

Constraints on Layout in Multimodal Document Generation

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Overview

Background to the Project

Levels of Representation for Generation

Rhetorical Structure in Document Generation

Rhetoric Meets Practicality

Conclusions and Further Research

Background to the Project

GeM: Genre and Multimodality

Genre model of illustrated document types

Close work with designers and layout professionals

Practical constraints on design tasks

Aimed at multimodal NLG

Levels of Representation

Content Structure

the structure of the information to be communicated

Rhetorical Structure

the rhetorical relationships between content elements, the 'argument'

Navigation Structure

the ways in which the intended mode(s) of consumption of the document is/are supported

Layout Structure

the nature, appearance and position of elements on the page

Genre is constituted in...

The necessity to satisfy goals at these levels, and to address constraints:

Canvas constraints

arising out of the physical nature of the object

Production constraints

arising out of the production technology

Consumption constraints

arising out of the way in which the object is mediated/consumed

Rhetorical Structure in Document Generation

The necessity to satisfy goals at these levels, and to address sources of constraint:

Canvas constraints	arising out of the physical nature of the object
Production constraints	arising out of the production technology
Consumption constraints	arising out of the way in which the object is mediated/consumed

The HERALD

PAG 5 **the mix** The critics' choice and previews of Oscar night

FATUR **Litter** Time we all mucked in

CONTS **MAJOR** Today's Token Pages 15

INSIDE
Brankin back at work after surgery
 Deputy Sports and Culture Minister Bruce Brankin was back at her desk yesterday, six weeks after undergoing surgery for breast cancer.
 Around 350 new cases are diagnosed each year in Scotland.
 Page 9

Home News
Nazi fears
 British nationalist formed in 1948 that the Bannock might spring over the border with Nazi sympathies, including Albert Speer from Spanish prison, secret papers released today.
 Page 3

Blair puts NHS crusade at heart of election fight

Challenge for health service to reform

BENEDICT BROGAN, MURRAY RITCHIE AND AISHA MACDONALD

TONY Blair yesterday pinned his hopes of re-election to a health service that has been the big battleground of the next election. Ministers are increasingly worried that the absence of visible improvements in the NHS, particularly in England, has meant that voters are not convinced by the promises of his Tory leader William Hague, who accused Blair of spending on recycled clichés. He warned: "The Prime Minister has not accepted any responsibility for the health service. We will use his own words to tell the voters that he has previously responsible."

Mr Blair said that the Government's "ambitious determination" to turn around Scotland's health record. "We will take these new measures to make the babies who fall more Scotch than any other. We want fewer smokers, fewer babies growing up with the hope of smoking, fewer deaths from cancer."

The £2m will also be used for a health promotion fund to meet long-term targets for better health and social justice, including a national campaign to encourage people to eat more healthily through diet and exercise.

£10m top of the range sale



See view: The Black Cuillin, on the market for £10m. The clan chief has pledged the rugged range on Skye will stay in the public domain. Picture: PETER DALRY

He promised to take around half of the £2m to be used for a health promotion fund to meet long-term targets for better health and social justice, including a national campaign to encourage people to eat more healthily through diet and exercise.

Mr. Deacon also promised to extend coverage to new user groups, and set up vaccination programmes.

Liberal Democrat health spokesman, Neil Radford, welcomed the establishment of the health promotion fund as the fulfilment of a long-standing Lib-Dem commitment.

However, SNP Shadow Health Minister Kay Ullrich criticised the £1.1m if Mr Deacon were to match Mr Brown's goal of increased health spending.

Clan chief puts Black Cuillins on the market

RAYMOND DUNCAN

ONE of Scotland's most famous mountains ranges has been offered for sale at more than £10m by a clan chief.

The aim is to raise funds to support an 800-acre wildlife park in the heart of a heathland.

When Black Cuillin, one of the country's most spectacular landscapes and an area of major international importance, has been put on the market by the 29th Chief of the Clan MacLeod.

John MacLeod of MacLeod yesterday described the sale as "the most difficult of his life and 'an extremely painful experience'."

The move brought strong criticism from Western Isles MSP Colin MacDonnell. He said: "The idea of selling the Cuillins is ridiculous but at such a price it's obscene."

MacDonnell said he had been told he had been asked to help in the sale of the Cuillins. He said he had been told he had been asked to help in the sale of the Cuillins.

Politics
On hold
 Construction of a £22.8m home for the World Assembly was put on hold yesterday by the First Minister Rhodri Iwan Jones.
 Page 7

Books
Write times
 The London Book Fair is doing a special trade, discover Alexander Lankford and our reviewers review the latest releases.
 Pages 14 and 17

Comment
What says
 Jack Webster reveals the winner of the annual Vespene Dinner while our reviewers review the latest releases.
 Page 19

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THE NEWS: MIRA - £3 (J) INFLATION 10.86% 20 - 40.64 (L) - 3 130.60 - £36 (L) - 4 0.413 - £28

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Wiseman bids to be even bigger cheese

ROBERT POWELL, Business Editor

ROBERT Wiseman Dairies yesterday revealed plans to bid to buy the milk, butter and cheese market in Scotland with a market share of over 70%.

He has given rise to previous grumbling among farmers and consumers. Accusations that the Wiseman bid to buy the market share of 28% is currently held by the Scottish milk market last month.

Wiseman started life in 1945 as a family farm which distributed

northern England and is building a dairy near Birmingham to establish a dairy in Scotland in the Midlands.

Wiseman's much larger milk operation was concentrated primarily in southern England and Wales.

The biggest problem facing Wiseman is that Unigate has already agreed to sell its milk processing competences to Dairy Crest, on the other hand, would have a heavy capital investment in southern England.

Wiseman approached Unigate last week and offers said it is expected to make a firm offer within days.

The Scottish company, whose shares were listed on a public exchange in December, has been steadily since the deal was announced on February 16, leaving the value of its proposed bid to just over £200m.

The Unigate shareholders would see the Government with less of a say in the company's future. However, the Scottish company is offering more money and is prepared to pay cash.

If you think times are hard try sleeping on the pavement

GLASGOW CITY MUSEUM

Check out the new temporary exhibition: **GLASGOW CITY MUSEUM**

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£10m top of the range sale



Sea view: the Black Cuillins, on the market for £10m. The clan chief has pledged the rugged range on Skye will stay in the public domain Picture: PETER JOLLY

Clan chief puts Black Cuillins on the market

RAYMOND DUNCAN

ONE of Scotland's most famous mountain ranges has been offered for sale at more than £10m by a clan chief.

The aim is to raise funds to repair an 800-year-old castle which is the seat of a leading clan.

Skye's Black Cuillins, one of the country's most spectacular landscapes and an area of major international importance, has been put on the market by the 29th Chief of the Clan MacLeod.

John MacLeod of MacLeod yesterday described the decision to sell as the most difficult of his life and "an extremely painful experience".

The move brought strong criticism from Western Isles MP Calum MacDonald. He said: "The idea of selling the Cuillins is ridiculous but at such a price it's obscene. MacLeod should hang his head in shame for trying to exploit what God has given the

people of Skye. It goes to show that one thing worse than a thieving foreign landlord is a greedy Scottish one."

He also said it demonstrated the need to get land reform through Parliament at top speed to stop "the obscenity of

INSIDE

The chief's castle
— Page 2

landlords trying to cash in on public concern for areas like the Cuillins".

The 23,300 acres include more than 14 miles of coastline, two salmon rivers, a sheep farm and farmhouse.

News of the sale prompted a call from Highland Council for the mountains to be bought for the nation. It wants the "world treasure" bought by a partnership of public bodies,

tenant farmers and local communities accessing Heritage Lottery Funding at District Valuer's valuation.

Potential partners could include the council, Highlands and Islands Enterprise, Scottish Natural Heritage and the National Trust for Scotland.

Councillor Michael Foxley, chair of the land and environment select committee, said: "We will be seeking a meeting in the very near future to set the ball rolling."

The 64-year-old owner of Dunvegan Castle said the move to sell the 35 square miles of rugged landscape was principally economic. Mr MacLeod called the mountain range "part of my soul". He vowed the Cuillins, once a temporary refuge for Bonnie Prince Charlie and now a paradise for geologists, botanists and mountaineers,

Continued on Page 2

Skye's £10m top of the range sale

Continued from Page 1 would stay "in the public domain". He said: "The continued freedom of access for all to these spectacular hills must remain an integral part of the process. I would not accept an offer of £15m from someone who wanted to put a fence round it."

The clan chief said he considered the protection of existing jobs and the creation of 120 new ones to be "more important than acres".

Money raised would be reinvested in Skye with the castle's fabric repaired and new conservation and tourism projects planned.

"This castle was built to keep people out and now we want to get people in," said the landowner, who said such was the roof's condition guests had been known "to sleep with an umbrella up".

The clan chief inherited Dunvegan in 1965, building it into a tourist attraction. It attracts 145,000 visitors annually.

He anticipates interest from clan members abroad and will consider interest from foreign owners prepared to abide by sale conditions.

International property consultants FPD Savills, which based the asking price on the recent sale of Snowdonia to the National Trust, and other benefactors are confident of creating serious interest.

John Lambert, chief executive of MacLeod Estates, was adamant that unless the asking price was reached urgent projects such as Dunvegan's re-roofing and a planned hotel and leisure complex would not go ahead. He viewed it as a "win-win" situation for the island if the Cuillins were looked after and at the same time capital was released for developments.

"I wouldn't want to turn it into a Disneyland attraction but we have not been able to

The Cuillins

□ Name often associated with the Irish hero Cuchullin, but more likely it is Norse for "upturned boat" because of the shape Cuillins resemble when approached from north-west.

□ Vikings took refuge there, as did Bonnie Prince Charlie, famously carried over the sea to Skye by Flora Macdonald.

□ Formed by volcanic activity about 60 million years ago, jagged outline of main Cuillin ridge seen today is result of post-ice Age glacial erosion.

□ Earliest recorded climb was in 1836 by Professor James Forbes. There are 20 peaks over 3000ft.

provide the facilities for those already going there."

Nigel Hawkins, director of the John Muir Trust that bought Cuillins land in 1974 from rock singer Ian Anderson, of Jethro Tull, said the asking price was high.

He said: "The Trust is not in the business of paying over the odds."

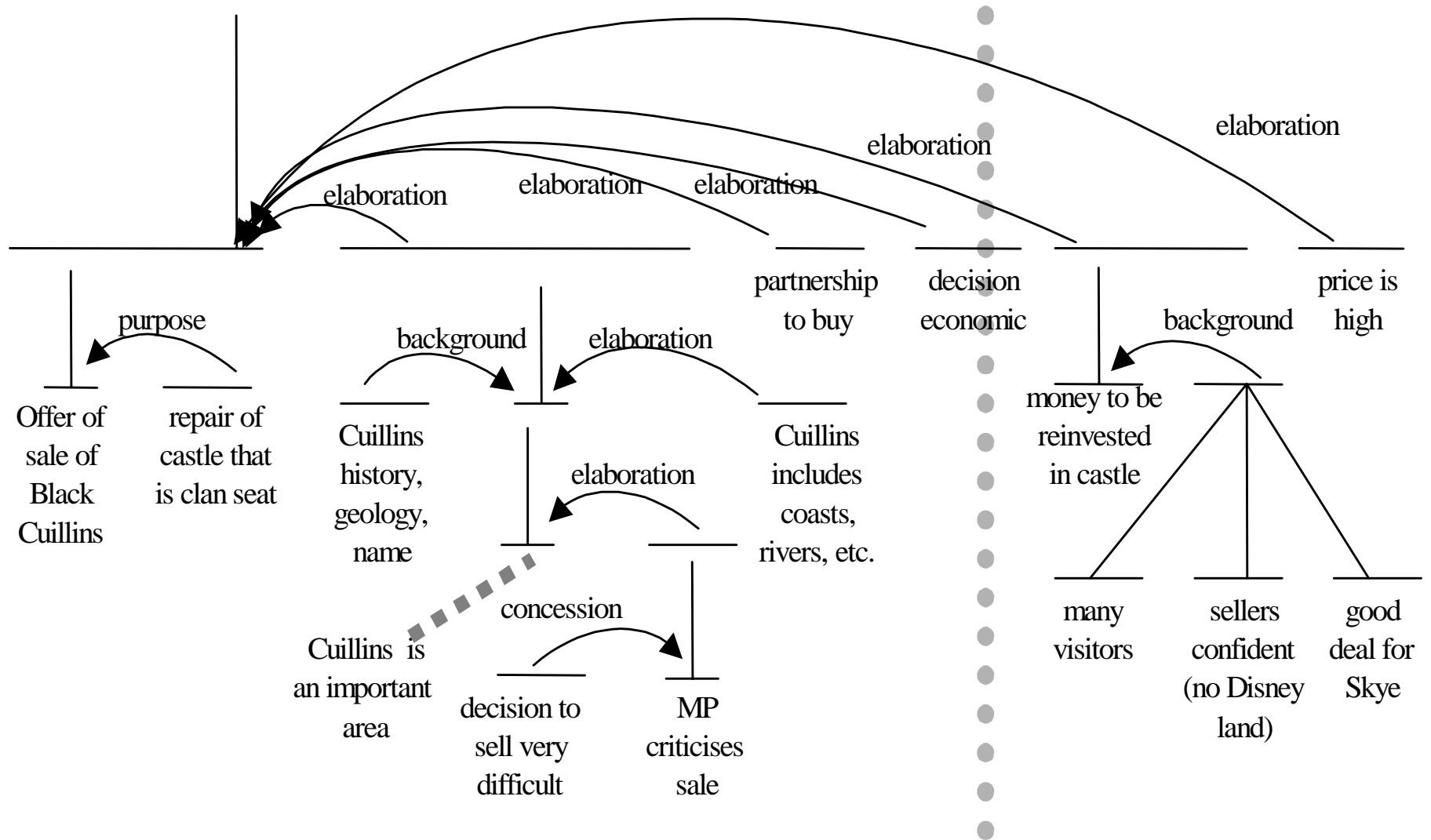
□ A piece of Scottish history has been sold to the Americans. Castle Grant at Grantown on Spey, the seat of the Clan Grant since the 14th century, has been sold to a US-based group which invests in holiday rental property in Europe and America. It faces a new lease of life as a holiday destination for US tourists anxious to trace their highland routes.

The castle, on the outskirts of the small Morayshire town, was sold by Mr Graham Kieler and his wife, Maureen. They bought it in 1994, and carried out substantial restoration work before putting it on the market last August for just under £400,000.



The spectacular Dunvegan Castle: the clan centre has triggered the proposed sale of the Black Cuillins because of the need for repair. The preserved interiors (below) have proved a great tourist attraction. Pictures: PETER JOLLY and JOHN P.





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[Clan chief puts Black Cuillins on the market](#)

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NEWS LATEST

Clan chief puts Black Cuillins on the market

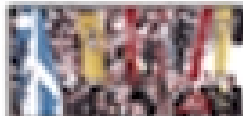
RAYMOND DUNCAN

One of Scotland's most famous mountain ranges has been offered for sale at more than £10m by a clan chief.

The aim is to raise funds to repair an 800-year-old castle which is the seat of a leading clan.

Skye's Black Cuillins, one of the country's most spectacular landscapes and an area of major international importance, has been put on the market by the 29th Chief of the Clan MacLeod.

John MacLeod, chief of Black Cuillins and a member of the MacLeod clan.



The inside story of Scotland's first democratic parliamentary election

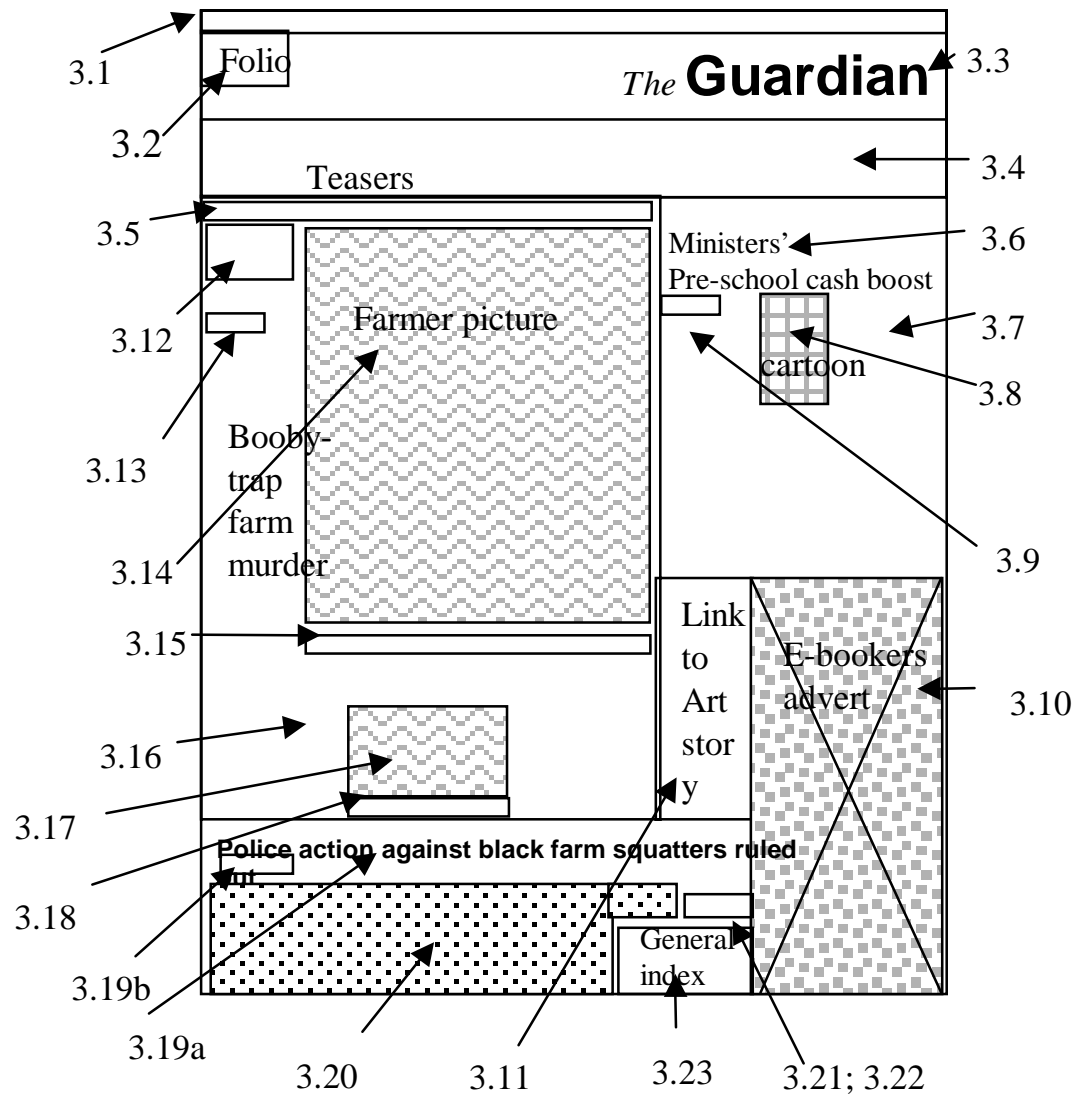
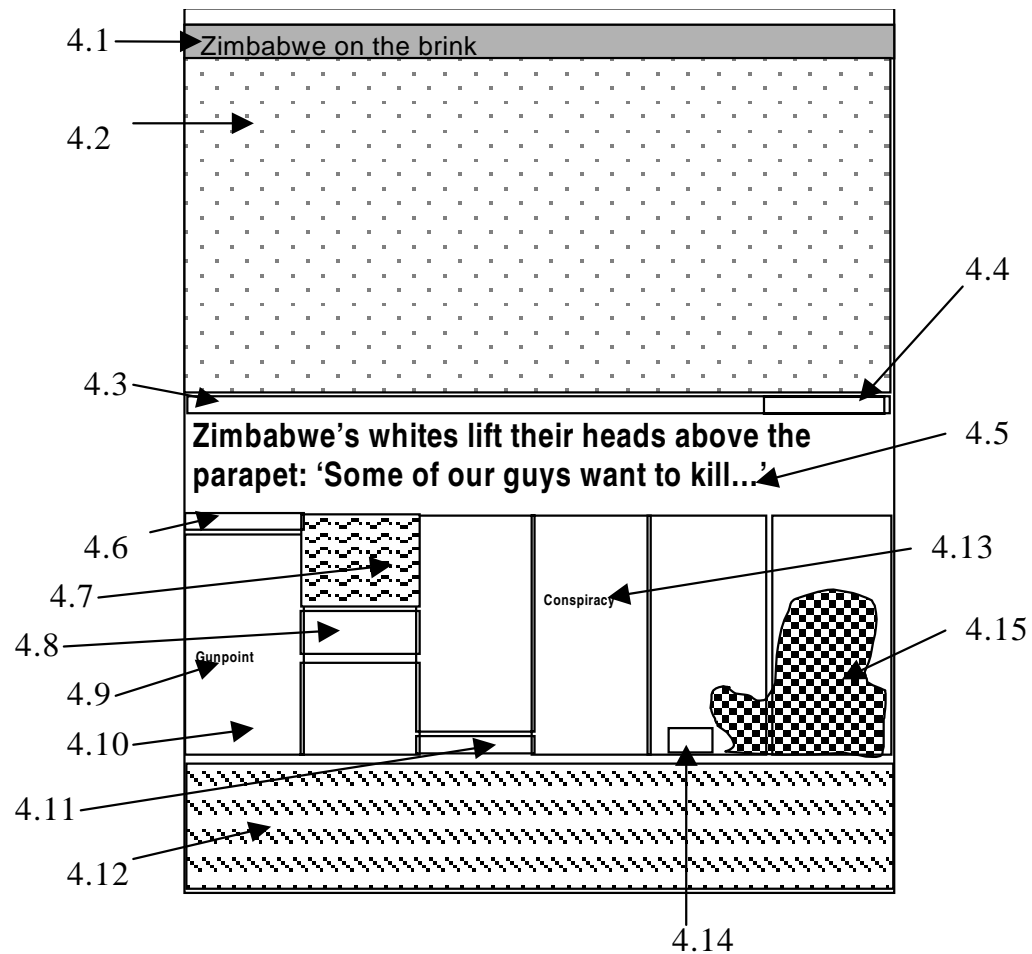


Figure 4. Terminal layout elements of the Guardian Front page, April 11th, 2000.

On the brink, page 3

**Special report and audio dispatch
from Chris McGreal in Harare at
[www.newsunlimited.co.uk/
zimbabwe](http://www.newsunlimited.co.uk/zimbabwe)**

Figure 5. Linking material concerning
Zimbabwe on *Guardian* front page



Key:

- 4.1 Page caption
- 4.2 Photo of 'poor blacks'
- 4.3 Caption: 'Dozens of white-owned farms in Zimbabwe have been occupied by poor blacks claiming the land as their own, with the support of Robert Mugabe's government, as the country's political crisis deepens'
- 4.4 Photograph: Marion Herud
- 4.5 Headline
- 4.6 By-line: 'Chris McGreal in Wedza, Zimbabwe'
- 4.7 Map of Zimbabwe in context of bordering countries, inset of position of Harare
- 4.8 Quotation: 'I am not a party political person but things are so bad I had to get involved. If democracy does not return, the economy of this country will collapse'. 'Monty' Montgomery, white ex-policeman
- 4.9 Crosshead: 'Gunpoint'
- 4.10 Text of article
- 4.11 'Links: <http://www.mdc.co.zw> Movement for Democratic Change'
- 4.12 Advert for charity
- 4.13 Crosshead: 'Conspiracy'
- 4.14 Photo caption: 'Morgan Tsvangirai, head of the opposition MDC: white support is crucial to his attempt to topple Robert Mugabe'
- 4.15 Inset photo of Morgan Tsvangirai

Figure 6. Guardian printed edition, page 3 coverage of events in Zimbabwe

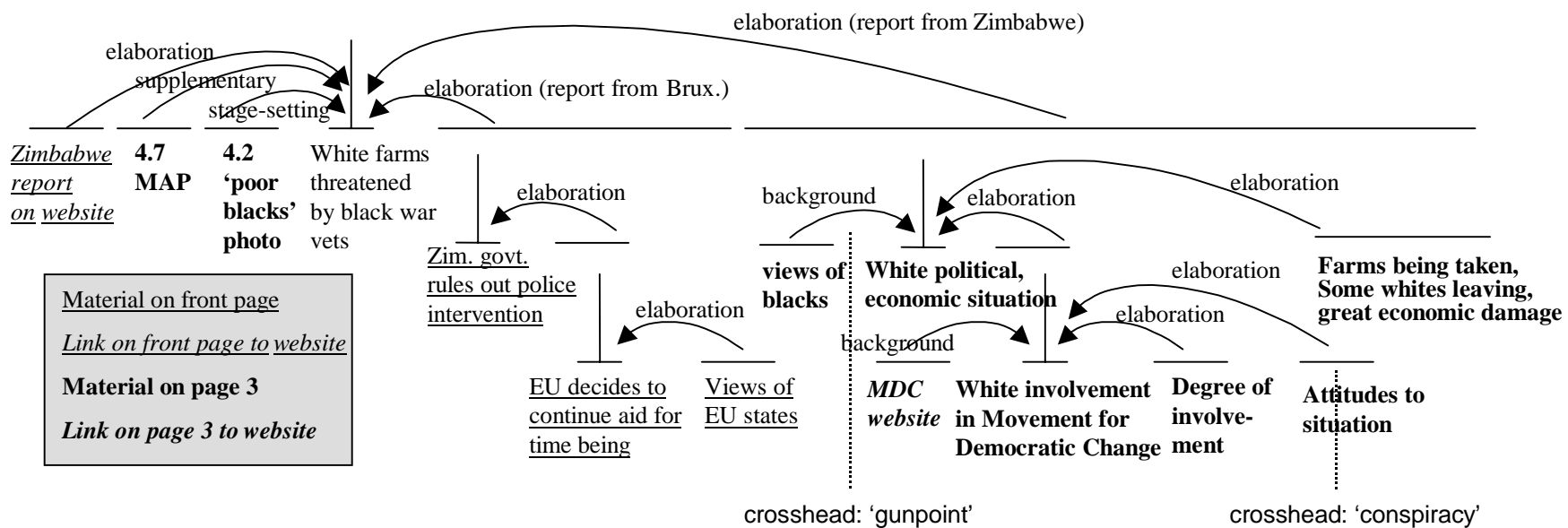


Figure 7: Rhetorical Structure Analysis: Zimbabwe material, *The Guardian*, 11 April 2000

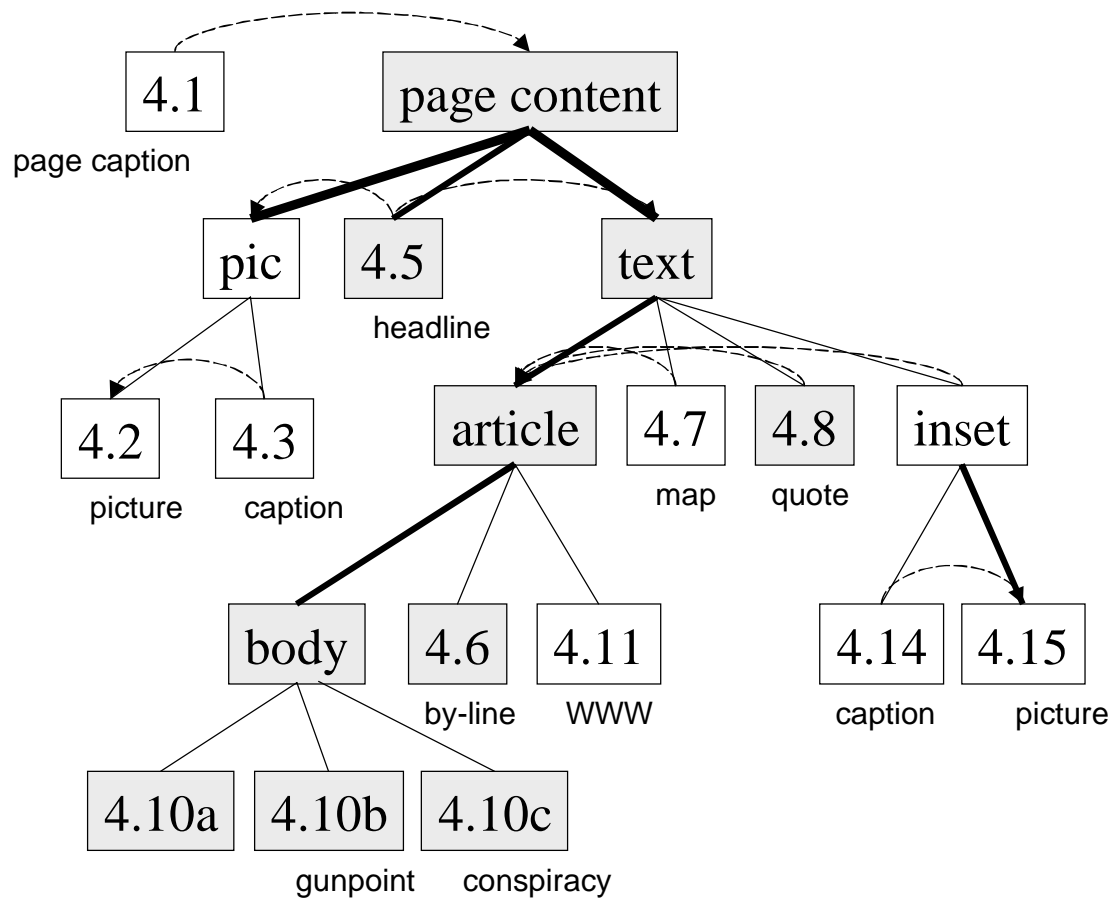


Figure 8. Layout structure for page 3 of *Guardian*



educationUnlimited
courses schools colleges graduates TEFL universities



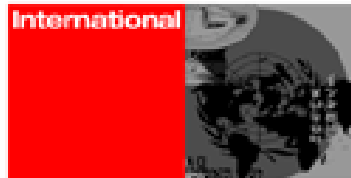
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The Observer

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Zimbabwe's whites lift their heads above the parapet: 'Some of our guys want to kill ...'

'I am not a party political person but things are so bad I had to get involved. If democracy does not return, the economy of this country will collapse' Monty Montgomery, white ex-policeman

[Zimbabwe: special reports](#)

Chris McGreal in Wedza, Zimbabwe Tuesday April 11, 2000

Comrade Edward Musuka's note was to the point. "The hour has come to take what is rightfully ours. You have clearly shown us that you have ill feelings against the land issue. If you continue doing that we will bring five lories of war vets tomorrow or any day. You are not the only farmer who has his farm taken. For your information we have taken Van Tonder's today and he was very cooperate," he wrote.

The note warned a white Zimbabwean farmer, Richard Bedford, to stop resisting the occupation of his sprawling tobacco farm by hundreds of poor blacks who now claim the land as their own. Their leader, Comrade Musuka, arranged for a few dozen men to pound out revolutionary songs while demonstrating what their machetes could do to a tree. Richard Bedford gave in.

Gunpoint

At a neighbouring farm, Derek Hinde has spent three weeks answering distress calls on the radio. When they come - some panic-stricken at the mob at the gates, some resigned - he cannot help



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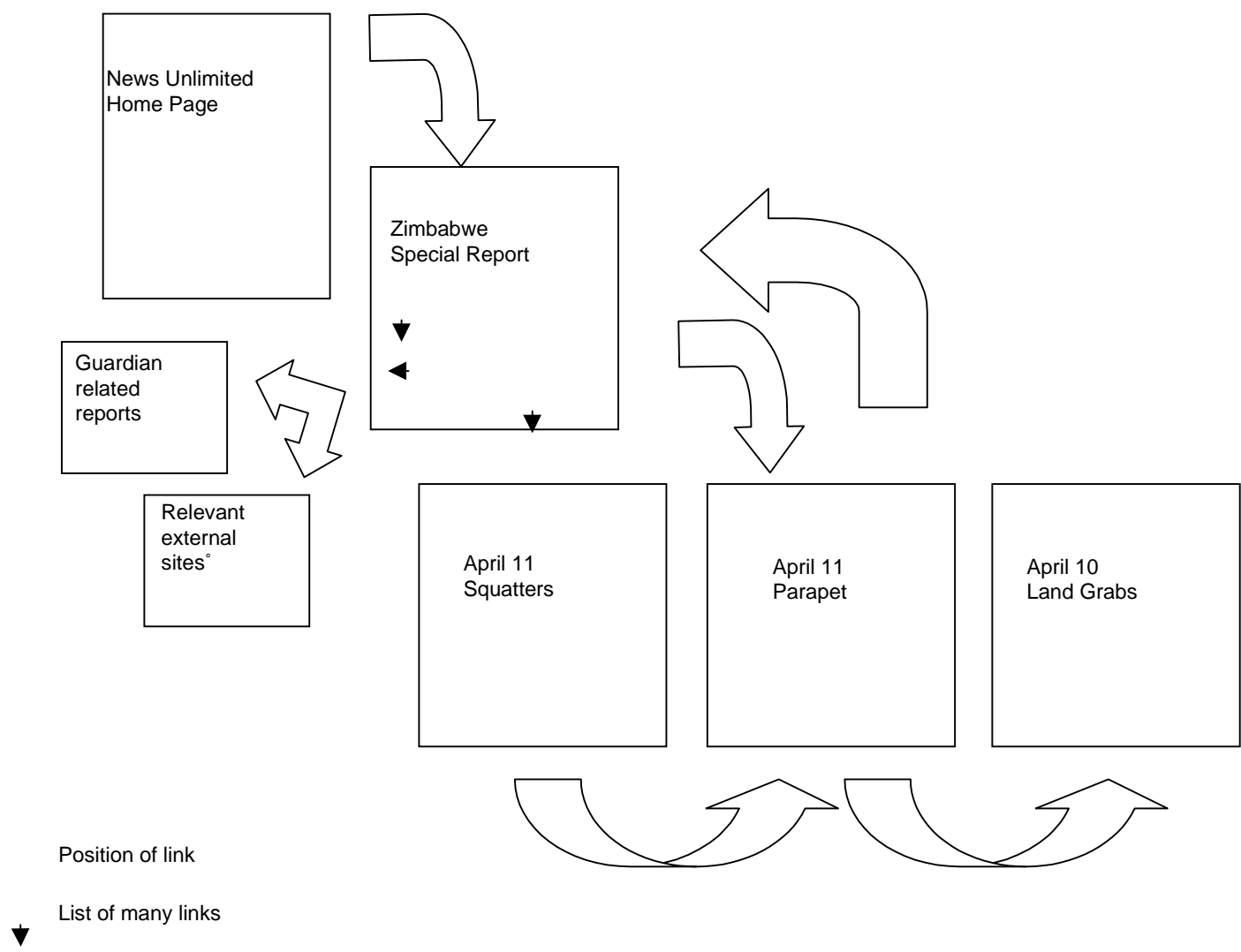
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Britain).

GANNETS: Sulidae

NORTHERN GANNET *Morus bassanus*

Plate 5

Du – Jan van Gent

Fr – Fou de Bassan

Ge – Basstöpel

Sw – Havssula

Identification: 36" (91cm). Majestic, goose-sized, cigar-shaped sea-bird, with long pointed bill, *long narrow wings* and *pointed tail*; twice as large as Herring Gull. Adult white, with greyish bill, *yellow hood* and *black outer wings*. Juvenile dusky-brown, closely speckled white; immature increasingly invaded by white over 4-5 years. Flight alternates deep flaps with long glides, with birds passing in characteristic lines astern; when fishing, soars and wheels, then *plunges head-long after fish*, sometimes from 30m. or more and with wings retracted.

Confusion species: Full adult unmistakable; similarly aged Cape Gannet *M. capensis*, reported from Iberia, differs in black secondaries and tail and longer black gular stripe. Immature may suggest frigatebird, booby, albatross and other large tubenoses, constituting serious pitfall for unwary observer.

Voice: Barking *arrah*, growls and gobbling notes.

Habitat: Offshore, sometimes pelagic. Breeds in dense colonies on island tops and cliff ledges. Map 15.

CORMORANTS: Phalacrocoracidae

Medium-sized to very large birds, mound-nesting in marshes, trees and rocky cliffs, spending winter on open waters or coastal seas. Swim and dive expertly, submerging in alarm like divers but presenting hooked bills and bare lower faces and sinuous necks. Perch freely, often with wings held open. Outline, action and formation in flight – at or well above sea surface, even higher over land – recall those of geese but beats of broad-ended wings shallower, while kinked necks held above body line. Seasonal change in adult marks and sheen; immatures lack sheen and may be pale below. Voices guttural.

CORMORANT *Phalacrocorax carbo*

Plate 4

Du – Aalscholver

Fr – Grand cormoran

Ge – Kormoran

Sw – Storskarv

Identification: 36" (91cm). Goose-sized reptilian water-bird, with *long, deep, hooked bill* and long head with steep nape held slightly raised in most postures. Plumage *bronze-black*, contrasting with yellow bill and gape and *white chin and cheeks*; when breeding, also shows *round white thigh patch* and, in most European and some British birds, whitish head-ruff and neck. Juvenile dull oily-brown above, dirty white below. Swims low in water like diver but thick neck more erect or kinked. Flight powerful, goose-like but with shallower, jerkier wing-beats; neck extended slightly above body line; flies in lines or V formations, often at some height. Perches upright, often with wings held out. Sociable. **Voice:** Low guttural *r-rah*.

Plate 5

MISCELLANEOUS LARGE LAKE AND SEA BIRDS

WHITE PELICAN

Very large with huge wingspan. Huge, flat, pouched bill. Extensive black on primaries and secondaries of under-wing are diagnostic. Feet reddish. Flies in lines, often at a great height.

p.41

DALMATIAN PELICAN

Very large. Separated from White Pelican by 'dirtier' white plumage and by lack of extensive black on under-wing. Feet blackish.

Map 19 p.42

BLACK-BROWED ALBATROSS

Wing span 7 ft. (2 m.). Confused with immature Northern Gannet and black-backed gulls but general character like huge Fulmar. Note striking black-white-black under-wing pattern and dark tail. Effortless flight, recalling Fulmar and Cory's Shearwater.

p.35

NORTHERN GANNET

Plunges after fish.

Adult: White; pointed tail; golden nape; bold black primaries.

Immature: Dark brown with a pointed tail.

Changing immature: Increasingly white, patched with dark.

Map 15 p.40





9 Fulmar

Partial migrant. Vagrant
Finland, C and S Europe.
Pl. 3; p.35



10 Cory's Shearwater

Nests south of red line.
Scarce autumn visitor to At-
lantic coasts. Vagrant C
Europe. Pl. 3; p.36



11 Manx Shearwater

Partial migrant. Red line
encloses colonies. Ranges
widely at sea. Vagrant
inland. Pl. 3; p.37



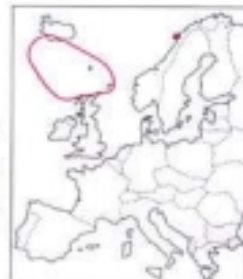
12 Mediterranean Shearwater

Partial migrant. Nests south
of red line. Has bred Bulgaria.
In autumn North Sea north to
Scotland, Scandinavia; also
Black Sea. Pl. 3; p.37



13 Storm Petrel

Partial migrant. Lines
enclose nesting areas. May
breed in N Norway. Vagrant
inland. Pl. 3; p.39



14 Leach's Petrel

Red line encloses main col-
onies. Has bred Ireland. Va-
grant inland including S
Europe. Pl. 3; p.39



15 Northern Gannet

Partial migrant. Red line
encloses main colonies.
Vagrant Baltic, C Europe, E
Mediterranean. Pl. 5; p.40



16 Cormorant

Partial migrant. Has bred
Austria, Italy, Estonia. Pas-
sage C Europe. Pl. 4; p.40

Summary

Practical constraints can subvert ideal rhetorical realisation: structure is not inherent in content

Navigation must be added to manage the result

Practical constraints differ between genres

Medium and production constraints will therefore help determine differences in realisations of RST structure across genres