alkali injuries with the expected poor prognosis. The patient was therefore started on intensive ascorbate, citrate, dexamethasone, with regular antibiotics and mydriatics.

On re-examination 24 hours later the corneal opacities had enlarged slightly but subsequently remained unchanged. The cornea re-epithelialised over the following week (Fig 2), and 1 month later, when the eye was stable he underwent a successful left penetrating keratoplasty (Fig 3). Histology demonstrated a deep stromal scar consistent with an exothermic reaction (Fig 4).

In our case fragments of Betonamit penetrated into the corneal stroma leading to full thickness scarring. The patient was looking down to examine the drill hole, in this way the upper and central cornea in each eye were most affected by the explosion.

The discrete pattern of corneal damage suggested that thermal damage was the main cause of corneal damage. Particulate matter penetrated the cornea and remained in contact during the exothermic reaction. Alkali injuries tend to produce a diffuse corneal reaction with delays in corneal epithelialisation as a result of permanent metabolic changes in the limbal epithelium. Although the alkalinity of the powder may have contributed to the corneal damage, it was interesting to note that where there was little fluid (such as on the eyelids) there was little tissue damage.

This case illustrates the hazards of using these novel crackling agents, but also the relatively benign course that combined thermal and alkali corneal injuries follow.

Figure 2  Minimal fluorescein staining of the right eye at 1 week, indicating rapid corneal re-epithelialisation (note the underlying cornea is white).

Figure 3  The left cornea 3 months after corneal grafting.

Figure 4  Histology of the scarred cornea showing loss of cell nuclei and disorganised collagen fibrils.

COMMENT
Vajpayee et al looked at 59 patients presenting with thermal corneal burns and found that 90% of these injuries occurred at home and involved boiling fluids, matches, or fireworks. In 89% the burn was limited to the epithelial layer and only two needed penetrating keratoplasty. During prolonged exposure to heat (for example, during molten metal injuries), full thickness burns are produced.

In our case fragments of Betonamit permeated into the corneal stroma leading to full thickness scarring. The patient was looking down to examine the drill hole, in this way the upper and central cornea in each eye were most affected by the explosion.

The discrete pattern of corneal damage suggested that thermal damage was the main cause of corneal damage. Particulate matter penetrated the cornea and remained in contact during the exothermic reaction. Alkali injuries tend to produce a diffuse corneal reaction with delays in corneal epithelialisation as a result of permanent metabolic changes in the limbal epithelium. Although the alkalinity of the powder may have contributed to the corneal damage, it was interesting to note that where there was little fluid (such as on the eyelids) there was little tissue damage.

This case illustrates the hazards of using these novel crackling agents, but also the relatively benign course that combined thermal and alkali corneal injuries follow.

granular cytology, and lack obvious cytoplasmic melanin. Ultrastructurally, the clear cell cytology is due to vacuolar degeneration and subsequent coalescence of abortive melanosomes that do not contain melanin pigment.

We present the first case of balloon cell naevus of the caruncle and discuss the differential diagnoses.

CASE REPORT
A 16-year-old girl presented with a 0.4 × 0.2 mm, brownish, and apparently cystic lesion in the left lacrimal caruncle. No other similar lesion was noted in the eyelids or elsewhere. The serum lipid level was normal. The lesion was excised, formalin fixed, and processed to paraffin embedding.

Special histochemical stains included periodic acid–Schiff (PAS), colloidal iron, and Alician blue. No stains for lipids were performed owing to lack of a wet tissue specimen. Immunohistochemical studies were performed with monoclonal antibodies against HMB-45 and human macrophage CD68 (Dakopatts), HAM56 (Enzo Diagnostics) and polyclonal sera against alpha-1-antichymotrypsin, S-100 protein, lysozyme (Dakopatts). Antibody attachment was identified using a standard avidin–biotin–peroxidase technique, with the enzyme label being visualised as the red final reaction product of aminoethylcarbazole.

Microscopically, haematoxylin and eosin stained sections showed tissue lined by non-keratinising epithelium with goblet cells, consistent with conjunctiva. The substantia propria contained a population of polygonal clear cells with a centrally placed, bland nucleus; occasional cells appeared to be binucleated (Fig 1). Further sections cut at a deeper level revealed a thin rim of characteristic naevus cells, with the formation of few nests, overlying the clear cell component. The clear cells stained weakly positive with PAS and Alician blue reaction and strongly positive with colloidal iron for acid mucopolysaccharides.

Immunohistochemical stain for S-100 protein was positive in both the naevus and clear cells, while a polyclonal antibody to alpha-1-antichymotrypsin stained the balloon cells only. No positivity to histocyste markers (HAM-56, CD68, lysozyme) and activated macrophage (HMB-45) was observed in the lesion.

In the absence of any intrinsic clinical significance, their occurrence in benign or malignant lesions is interesting because it increases the potential for histological misdiagnoses, particularly when the site of occurrence is uncommon.

Although the presence of balloon cells does not appear to have any intrinsic clinical significance, their occurrence in benign or malignant lesions is interesting because it increases the potential for histological misdiagnoses, particularly when the site of occurrence is uncommon.

Although the presence of balloon cells does not appear to have any intrinsic clinical significance, their occurrence in benign or malignant lesions is interesting because it increases the potential for histological misdiagnoses, particularly when the site of occurrence is uncommon.

Although the presence of balloon cells does not appear to have any intrinsic clinical significance, their occurrence in benign or malignant lesions is interesting because it increases the potential for histological misdiagnoses, particularly when the site of occurrence is uncommon.
cal methods for acid mucopolysaccharides, such as colloidal iron and Alcian blue. Masson–Fontana stain for melanin pigment may also occasionally prove positive in a few balloon cells. Other differential diagnoses should include, in the ocular context, sebaceous adenoma, granular cell tumour, clear cell hyadradenoma, and malignant clear cell neoplasms. In granular cell tumour, the cytoplasm can also look clear although at high power it is usually finely granular. Features more in keeping with a diagnosis of balloon cell naevus in this case are the absence of immunoreactivity to panmacrophage markers (granular cell tumour are often positive) and the presence of characteristic naevus cells adjacent to the main lesion. Adrenal tumours could be ruled in or out of the diagnosis on the basis of cytokeratin staining.

IRENE PECORELLA
ANTONIO CIARDI
Dipartimento di Medicina Sperimentale e Patologia,
Università degli Studi di Roma 'La Sapienza',
Roma, Italy

SANTI MARIA RECUPERO
II Clinica Oculistica, Università degli Studi di Roma 'La Sapienza',
V le Regina Elena, 324-00161 Rome, Italy

Correspondence to: Dr Irene Pecorella, Dipartimento di Medicina Sperimentale e Patologia, Policlinico Universitario ' Umberto I', Università degli Studi 'La Sapienza', V le Regina Elena, 324-00161 Rome, Italy.

Accepted for publication 13 September 1996

Bone formation in rejected corneal graft

EDITOR,—Intracorbal bone formation is a well known phenomenon that occurs mainly in long standing phthlitical eyeballs.1 Presence of bone was reported also in cases of epibulbar osseous choristoma2 as well as in sclera of a patient with chronic renal failure.3 We present, to our knowledge for the first time, bone formation in the cornea.

CASE REPORT
A 47-year-old woman, known to suffer from congenital glaucoma, had bilateral completely opaque large cornes. She had been treated in another hospital at the age of 15 years, undergoing corneal graft in her left eye, but the graft opacified soon after surgery.

In her first visit in our eye clinic her visual acuity was no light perception in the right eye and light perception in the left eye. Both corneas were completely opaque and vascularised (Fig. 1), and the retrocorneal parts of the eyes could not be examined. Ultrasound examination of the left eye revealed an axial length of 31 mm and dislocated lens in the vitreous. Because of the potential for vision in the left eye, perforating keratoplasty was performed under local anaesthesia; the recipient corneal button was sent for histopathological evaluation. Four months after surgery the corrected visual acuity of the operated eye was finger counting from 1 metre. The cornea was clear, enabling visualisation of the fundus that showed almost total cupping of the optic nerve head. The patient has been treated by antiglaucomatous drugs and topical and systemic corticosteroids.

The specimen that was submitted to our ophthalmic pathology laboratory consisted of a completely opaque and thickened corneal button measuring 7 mm in diameter. In cutting the cornea with the microtome, it was found to be hard; therefore, we performed decalcification. Microscopic examination revealed scarred, vascularised, and inflamed corneal tissue with irregular epithelium and almost no Bowman’s layer. Areas of calcification were seen in the superficial corneal layers, some in the form of band keratopathy and others as large calcified stromal areas. A large piece of bone formation with fibrovascular bone marrow was located in the deeper stromal layers (Fig 2). Another small piece of bone was seen more superficially. The Descemet’s membrane was broken and folded, and thick fibrous tissue was seen behind it. Some melanin pigmentation (Fontana staining positive; PERLS staining negative) were found in the posterior stromal layers.

COMMENT
In a large series4 of 2486 enucleated eyes, 4.8% had intraocular ossification. In 69% of them marrow was found within the hetero-

Figure 1 Caruncular compound naevus, predominantly composed of large, clear cells. Towards the surface, small melanocytes with the formation of few nests can be recognised. Haematoxylin and eosin, × 250.

Figure 2 Histological section of the cornea showing superficial vascularisation and calcifications, and two layers of bone tissue with bone marrow in the deep stromal layers (haematoxylin and eosin, × 40).

Figure 1 Clinical picture showing the completely opaque and vascularised right cornea, and the opaque corneal graft in the left eye.