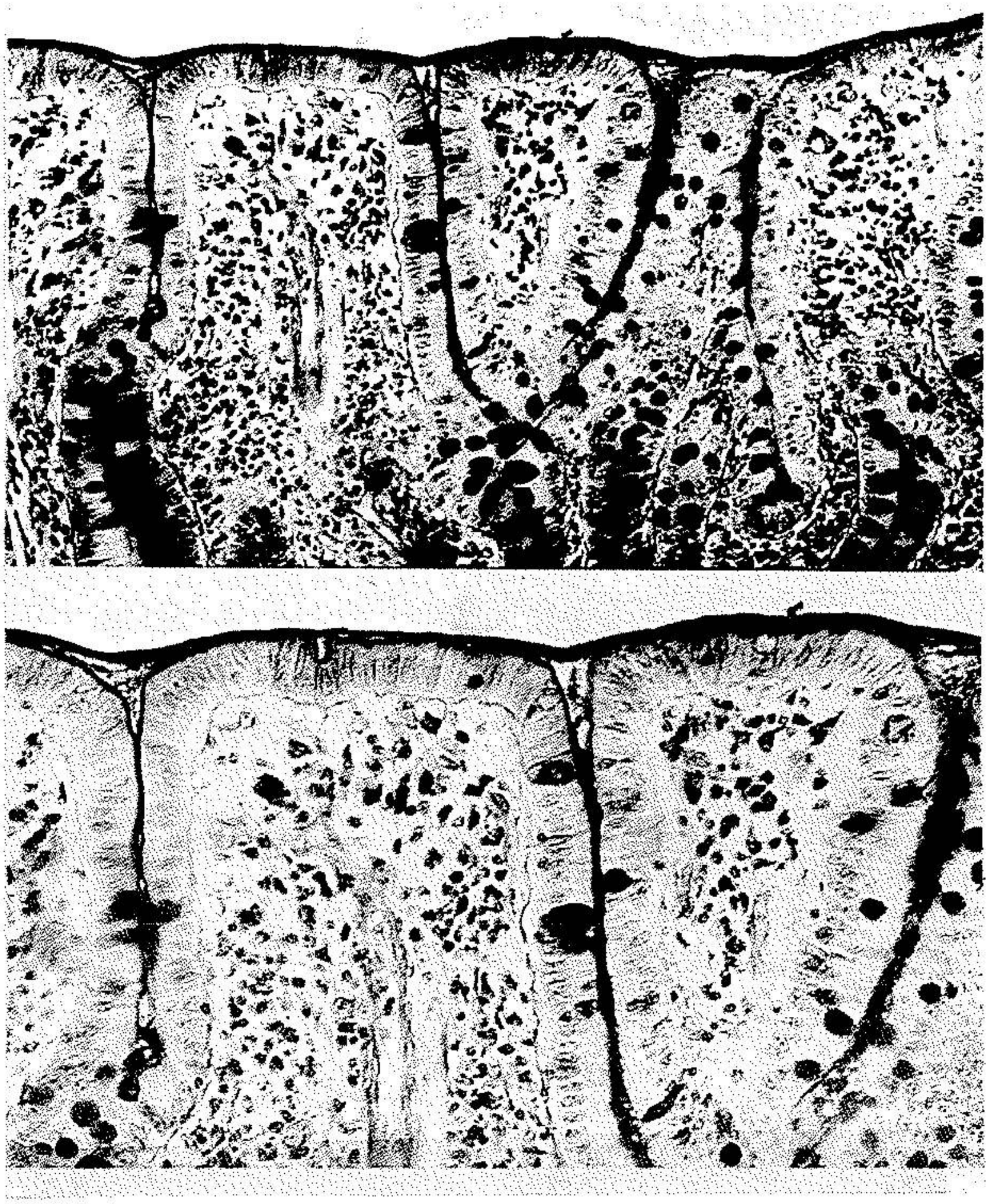

FIG.2 - Man of 49 years, submitted five years before to sub-total cystectomy and ileotrigonoplasty.Histology of neo-bladder(top x250; bottom x600): villi are thoroughly flattened,cryptae obliterated.Polimorphocellular infiltration of lamina propria.A thin layer of mucus covers the epithelial surface.

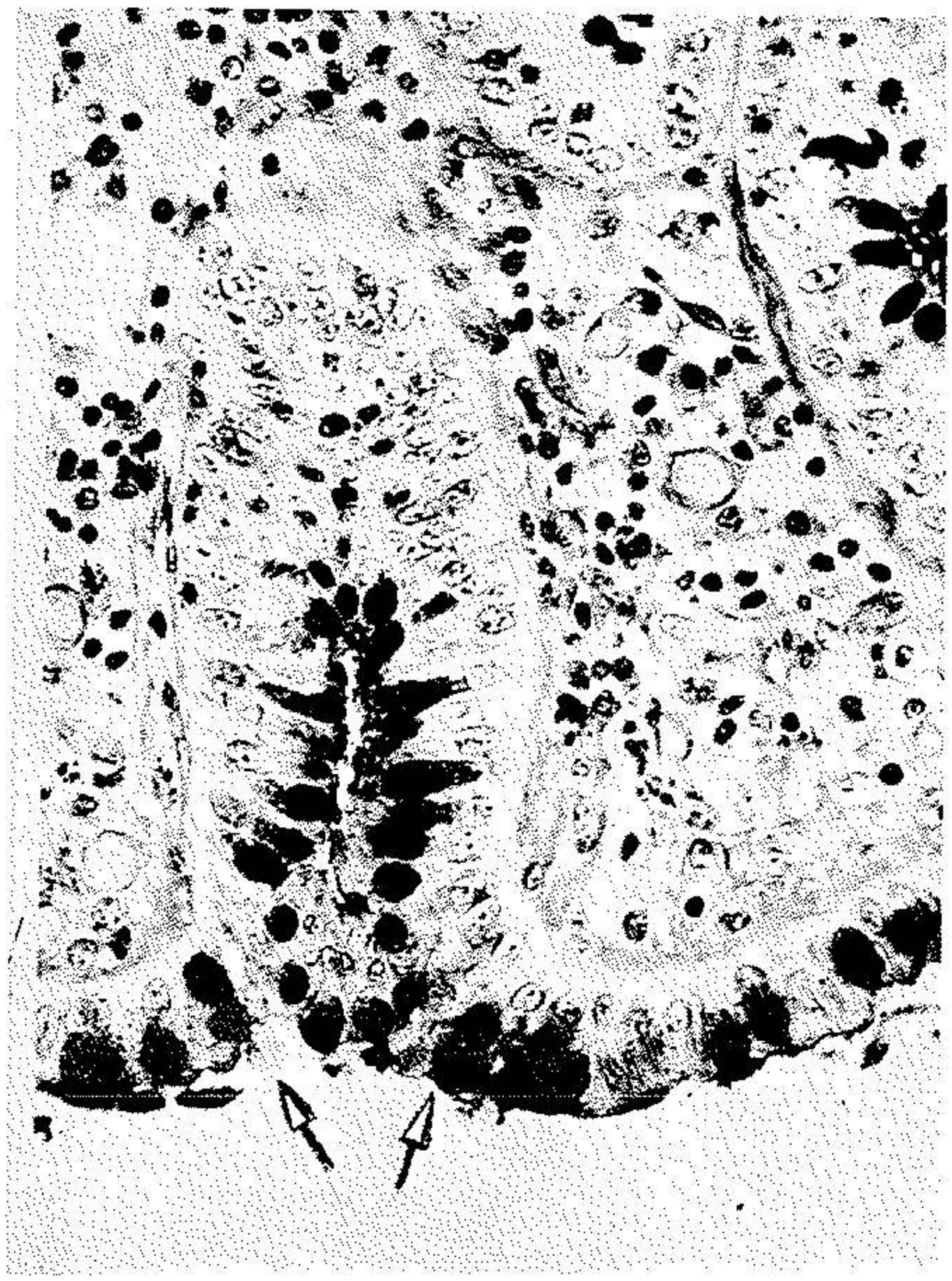

FIG.3 - Girl of 15 years,carrying an ileal conduit since four years of age.Histology(x600,PAS)of conduit shows scarce aspects of reduplication(arrows),cuticular thic-kening, polimorphocellular infiltration of lamina propria.

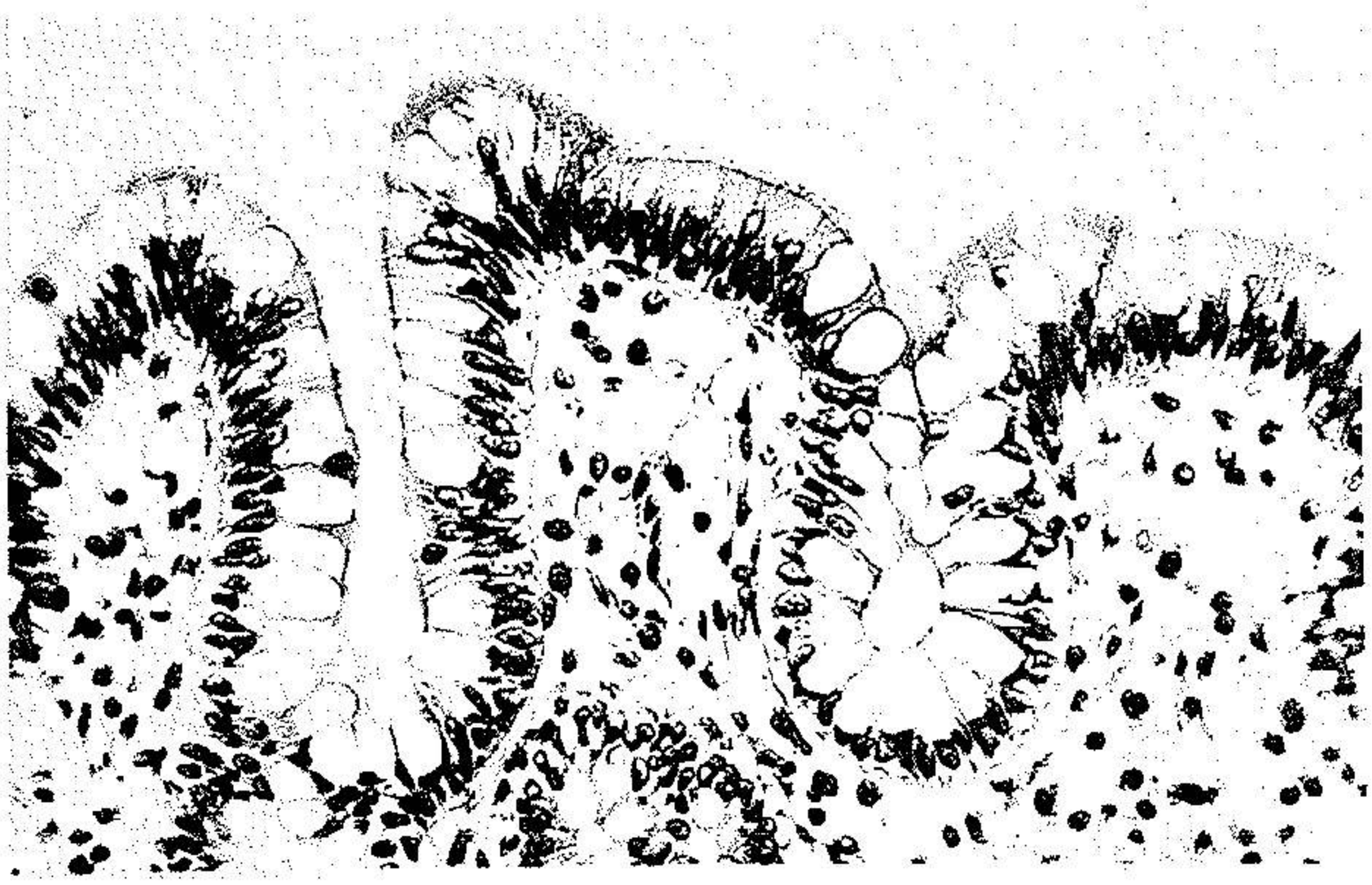

FIG.4- Neo-vagina following Baldwin(biopsy by Carey forceps): The whole structure,architectural as well as cytological,of ileal loop is maintained.Apparent features of inflammation,such as polimorphocellular infiltration of lamina and enhanced muciparous activity.

mparatively more apparent(a candidosis of the neo-vagina was also ascertained and treated,at the time).

Confrontation of two conditions,similarly liable to external infections but differing as contact of urine is concerned, confirms the role of the latter in promoting inflammatory and involutive processes. Though a finality could be easily suggested by the aforesaid findings,we think it more adherent to reality to retain that contact with urine, through physico-chemical changes, bacterial contamination,fermentation and so on, induces both regressive processes and atypical coarse attempt to re-structuring(cuticular thickening;reduplication of layers or single eells).On the other hand, an advanced grade of structural involution can favorise-if anatomo-topographical patterns allow it-an overlapping by contiguous urothelium.

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