In 1977, Metrizamide (Amipaque), the first non-ionic water based contrast agent became available, and was thus in direct competition with Pantopaque.

Marketing studies of Pantopaque between 1976 and 1977 showed that the product accounted for 82% of Lafayette's product sales. A highly lucrative commodity!

In 1977, **Alcon** proposed acquisition of Lafayette (Alcon itself had been acquired that same year by **Nestle**).

Stock purchase and sale were finalised on January 1, 1978.

Pantopaque production required only a single ingredient purchased from **Eastman Kodak**.

At the time of Alcon's takeover, Lafayette's erstwhile President, Bucke, was in fact the principal owner, the two other major stockholders being Griggs and Kunz (names we have already seen).

In 1977, two papers were published of cases of pulmonary embolism after or during myelography. ([1] / [2]) which was thought to be due to venous intravasation associated with a traumatic lumbar tap.

1977 was also the year in which the International Society for the Study of the Lumbar Spine met in Utrecht.

Later a report entitled "Myelographic media" was published in the journal

Neurosurgery, detailing the concern expressed at the meeting regarding the increasing awareness of long-term inflammatory sequelae of iophendylate.

Various measures were suggested, in particular preferred use of water-soluble dyes, but with an emphasis on looking for non-invasive imaging methods.

However, a ban on oil-based dyes was ruled out. Burton and Wiltse ([3]) discussed the Utrecht meeting in a Guest-Editor's Comment in the journal Spine in March
1978.

They remarked:

"Introduction of foreign bodies into the subarachnoid space invariably involves some patient risk."

In the same edition of Spine, Burton published an article on Lumbosacral Arachnoiditis. ([4])

He noted

"the importance of Pantopaque in contributing to this disease process appears to be quite significant."

Skalpe ([5]) also published a paper in the same edition of the journal, writing about adhesive arachnoiditis as a late sequela, attributing this to increased osmolality of the spinal fluid after injection of oily contrast medium.

Johnston and Matheny also contributed to this edition of Spine, with a paper on the microscopic lysis of lumbar adhesive arachnoiditis. ([6])

The authors, writing on the causes of the condition, noted

"some emphasis on the role of Pantopaque, multiple surgeries and other trauma."

They also concluded that reaccumulation of scar tissue, and recurrence of the condition meant that their technique of lysis of scar tissue was not recommended.

Brodsky also contributed a paper ([7]) on cauda equina arachnoiditis.

He noted that

"the majority of patients studied did not have the usual adhesive arachnoiditis, but the picture they projected was more commonly due to spinal stenosis, extraarachnoid dye injection, extradural scar, etc."

Brodsky concluded

"In only a small percentage of these patients could the symptoms be attributed to the arachnoiditis changes seen in the myelogram."

However, this conclusion can surely only be applied within the parameters of the study, and as Brodsky himself pointed out, these were not typical adhesive arachnoiditis cases.

Quiles et al ([8]) writing on surgery for chronic arachnoiditis noted that the gross and histopathological changes seen were very similar to those seen in dogs.

The authors concluded:

"Lumbar spine surgery and the **injection of contrast materials** prior to the diagnosis of this condition are considered the most important factors in its genesis."

Benner and Ehni, ([9]) looking in particular at the post-operative type of arachnoiditis, stated:

"The combination of oil myelography and spinal surgery was the probable cause of arachnoiditis in almost all cases."

Meanwhile, Johnson and Burrows published in the British Journal of Radiology a paper ([10]) describing thecal deformity; they looked at 93 repeat myelograms and found thecal scarring in 61% after the water-based dye
Conray
and 74% after
Myodil.

Dujovny et al ([11]) in their dog study used a scanning electron microscope (SEM) to detect the effects of contrast media on the arachnoid membrane.

They found that the normal fenestrations of the membrane became closed by a fibrin-like structure after the dye had been used, and there were macrophages present, indicating inflammation.

Iophendylate produced the greatest number of macrophages within the fenestrations.

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[2] Kwan WW, Kwi NK, Chye Le, *J Neurosurg* 1977 Mar; 46 (3): 391-3 Pantopaque pulmonary embolism during myelography.

[3] Burton C Wiltse L *Spine* ; 1978 Mar; 3 (1): 23

[4] Burton CV *Spine* 1978 Mar; 3(1): 24-30 Lumbosacral arachnoiditis.

[5] Skalpe IO *Spine* 1978 Mar; 3(1): 61-4 Adhesive arachnoiditis following lumbar myelography

[6] Johnson JD, Matheny JB *Spine* 1978 Mar; 3(1): 36-9 Microscopic lysis of lumbar adhesive arachnoiditis.

[7] Brodsky AE *Spine* 1978 Mar; 3(1): 51-60 Cauda equina arachnoiditis. A correlative clinical and roentgenological study.

[8] Quiles M, Marchisello PJ, Tsairis P. *Spine* 1978 Mar; 3(1): 45-50 Lumbar adhesive arachnoiditis. Etiologic and pathologic aspects.

[9] Benner B, Ehni G. *Spine* 1978 Mar; 3(1): 40-4 Spinal arachnoiditis. The postoperative variety in particular.

[10] Johnson AJ Burrows EH *Br J Radiol* 1978 Mar; 51 (603): 196-202

[11] Dujovny M, Barrionuevo PJ, Kossovsky NIR, Laha RK, Rosenbaum AE *Spine* 1978; 3(1): 31-35 Effects of contrast media on the canine subarachnoid space.