

# Geography Summer Work...

Read all 4 articles and answer  
the questions at the end of  
each.

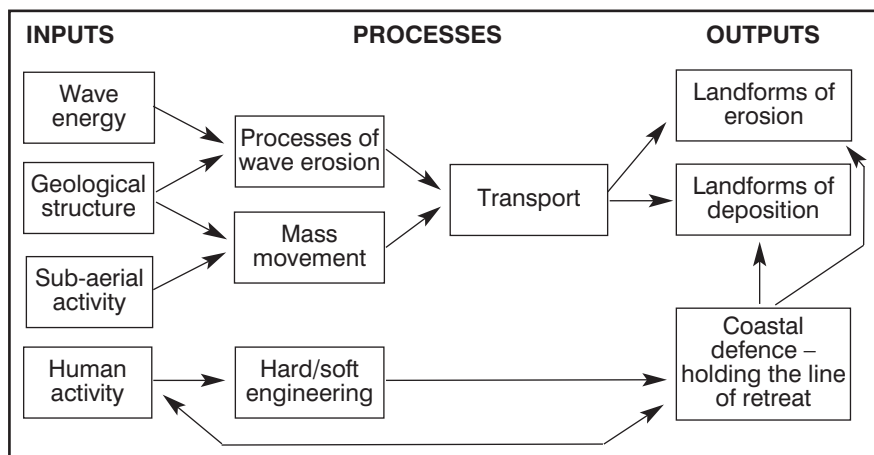
## LANDFORMS OF COASTAL EROSION: EXAMPLES FROM EAST YORKSHIRE

### Introduction

The coast – the interface between land and sea – is a worldwide linear zone, often only a matter of a few metres wide. In Britain we often think of the coast as being formed by the energy of the waves, largely due to their ubiquity and power; however, sub-aerial processes are also significant; sometimes climatic regimes are important and also vegetational processes on some coasts.

The coastal zone can also be viewed as a **system**, with **inputs**, **processes** and **outputs** (Figure 1).

Figure 1: Coastal systems



### Wave Energy

Waves are pockets of energy generated by the wind; consequently the **fetch** of a wave is significant. In the North Sea, wind can blow from the Arctic directly southwards, generating storm waves that attack north-facing sections of the East Coast such as Whitby, Flamborough Head, and the north Norfolk coast. On a global scale, winds blow across the Atlantic Ocean from the south west, creating **swell** that reaches the Cornish coast.

Depending upon preceding weather conditions over the surrounding sea area, waves arrive at the coast with a number of characteristics: wave height, wave period, wavelength, wave velocity and wave steepness. The combination of length and height determine the amount of energy:  $E = LH^2$ , so a small increase in height gives a large increase in energy.

As waves approach shallow water, friction with the sea bed increases, so the height and steepness increase, causing the crest of the wave to 'fall over'; this is when the wave breaks, water rushes up the beach as the **swash** and returns by gravity as the **backwash**. Under calm conditions the frequency of waves (**wave period**) ranges from 6 to 8 per minute, but under storm conditions this increases to 10 to 14 per minute, with a commensurate increase in the amount of energy expended on erosion.

### The Processes of Coastal Erosion

Waves are affected by friction as the body of water moves forward and the energy within becomes a major erosional process.

- **Abrasion** (Corrasion) Waves throw loose sand and shingle and even boulders at the cliff; this is one of the most effective methods of erosion. A hard cliff face becomes smoothed and even undercut to create a notch; a cliff face of alternating hard and soft rock becomes indented (differential erosion).
- **Attrition** This is where all movement of the water turns rocks, boulders and gravel into smooth, rounded, smaller rocks, usually between high and low tide.
- **Solution** (corrosion) This takes place where carbonic acid in sea water reacts with  $\text{CaCO}_3$  in limestones, or the salt in sea water and spray corrodes rocks, especially if salt crystals grow and cause rocks to disintegrate.
- **Biological activity** Secretions from algae attack rocks, and some molluscs can bore holes in rock.
- **Wave pounding** (Waugh), **wave quarrying** (Knapp) Waves impact the rock face with pressures of up to  $50\text{kg/cm}^2$  (cf. car tyre  $2\text{kg/cm}^2$ ) (Knapp). The effect of this is to loosen blocks of rock along any weakness. This process can eventually destroy sea walls.
- **Hydraulic pressure** This is often unseen, but very effective. Waves

enter a tiny crevice or large cave and air is trapped, then forced into all the weaknesses, time after time, so that the rock can eventually collapse.

- **Subaerial weathering** This occurs most notably by rain leading to the saturation of cliff material and then the failure of the cliff by **mass movement**. This mass movement can range from soil creep, to slumping, to landslides. This is an important process on the upper part of the cliff and in softer material.

### Factors Affecting Coastal Erosion

#### Geological structure

All rock has degrees of hardness or softness. Boulder clay is much softer than chalk, so the former will erode to form a bay, the latter will be resistant and form a headland. However, the same features will result with two similar rocks eg limestone, providing one is harder than the other.

Within the rock it is necessary to recognise some common structural features. All sedimentary rocks are laid down in layers called **beds** or **strata**, one layer being separated from the next by the **bedding plane**. Within beds are **joints**, the result of **lithification** (soft sediment turning into hard rock). Bedding planes and joints are weaknesses within the rock and are likely to be exploited by processes of weathering and erosion (Figure 2).

Figure 2: Some structural terminology

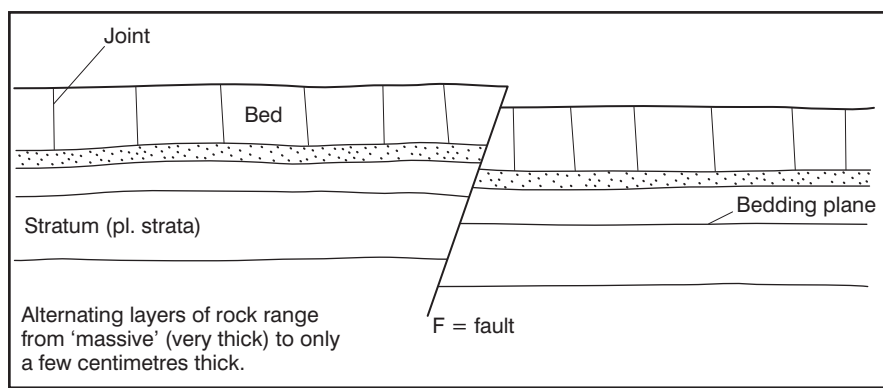
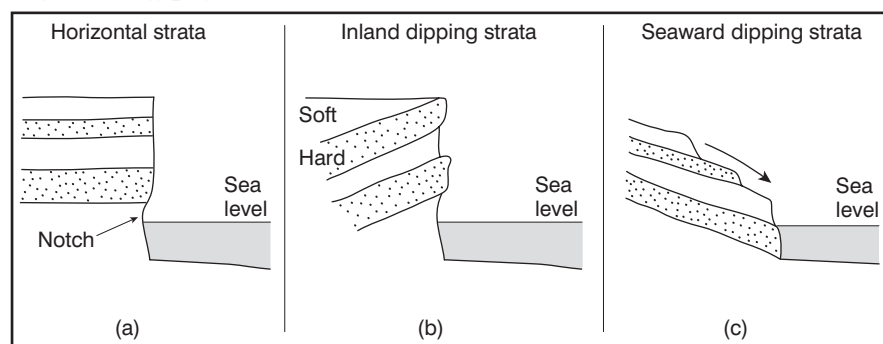


Figure 3: Cliff profiles



Igneous rocks also exhibit joint patterns, as in the hexagonal columns of basalt seen widely throughout Iceland and on the Giant's Causeway in Antrim, Northern Ireland.

Metamorphic rocks exhibit banding or lineation formed in the process of metamorphism as minerals are realigned with their long axes parallel to each other; schistosity is one of the best examples.

The cliff profile can be influenced by the dip of the rocks (Figure 3).

### Folding and faulting

As a result of earth movements all rocks exhibit some degree of folding which can become weaknesses. Faulting does not have to be a major movement, but merely a few millimetres, which is sufficient to dislocate the beds and create a line of weakness for the processes of weathering and erosion to exploit.

### Coastal morphology

On an indented coastline, headlands and the offshore topography concentrate wave attack on that headland by the process of **wave refraction**. Many headlands have a wave-cut platform between high and low tide which can cause friction for the wave, but due to their solid nature they do not absorb energy, as a sandy beach would do, so waves can break at

the foot of the cliff, causing maximum erosion. Some waves at high tide may cross the wave-cut platform and not be much affected by friction and then refracted by the cliff, having minimal erosional impact.

In a bay, waves have to travel further, and a beach absorbs wave energy and reduces the power of the wave before it reaches the cliff. Where there is a wide, deep, sandy beach, waves may not even reach the cliff at all.

## Flamborough Head and Holderness Coast

Flamborough Head in East Yorkshire is a chalk headland exhibiting classic features of coastal erosion, but also some unique features (Figures 4, 5 and 6).

The Lower Chalk zones form the highest cliffs of the headland north of Thornwick and are inaccessible. The Middle Chalk forms Thornwick Bay and the North Landing area, whilst the Upper Chalk can be seen at Selwicks Bay. Chalk in northern England is harder than that in southern England due to a higher calcite content. The Lower and Middle Chalk also contain varying amounts of flint, a secondary deposit which is very hard and brittle. The layers of chalk dip in a southerly

direction at 4°; they are well jointed and criss-crossed by minor faulting – all the necessary ingredients for erosion.

### Geological history

The recent geological history of the area is important. Pre-glacially the cliffs were only made out of chalk and were about half their present height. The sea eroded caves, arches and stacks and a wave-cut platform. During the Ice Age the whole of this area was covered in ice; post-glacially, as the ice retreated, a vast deposit of Boulder Clay was left over all the area, masking pre-existing features: the caves were plugged with Boulder Clay and the bays were infilled. As the North Sea basin filled up and the waves rolled in, their first job was to excavate the Boulder Clay, to reveal many of the original features.

### Selwicks Bay

In Selwicks Bay, most easily eroded by the sea are the faults, which enlarge into **caves**. In places, two caves erode back to back to form a through-cave, or a cave can erode through a small headland into a pre-existing bay, both of which are called **arches**. Some arches are so small it is only possible to crawl through them, others are large enough to sail a yacht through. Arches themselves eventually collapse; the upstanding tower of rock is a **stack** and they also eventually collapse, to leave a **stump**, only slightly proud of the **wave-cut platform**. All this erosion results in the slow, inexorable retreat of the cliff line, leaving a foundation of chalk as the wave-cut platform, one of which occupies the majority of Selwicks Bay (Figure 4).

There are two unique features. Part of Selwicks Bay is composed of a wide 'line of disturbance' where the chalk has been subjected to and contorted by severe earth movements, the friction reconstituting some of the minerals into calcite which has hardened this section of cliff, so as to form a small headland within the bay. Also at Selwicks Bay is a **blow hole**, not unique in itself, but it reflects the glaciological history of the headland. Pre-glacially it was created as a blow hole that was then infilled and covered by Boulder Clay, only to be post-glacially re-excavated and enlarged so that today, even though the water rushes in, it does not blow. The weaker clay surrounding it is actively slumping into the blow hole and forms a huge amphitheatre

Figure 4: Sketch map of features at Selwicks Bay

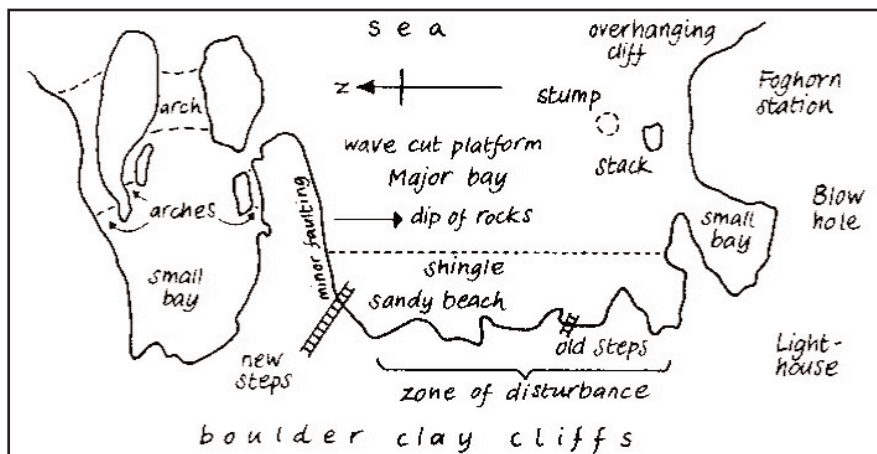


Figure 5: Sketch diagram of the west side of North Landing, Flamborough Head (pre-1984)

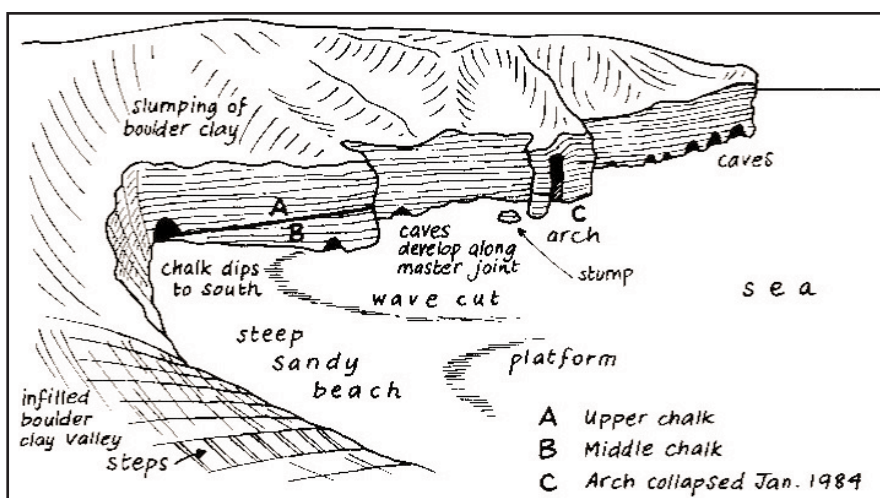
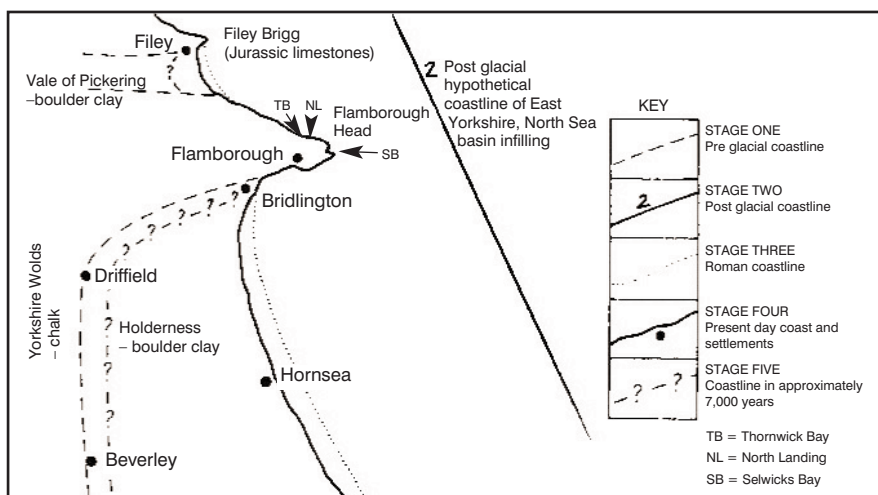


Figure 6: The sequence of East Yorkshire coastlines in pre- and post-glacial times



around the blow hole, an example of the subaerial weathering of the cliffs (Figure 7).

### North Landing

At North Landing in the Middle Chalk, the layers of chalk are much thinner, there is a lot of flint, the jointing is very close so the whole rock is highly fragmented, there is a

lot of faulting and the bay, being open to the north, is subjected to attack by the storm waves from the Arctic. Caves abound and one fault has been enlarged into a long narrow inlet, called a *geo*. On the west side of the bay there was once a series of arches. Figure 8 shows an arch that is no longer there – it collapsed one night in January 1984. Two to three metres

from the base it was quite narrow and it is tempting to suggest that storm waves battered it to bits, but the roof of the arch had been under pressure for many years, with two major right-angled cracks and overhead pressure bending the layers of chalk. The overlying weight of saturated Boulder Clay caused the eventual collapse, a result of sub-aerial processes; marine erosion removed most of the collapsed debris within about three months (Figure 9). Currently there are two stumps being abraded, one from a pre-existing arch that collapsed long ago and a second stump from the 1984 arch collapse. They both now form part of the wave cut platform.

### A retreating coastline

The Holderness coast is well known as one of the most rapidly eroding coasts in the world. As shown in Figure 6, Holderness did not exist pre-glacially and the chalk formed a coastline that stretched from Sewerby (just north of Bridlington) to Driffield and south to Beverley (Stage One). At the last onset of the ice, glaciers rode over the existing cliff and pushed their way up the Vale of Pickering, over Flamborough Head and up the lower slopes of the Yorkshire Wolds. As they melted and retreated they covered the landscape in a thick layer of Boulder Clay (Stage Two). The North Sea Basin became the North Sea and waves began to attack the clay deposits, rolling the cliff line westwards. The offshore gradient of Bridlington Bay is very gentle, but the beach sand near Holderness cliffs is very thin and underlain by a platform of impermeable Boulder Clay; most tides except summer neap tides, reach the base of the cliffs and in storm conditions waves break on the soft clay of the cliff. It is estimated that the coastline has retreated by 4 km since Roman times (Stages Three and Four).

Villages are still under threat, such as Mablethorpe, which at great expense has been protected. The cost of protection for rural areas is just too high – saving farmland that is valued at a few thousand pounds per acre with protection that costs millions of pounds. The storm surge of January 31/February 1 1953 was of such ferocity that the concrete promenades at Hornsea and Withernsea were smashed to bits. All our engineering ability may combat 'normal' waves or even some storm surges, but if we are to continue to experience sea level rise and further storm surges, then coastal



defences as they exist will not suffice; managed retreat is the only option, but what about towns like Hornsea and Withernsea? In the past few years both have had their coastal protection substantially upgraded, but what will happen when a whole village is next threatened? (Stage Five).

## Conclusion

Throughout the world, coastal features are ubiquitous and the sea relentlessly erodes the edge of the land, but where waves attack upstanding coasts the resultant features can be impressive.

Wave energy, geological structure and sub-aerial activity are the major inputs influencing cliff formation. These cliffs are attacked by the processes of wave erosion and modified by the processes of mass movement which result in a variety of coastal landforms, both depositional and erosional.

Human activity is cyclical. As soon as hard or soft engineering is used, especially the former, it has an interruptive effect on the processes. Coastal defences often have to be modified in the light of experience.

## Bibliography

Clowes, A. and Comfort, P. (1982) *Process and Landform*, Oliver & Boyd.  
Goudie, A. (1984) *The Nature of the Environment*, Blackwell.  
Waugh, D. (2000) *Geography: An Integrated Approach*, 3<sup>rd</sup> edn, Nelson.  
See also **Geofile** No. 388, September 2000, N. Punnett: 'Coastal Erosion – Back to Nature'.

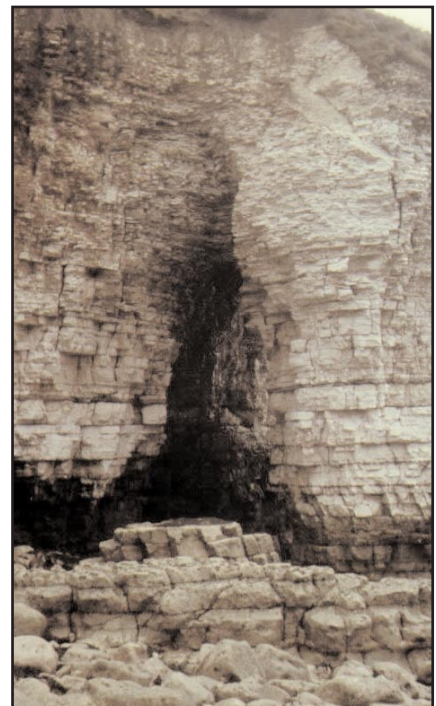
Figure 7: The blow hole at Flamborough Head, adjacent to the Lighthouse and Selwicks Bay



Figure 8: Arch at North Landing, prior to collapse. Note not only the narrowing of the column, but more importantly the weakness at the top of the arch caused by the overlying weight



Figure 9: Taken only three months after the arch collapsed in 1984. Most of the debris has already disappeared



## FOCUS QUESTIONS

1. How can a coastline demonstrate the inter-relationship between process, structure and stage of development?
2. Develop arguments for and against protecting coastlines subject to rapid erosion referring to hard and soft engineering techniques
3. Discuss the assertion that it is not possible to understand the present day landscape without reference to past geomorphological processes.

## GLOBALISATION OF SERVICES – CALLING INDIA

### Globalisation of services

Globalisation is the process by which regional economies, societies, and cultures have become integrated through a worldwide network of communication and exchange. In relation to industry it is also the move to a globalised economic system dominated by supranational corporate trade and banking institutions operating beyond national governments.

The current wave of economic globalisation started in the 1980s, following on from the earlier relocation overseas of manufacturing industries to gain access to raw materials and cheaper labour costs. The globalisation of services is also in part due to labour costs but also the global mobility of factors of production, capital and advances in infrastructure, transport and communications technologies. These developments have coincided with the opening up of the less economically developed countries (LEDCs) to direct foreign investment and international trade.

Why and how is it happening?

**Service industry or tertiary industry:** an industry comprised of companies that primarily earn revenue through providing intangible products and services.

### Factors of industrial location

- Labour/human capital
- Capital
- Government policy
- Transport/accessibility
- Raw materials
- Site

'Footloose' service industries have no need of heavy raw materials nor large sites. What they require is an educated workforce, with IT skills, access to communications systems, offices or business parks and government policy in favour of foreign investment and development of their country's infrastructure. Since these location factors are all readily available around the world there is no restriction on business in choosing a location, and so the key determining factor for industry is the cost of production.

Developing countries, newly industrialised countries (NICs) and periphery countries in developed regions are endowed with the well-qualified workforces that the service industry requires, but pay levels are relatively low. This gives them a 'comparative advantage' in terms of labour costs.

### Clustering/cumulative causation

Clustering of similar industries due to cumulative causation is also part of the explanation. According to Dicken these specialised clusters reflect the tendency for firms in the same or closely related, industries to locate in the same place. They grow through a process of cumulative self-reinforcing development (Dicken, 2007).

This means as industries become successful, they will:

- attract linked activities
- stimulate entrepreneurship and innovation
- deepen and widen the local labour market
- cause economic diversification
- stimulate development of the physical infrastructure.

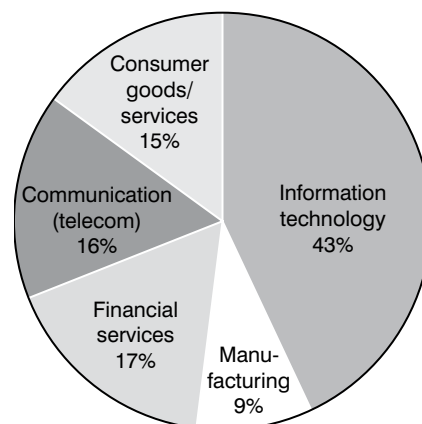
This ongoing process makes established overseas sites even more attractive.

### Outsourcing and offshoring

In making decisions on the provision of IT or accountancy services, companies can choose between having the work done in-house (internalisation) or subcontracting/outsourcing (externalisation). Outsourcing used to be limited geographically to companies in their home nation, but with innovations in communications these services can now be provided anywhere in the world. This is referred to as offshoring.

Initially, offshoring catered for simple 'back room' office functions, such as payroll, and IT services. These remain a major element of the industry and are collectively referred to as business process offshoring (BPO) and information technology enabled services (ITES). Figure 1

Figure 1: Global BPO market by industry



Source: Price Waterhouse Cooper  
([www.pwc.com/en\\_IN/in/assets/pdfs/evolution-of-bpo-in-india.pdf](http://www.pwc.com/en_IN/in/assets/pdfs/evolution-of-bpo-in-india.pdf))

shows the services provided in the global BPO market

Innovation has allowed the BPO market to expand to include database marketing, transcription, billing services, web design, sales/marketing, accounting, tax processing, telesales/telemarketing, human resources, market research, legal processes, biotech research and special effects for Hollywood. On a smaller scale, one company in India is offering outsourced personal assistants.

Knowledge process outsourcing of core innovation activities (product development, engineering, R&D) is also increasingly being offshored. e.g. US aircraft manufacturers Boeing (US) and Airbus (Europe) have design centres in Russia.

### Company structure

The move to BPO in its many forms is for many organisations just one aspect of their operation as a multinational company (MNC), utilising their experience of working in different countries. They also outsource backroom operations to large service MNCs. The success of companies competing for business in offshore locations has allowed them to develop into MNCs, including establishing offices back in the originating more economically developed countries (MEDCs).



## Government policy

The move to offshoring has also required LEDCs to create appropriate economic development policies, to liberalise policy to allow foreign direct investment (FDI), and to support investment in infrastructure and specialised education.

## Locations for offshoring

### Who generates the demand?

Figure 2 shows the source of the demand for offshoring. North America generates the greatest demand and is responsible for 70% of spending on offshore outsourcing. This demand was originally met by captive subsidiary companies; more recently this has shifted to buying from providers: e.g. Citibank sold its captive subsidiary to Tata Consultancy Services in October 2008.

Figure 2: Global BPO market by volume

USA	59%
Europe	27%
Asia-Pacific (inc Japan)	9%
Rest of World	5%

Source Price Waterhouse Cooper  
([www.pwc.com/en\\_IN/in/assets/pdfs/evolution-of-bpo-in-india.pdf](http://www.pwc.com/en_IN/in/assets/pdfs/evolution-of-bpo-in-india.pdf))

### Who provides the service?

The primary factors in deciding on an offshore location include:

- Cost competitiveness:
  - cost of labour
  - infrastructure costs
  - exchange rates.
- Labour competitiveness:
  - size of the available labour force
  - level of education
  - fluency in the English language
  - cultural compatibility to western markets.
- Other factors:
  - existing business and political risks
  - geographic location (time difference)
  - tax regime
  - regulatory considerations such as data security and intellectual property rights issues.

The top three countries in the 2009 Kearney Global Services Location Index were India, China and Malaysia. India leads the way in all business functions but now faces competition from an ever-increasing

Figure 3: Worldwide offshoring locations

Argentina	Web & software programming, game development, IT support, network solutions
Bangladesh	Web & software programming, game development, IT support, network solutions, offshore outsourcing service
Belarus	Programming, R&D
Brazil	Web & software programming, game development, IT support, network solutions
Bulgaria	Programming and R&D
China	Programming, data entry, customer support, F&A
Egypt	Customer support and programming
Indonesia	Programming, data entry, customer support
Malaysia	Customer support and R&D
Mauritius	BPO (for France)
Nepal	Programming, customer support
Pakistan	Programming, customer support
Panama	Programming, customer support
Philippines	Customer support, IT support, programming, animation, transcription
Romania	Programming and IT
Russia	Programming and R&D
Ukraine	Programming and R&D

Source: A T Kearney ([www.atkearney.com/index.php/Publications/global-services-location-index-gsli-2009-report.html](http://www.atkearney.com/index.php/Publications/global-services-location-index-gsli-2009-report.html))

list of countries. Central Europe had emerged as one of the key centres for offshoring, primarily for Western European clients. However, during 2009 Poland, the Czech Republic and Hungary were hit by increasing costs, eroding their competitiveness. The most recent destinations for companies include Guatemala, El Salvador, Dominican Republic, Barbados, Bangladesh, Kenya and the Himalayan Kingdom of Bhutan. Others are listed in Figure 3.

## Case Study: India

The major concentrations of the IT and ITES industry are located in Bangalore, Mumbai, Chennai, Hyderabad, Pune, Chandigarh and close to New Delhi at Noida, Gurgaon and Faridabad. Ahmedabad is the fastest growing centre for offshore IT outsourcing.

In March 2009, annual revenues from outsourcing operations in India amounted to US\$60 billion and this is expected to increase to US\$225 billion by 2020. This is remarkable in a country considered as an LEDC with a rural population of 71%, where GDP per capita is \$2,800 (2008), compared to the UK figure of \$36,600 (2008). Its GDP has been growing at over 7% for the last decade and even in the current difficult economic times growth is

Figure 4: Major centres of India's offshore IT outsourcing industry



estimated at 6%. The service sector's contribution to India's GDP has increased from 15% in 1950 to over 50% (Figure 5).

Elements of the service sector in India are so well established they are part of

Figure 5: Comparison of India's and the UK's economies

Percentage of GDP by sector (estimate 2008)	India	UK
Agriculture	17	1
Industry	29	23
Services	54	76

Figure 6: What India offers – competitive advantages

1	Low cost, high quality
2	2nd largest English-speaking manpower resource in the world
3	Investment friendly & supportive government policies
4	Adaptability to new technologies
5	Geographical advantage
6	Legal protection for intellectual property rights
7	World class infrastructure in line with the developed countries for power, transport and data communication
8	World's 3rd largest brain bank – availability of around 2.5 million technical professionals
9	Stable democratic environment in over 50 years of independence
10	Large market size with a middle class population of 250-350 million with increasing purchasing power reflected by remarkable increase in purchase of consumer durables in recent years
11	Access to regional international markets through membership of regional integration frameworks such as South Asian Association for Regional Cooperation (SAARC)
12	Large and diversified infrastructure spread across the country
13	Thrust on technology, innovation and knowledge base
14	Large manufacturing capability, spanning almost all area of manufacturing activities
15	Well developed R&D infrastructure and technical and marketing services
16	Large resources of untapped natural wealth

Source: adapted from Ministry of External affairs  
<http://meaindia.nic.in>

our domestic lives, be it the day-to-day management of phone and broadband provision, or in our entertainment, with call centres featuring in the film *Slumdog Millionaire* and on the TV in Mumbai Calling. Yet the service sector in India is so much more than this; India is dominant across all business functions, in particular in Information Technology Enabled Service (ITES). This form of outsourcing includes all processes that can be enabled with information technology and covers diverse areas like finance, human resources, administration, health care and telecommunications. In 2009, seven Indian firms, including Tata Consultancy Services, Wipro Technologies and Infosys Technologies, were listed among the top 15 technology outsourcing companies in the world. Source: <http://outsourcingprofessional.org/content/23/196/1861/>

India's success has developed over 30 years. Initially overseas MNCs including American express, General Electric, British Airways, Citibank and AOL set up wholly owned captive companies to carry out their back office operations. This was followed by experienced professionals setting up start-up operations in India, often funded by venture capital. Infosys was established in 1981 and is now one of the world's top-performing companies in the software and services sector, with 50 offices and development centres in India, China, Australia, the Czech Republic, Poland, the UK, Canada and Japan, employing over 100,000 staff.

As skills and infrastructure have developed, many large IT services companies have ventured into providing ITES. More recently, captive companies have been partly or completely sold off, allowing them to seek third party business and become MNCs in their own right. British Airways Operations became WNS Global services in 2002, and General Electric's Operations became Genpact in 2005. The latter now has 31 operations centres in 10 countries. In 2008-09 Genpact was India's top BPO company, enjoying growth of 54% with their clients, including Nissan. The year also saw Genpact opening new centres in Guatemala, Poland and Morocco. Indian companies are also expanding across the world e.g. Tata Consultancy services has delivery centres in Argentina, Brazil, China, Hungary, Mexico, Singapore, USA

and Uruguay, plus numerous centres in India.

### Why the success?

The Indian perspective on India's advantages can be seen in Figure 6.

### Labour

India is capitalising on its large, well-educated workforce skilled in the English language. It produces over a million graduates each year, including 350,000 engineers. It has a history of excellence in mathematical and software problem-solving; its world ranked educational institutions include 15 Institutes of Technology. The Indian School of Business MBA was ranked 15th in the world, ahead of Cambridge. Source: <http://rankings.ft.com/businessschoolrankings/global-mba-rankings>.

### Cost

The cost advantages of offshoring to India are significant. The costs of hiring in the IT sector in India are between 15 and 40% of the cost in the USA. A bright science graduate can expect a starting salary of approximately £3,400 as a software engineer, and within two years they will be earning far more than their university lecturers.

### Geographic location

India is 10.5 to 13.5 hours ahead of mainland USA. Problem-solving or processing of jobs sent during the evening from the US can be completed in India during the day to be sent back to the US.

### Government policy

Economic development in India was held back until the 1990s by protectionist government policies and barriers to trade which supported state-run companies. However, in 1988 the government did establish the National Association of Software and Service Companies (NASSCOM). As the coordinating trade body for the ITES/BPO industry NASSCOM facilitates trade in software and services, and encourages research in software technology.

Following a balance of payments crisis in 1991, the government liberalised economic policy, removing barriers to trade and allowing foreign direct investment. The policy on FDI was extended in 2005 to allow 100% foreign ownership in most sectors of the economy.



This period brought deregulation of the telecoms industry, with the National Telecom Policy (NTP) opening up national, long distance and international connectivity to competition. In 1991 the Department of Communication & Information Technology, established the idea of Software Technology Parks of India (STPI). The objective of this policy was to encourage, promote and boost software exports from India.

Its role includes:

- establishing Software Technology Parks throughout the country
- establishing and managing the infrastructural resources in the parks such as communication facilities, core computers, buildings, amenities etc to provide services to the users
- undertaking export promotional activities
- organising specialised training in the field of software
- acting as an interface between industry and government.

The Software Technology Parks have been complemented by the Indian Government's announcement in April 2000 of the Special Economic Zones (SEZs) Policy, with a view to attracting larger foreign investments. By October 2009 they had approved 578 SEZs, of which 333 detail IT/ITES as part of their operations. The SEZs generate more than \$15 billion per year in exports and provide employment for more than half a million.

The SEZ Act 2005 included the development of infrastructure facilities among its objectives. Other incentives and facilities offered within them include:

- duty-free import/domestic procurement of goods
- 100% income tax exemption on export income for SEZ units for the first five years, and 50% for the next five years
- external commercial borrowing by SEZ units up to US\$500 million in a year
- Exemption from sales and service taxes.

Companies attracted to SEZs include:

- Nokia SEZ in Tamil Nadu (telecom equipment/R&D services)
- Motorola and DELL
- WIPRO Kolkatta (software development)
- Infosys Technologies SEZ Bangalore (IT/ITES).

Other government investment in infrastructure includes the 'Golden Quadrilateral', a highway network connecting Delhi, Mumbai, Kolkata and Chennai.

### The future

India's role in the globalisation of services will continue to develop as the homegrown MNCs in the BPO and ITES sectors expand their operations around the world seeking to lower their labour costs. This search is also taking place within India, with smaller processing centres being set up in rural areas to undercut the salaries demanded in Indian cities.

The growth of India's middle class is also leading to interest from overseas MNCs in other sectors. Currently in the retail sector government policy prevents 100% foreign ownership. It seems likely that this will change and allow the big names, including Wal-mart and Tesco, full access to the Indian market. At present they are only allowed to provide support services to Indian companies, such as Tesco's 2008 exclusive franchise agreement with the retail arm of the Tata group. This will provide extensive retail and technical services to support the development of its hypermarket business, Star Bazaar.

Whilst India does appear to be riding out the current economic situation it is subject to the same threats as many MEDCs:

- terrorism
- competition from cheaper locations
- corporate scandals
- risk spreading by MNCs setting up operations in more than one country
- relocation back to domestic locations e.g. July 2009 BT announced the transfer at least 2,000 jobs from call centres in India back to Britain, and Dell offering a premium technical support subscription which guarantees US customers they can talk to a representative in the US rather than India.

## Conclusion

The globalisation of services is well-established and will continue to spread across the world following improvements in communication infrastructure, especially access to broadband. In the summer of 2009 the coastline of East Africa became the final major inhabited coastline to be connected by undersea fibre-optic cable (Seacom) to networks in Europe and India. This means Kenya can promote itself as the new English-speaking base for call centres and other outsourcing. The broadband networks will spread inland from the East African coast, increasing the possibility for further globalisation.

## References

- Thomas L. Friedman (2006) *The World is Flat*, Penquin
- Peter Dicken (2007) *Global Shift*, Sage
- <http://youthink.worldbank.org/issues/globalization/>
- <http://www.download3k.com/Press-The-Offshore-Outsourcing-History-of-India.html>
- <http://www.ukibc.com/ukindia2/files/India60.pdf>
- <https://www.cia.gov/library/publications/the-world-factbook/geos/in.html>
- <http://www.atkearney.com/index.php/Publications/global-services-location-index-gsli-2009-report.html>
- <http://outsourcingprofessional.org/content/23/196/1861/>
- [http://www.pwc.com/en\\_IN/in/assets/pdfs/evolution-of-bpo-in-india.pdf](http://www.pwc.com/en_IN/in/assets/pdfs/evolution-of-bpo-in-india.pdf)
- <http://www.sezindia.nic.in/>
- <http://www.infosys.com/>
- <http://outsourcingprofessional.org/content/23/196/1861/>

## FOCUS QUESTIONS

1. Why has the provision of offshoring IT services been so successful in India?
2. Discuss the role of MNCs in the changing global economy.

## TWO PLATE BOUNDARIES: THE HIMALAYAS AND PACIFIC USA

### Introduction

Where the Earth's tectonic plates meet, earthquakes and volcanoes can occur. This **Geofile** studies two regions where tectonic forces along plate boundaries have created dramatic landscapes. The Himalayas form a spectacular boundary between the Eurasian continent and India, while the Pacific coast of the USA owes its origins to two types of plate boundary. The tectonic evolution of these two regions is considered.

### The Himalayas

The Himalayas contain more peaks over 8000 m than anywhere else on Earth. Mt Everest, at 8848m, has the highest summit on Earth and its altitude is so great that the summit cone projects into the high altitude winds of the jet stream (Figure 1). On Mt Everest the Yellow band limestone at 8462 m was originally part of the shallow seas of an ancient ocean (the Tethys Ocean) but has now been thrust upwards and contains the highest fossils in the world!

The Himalayas are growing at a rate of 0.5cm/year; this growth has to be balanced with the effects of erosion.

Table 1: Plate tectonics and margins reminder (see also Geofile 477)

<b>Constructive</b>	Where oceanic crust is created along chains of ocean floor volcanoes called mid-ocean ridges.
<b>Conservative</b>	Where two plates slide past one another causing lateral movement and earthquakes.
<b>Destructive</b>	Where dense oceanic crust sinks beneath another plate edge at subduction zones and is recycled back into the mantle. Melt is produced and volcanoes occur. Earthquakes also occur.
<b>Collisional</b>	Where two continents collide after the closure of an ocean and a mountain range is uplifted.

NB: Plate movement is on average 5–10cm/year

The Himalayas extend for 2900 km along the borders of India, Pakistan and Tibet in an arcuate shape that also envelops the countries of Nepal and Bhutan. They supply a fifth of the world's population with fresh water such as in the highly populated areas of the Ganges valley and Bangladesh to the south.

#### Formation of the Himalayas

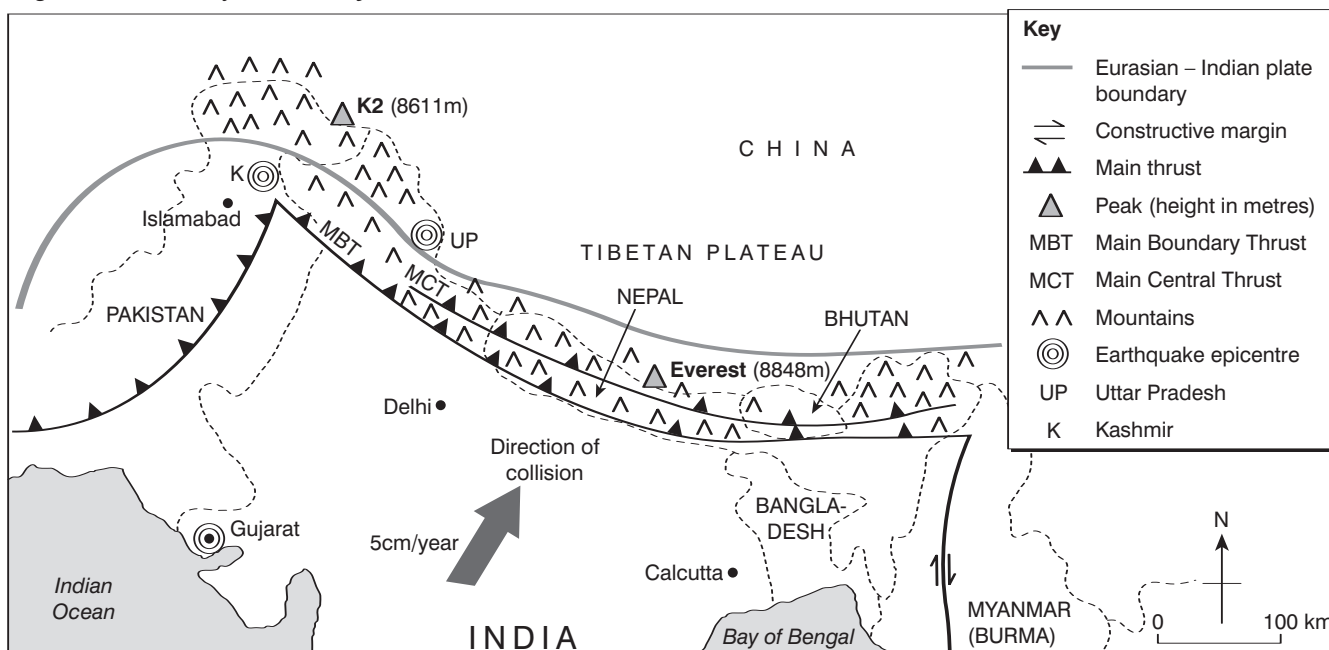
The Himalayas are the result of the collision of two continental plates at a **collisional or convergent** plate boundary. This type of event is called an **orogeny**.

- India 300ma (ma = millions of years ago) was part of the super-continent of **Pangaea**.

- When Pangaea split (200ma) it then became part of a large southern land mass called **Gondwana**, until 130ma when India finally broke away and started on its northerly collision course with Eurasia, moving at a rate of 16cm/year.
- The Tethys Ocean lay between the two landmasses and its oceanic crust was subducted beneath Eurasia, forming a trench and volcanic arc.
- Finally, at 50ma collision occurred and the Tethys Ocean disappeared.

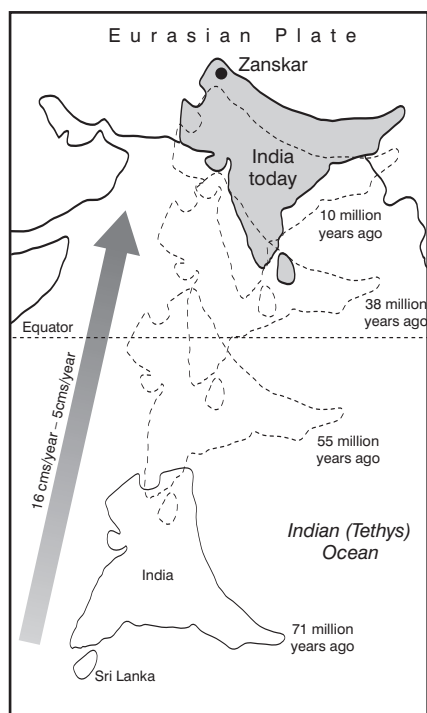
Figure 2 shows the position of India after it broke away from Gondwana, and the progress of its northward movement.

Figure 1: Location of the Himalayas



Source: compiled from 'Mountain Building': Block 4 : Open University 2001

Figure 2: Position of India 100 ma after break-up of Gondwana and movement northwards to collision with Eurasia



Source: Pierre Dezes, PhD thesis: 'Tectonic and metamorphic evolution of the Central Himalayan domain in South East Zaskar', *Memoires de Geologie Clausanne* No.32 1999

Once collision occurred the Indian continental crust was unable to **subduct** fully as it is more buoyant than oceanic crust, this led to the Indian plate being sliced by enormous faults called **thrusts** which pushed the rocks and sediments of the leading edge backwards and upwards forming the Himalayas. It is largely the leading edge of the Indian subcontinent that has deformed to form the Himalayas. The **Main Central Thrust (MCT)** is largely responsible for the highest peaks of the Himalayas; the **Main Boundary Thrust (MBT)** delimits the southern edge of the foothills.

The collision with India squeezed the Tibetan plateau up to an average height of 5000 m, leaving the continental crust below Tibet 70 km thick, the maximum known.

India is still indenting into Eurasia at a rate of 5 cm/year.

#### Seismic events

The collision boundary between India and Eurasia is seismically very active. As the two continents push against each other, enormous pressures deep

down in the crust develop. Some of the largest earthquakes in recent times have occurred not in the mountains but in the lower-lying foothills or coastal plains to the south.

### Pacific Coast of the Western USA

The United States to the west of the Rocky Mountains owes its topography to tectonic processes which have compressed, sliced and erupted through the North American continent. The United States Pacific coastline (excluding Alaska and Hawaii) extends from the border with Mexico in the south 6800 miles along the Pacific Ocean to the Canadian border.

There are two types of plate boundary present: **conservative** and **destructive**. Within California a conservative or **strike-slip fault** (the **San Andreas Fault**) is the dominant tectonic feature whereas through Oregon and Washington State it is a destructive margin or **subduction zone** which is responsible for the volcanic landscapes of the **Cascade volcanoes**.

#### Tectonic evolution

The original coastal margin of the North American continent was near

to the western boundary of the present-day Rocky Mountains. As the continent was pushed westwards by the widening Atlantic Ocean, the margin with the Pacific plate became **active/destructive/compressional**, and mini-continents or groups of islands were accreted onto the western margin of the continent as the Pacific Ocean floor was subducted. These are called **accretionary terranes** and became part of the lithosphere of the North American continent. Hence the western coast of the USA was built out towards the west.

The **Sierra Nevada** mountains are the granitic roots of an old chain of volcanoes formed as the Pacific plate subducted beneath present-day California about 125–82ma. **Yosemite National Park** is in the Sierra Nevada Range and is famous for its large granitic mountains, e.g. Half-Dome.

#### Present day

Subduction now only occurs where the last remnant of oceanic crust to the east of the spreading ridge, the Juan da Fuca plate, is still being subducted beneath Northern California, Oregon and Washington forming the Cascade range or arc of volcanoes, including Mt St Helens (Figure 3). Eventually as the spreading margin is subducted then the active volcanoes of the Cascade Range will become fewer as magma generation, caused by subduction, stops. Eventually the margin will become a conservative margin as it is in California. Just offshore from Cape Mendocino is a triple junction where the Pacific plate, the southern Juan da Fuca plate (Gorda plate) and the North American plate meet. It is one of the most earthquake-prone areas in North America.

#### The volcanoes of the Cascades

The volcanoes of the High Cascades are part of the Pacific 'Ring of Fire' and extend from Lytton Mountain (2049 m) in Canada to Lassen Peak (3189 m) in California. In the last 4000 years, 13 of the Cascade volcanoes have erupted.

- Lassen Peak, in California, erupted in 1914/1921 and is one of the world's largest lava dome volcanoes, which has grown by extrusion of a highly viscous lava called dacite rather than by explosive eruption.
- In 1980 Mt St Helens produced a catastrophic lateral blast, and the volcano is still producing smaller

#### Notable earthquakes (see Figure 1):

##### Uttar Pradesh 1999

- 29 March 1999
- 6.8 Richter scale
- 185 miles north-east of New Delhi near India's border with China
- The earthquake was caused by a sudden release of energy along a thrust within the Himalayan foothills.

##### Gujarat 2001

- 25 January 2001
- 7.7 Richter scale
- Coastal area of Gujarat near the border between Pakistan and India
- Estimates say 30,000 people died.

##### Kashmir 2005

- 5 October 2005
- 7.6 Richter scale
- Indian/Pakistan border region of Kashmir
- 75,000 people died as a direct result of the quake
- 3.3 million were left homeless.
- Recovery from the quake was impeded by the remote and difficult terrain at the beginning of the winter snowfall.



eruptions. A lava dome is currently rebuilding the summit within the evacuated summit crater.

- Mt Rainier, which at 4392 m is the highest peak in the Cascades, has the largest glaciers in the USA outside of Alaska. It is carefully monitored as it has the potential to produce disastrous lahars (volcanic mud-flows) which could reach Seattle.
- Crater Lake, or Mount Mazama, appears as a flooded caldera (collapsed magma chamber) which was formed 6900 years ago in a catastrophic eruption. The small cone in the middle is called Wizard Island.

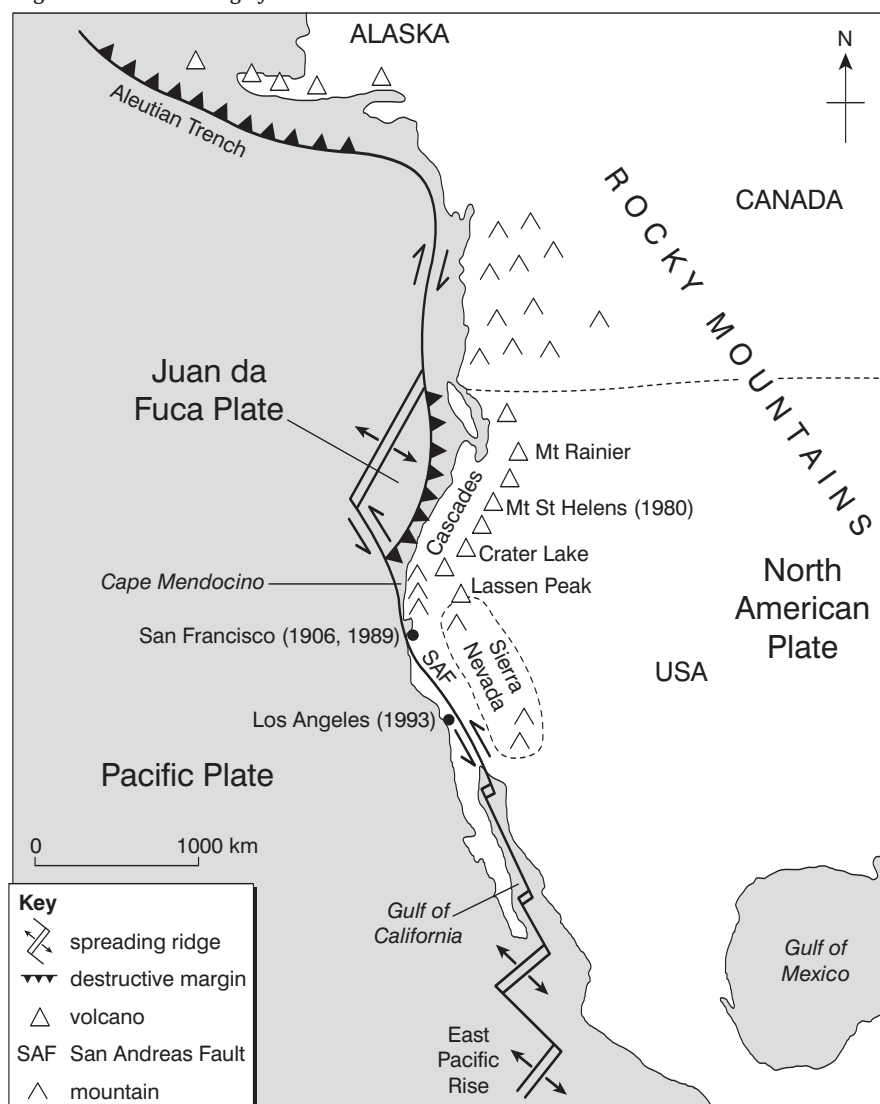
The greatest potential for explosive eruption in the Cascades comes from eight major strato or composite volcanoes. Five of these are in Washington State, including Mt St Helens and Mt Rainier.

Strato volcanoes tend to have a central summit crater which is underlain by a network of conduits along which magma can reach the surface. Slow-moving lava flows can break out along the slopes, but this type of volcano is highly explosive due to a high silica and gas content in the magma which makes it highly viscous. The cone is composed of layers of ash, lava and rock debris from previous eruptions. The rock types are said to be of 'intermediate' type, which refers to their silica content of around 60–65%, and includes dacite lavas. Pyroclastic flows, heavy ashfall and lahars are the main hazards associated with this type of volcano, as illustrated by Mt St Helens in 1980.

### The earthquakes of the San Andreas Fault system

California is one of the most seismically active regions of the world and has approximately 10,000 earthquakes a year, of which around 20 are above magnitude 4 on the Richter scale. The San Andreas Fault system, along which the earthquakes occur, is 800 miles long and extends into the Earth's crust for over 16 km, and has existed for 20 million years. Figure 3 shows how its trace first appears on land at Cape Mendocino then travels southwards just to the west of downtown San Francisco before cutting through Los Angeles and finally exiting land at the Gulf of California where it becomes the spreading constructive boundary of the East Pacific Rise.

Figure 3: Plate setting of western North America



Source: adapted from *The Earth and its place in the Universe: Discovering Science*, Open University, 1998

The lateral movement on the fault is thought to be 350 miles over the last 20 million years and is currently 0.6 cm/year. Very slowly the land to the west of the fault is moving northwards; consequently Los Angeles is getting closer to San Francisco and will one day be in Alaska!

The earthquakes occur as the Pacific plate grinds slowly northwards relative to the North American plate; a **conservative or strike slip margin**. This is not a smooth process and the plates can become locked, when the fault finally breaks the energy stored is released as seismic waves causing an earthquake.

Some sections of the fault creep slowly rather than rupture and fewer earthquakes occur on these sections. The impact of the earthquake depends on how deep and how much of the fault moves in one event. The longer a section of the fault remains locked generally the larger the earthquake which is produced.

In Los Angeles the fault makes a sharp turn to the west. This has compressed the crust to the north of the fault and has pushed up the Central Transverse Ranges and other coastal ranges. Consequently there are number of east/west strike slip faults and thrust faults to the north of LA, one of which caused the Northridge Earthquake in 1994. Figure 4 shows just some of the faults which cross the urban area of Los Angeles in addition to the San Andreas Fault.

The San Andreas fault is very closely monitored by the USGS (United States Geological Survey) and the next 'Big One' is likely to occur on the southern section of the fault, which has not ruptured for 300 years, affecting Los Angeles and San Diego. Precise prediction of timings and locations of earthquakes is still not possible and safer buildings and procedures are the best protection at present.

## Conclusion

Both the plate boundaries described are still evolving and the landscapes we see are not finalised but still under construction. Both owe in some part their formation to the oceans. The Himalayan peaks are composed of sediments from an ancient ocean. The San Andreas Fault is extending northwards as Pacific Ocean floor is destroyed and in the process causing the demise of the Cascades which owe their origin to the destruction of the Pacific Ocean plate.

### San Francisco: 18 April 1906

- Magnitude 7.8: shaking 48 seconds
- San Andreas Fault ruptured for 296 miles
- Surface displacements 6–8.5 m
- Approximately 3000 dead
- 300,000 people homeless from a population of 410,000
- 80% of the city destroyed by earthquake; fire was responsible for 90% of the destruction

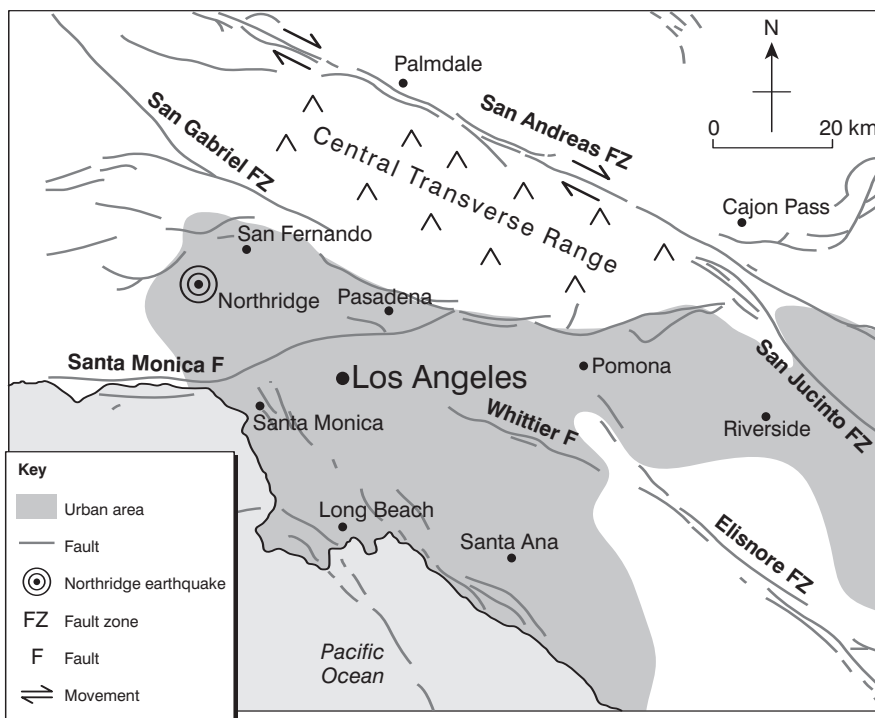
### Loma Prieta (San Francisco): 17 October 1989

- Magnitude 6.9: shaking 15 seconds
- Epicentre 16 km NE of Santa Cruz
- Focus depth 16 km
- Deaths 57 (40 on Nimitz Freeway collapse): 3757 injuries
- Liquefaction in the Marina attributed to rubble from 1906 earthquake
- Bay Bridge breached
- \$6 billion in property damage

### North Ridge (Los Angeles): 17 January 1994

- Magnitude: 6.7
- Epicentre 32 km NW of downtown Los Angeles in the San Fernando valley
- Occured on previously unknown thrust fault (vertical displacement)
- Deaths: 51; 9000 serious injuries
- Permanent uplift of 50 cm of the ground surface
- Major structural damage and destruction of elevated motorways

Figure 4: Fault map of Los Angeles



Source: U.S. Geological Survey

## References

www.Wikipedia.org: Online encyclopaedia with good clear explanations on plate tectonics, Himalayas, tectonic evolution of USA  
 www.USGS.gov – United States Geological survey with daily updates and maps on earthquakes in California and around the world:  
 Evolution of Himalayas and Western USA  
 'Mountain Building': Block 4 : Open University 2001  
*The Earth and its place in the Universe:*

*Discovering Science*, Open University, 1998) (Current Open University course books can be purchased direct from the OU without having to sign up for a course.

## FOCUS QUESTIONS

1. Create a glossary of the terms in bold by using this unit, Geofile 477 and the web resources above.
2. How can the growth of the Himalayas help to explain plate tectonic theory? (Key ideas: rifting, plate movement, subduction, collision, mountain building.)
3. How has the western coast of the USA evolved geologically over time and how will it change in the future? Draw simple sketch maps to help in your explanation.
4. Research and write a case study for:
  - a) a Himalayan earthquake
  - b) a Cascade volcanic eruption
  - c) a Californian earthquake.
 You do not have to use the examples in the Geofile. Include a Top Ten list of facts and an explanation of these.
5. Compare the two plate margins discussed by stating in which ways they are similar and in which ways they differ.

## CASE STUDY OF URBAN REGENERATION – THE JEWELLERY QUARTER OF BIRMINGHAM

Regeneration within urban areas in the United Kingdom has largely been confined to the centres (Central Business Districts) and inner city areas which are located in a zone surrounding the CBD. Inner city areas saw very rapid growth as manufacturing and residential areas during the industrial revolution in the 18th and 19th centuries. Since the mid 1970s some inner city areas have become less popular as places to live and as locations for economic activities. Residents have moved out because of poor quality of life and unemployment. Factories have closed as a result of an increasingly globalised economy which has seen some types of manufacturing transferred to locations outside the United Kingdom. Sites on the edges of urban areas or close to motorway junctions have generally become more popular locations for manufacturing or new economic activities like superstores. As a result, some inner city areas have often experienced a spiral of decline (Figure 1).

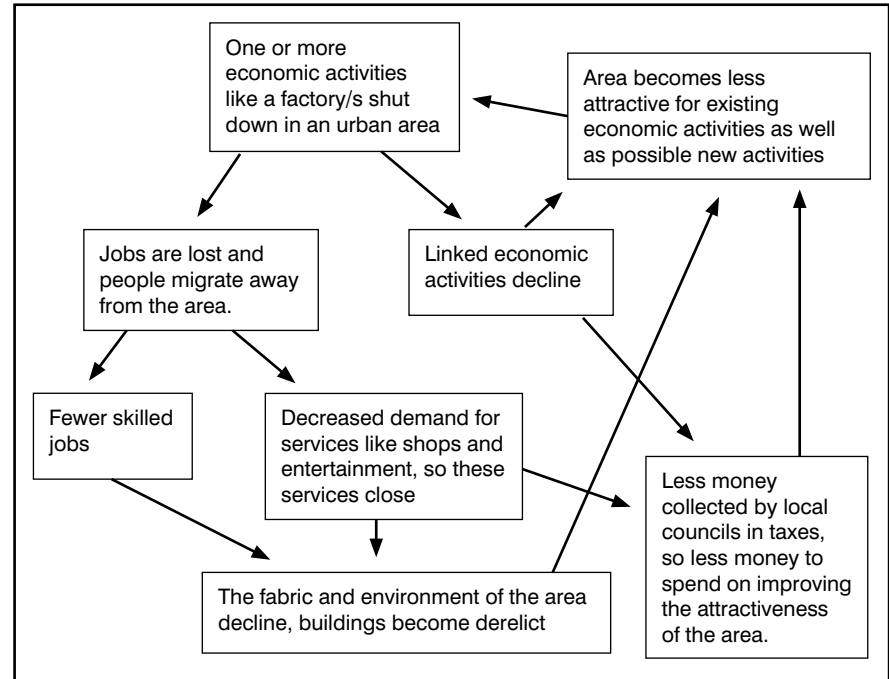
### National government and regeneration

The problems of inner city areas have long been recognised and various groups have worked both separately and in combination to try and 'rebrand' these areas by changing their image and by regenerating (renewing or revitalising) to reverse the spiral of decline and to give them a more sustainable and prosperous future. In the last 30 years central government has introduced a variety of schemes in specific parts of urban areas, such as:

- property-led regeneration through urban development corporations
- partnerships between local and national government and privately owned companies
- City Challenge projects
- flagship projects
- sustainable communities

Such regeneration schemes have focused on the economy of the area, largely by the creation of job opportunities or by improvements

Figure 1: The spiral of decline in inner city areas



in communications; on social improvement (eg improving educational and training opportunities) and finally on environmental improvements such as revitalising green spaces or by the creation of new parks in urban areas.

Many urban areas, however, have not been targeted by the initiatives outlined above, and in these areas any regeneration has largely taken place as a result of the work of a number of different interested players or stakeholders. These have included organisations supported by national government, local government, non-governmental organisations like Friends Groups, private organisations and individual residents. These groups can work separately and in cooperation to bring about regeneration both directly and indirectly in an area.

### The Jewellery Quarter in Birmingham

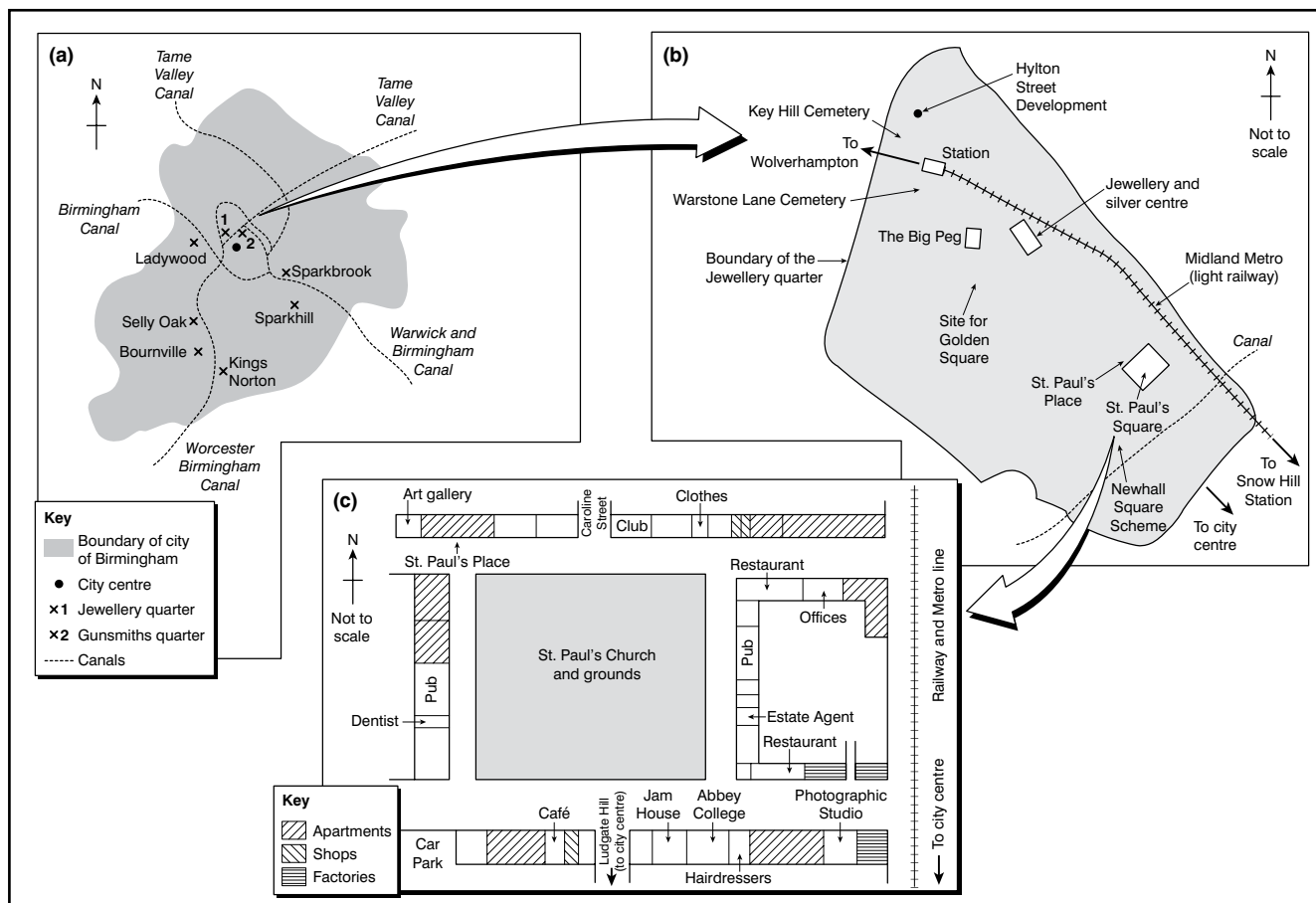
One such inner city area where regeneration by a number of different groups or players has taken place is the Jewellery Quarter in Birmingham. Originally, it was a wealthy residential area just to

the north west of the centre of Birmingham (Figure 2(a)), but as Birmingham grew rapidly in the 18th and 19th centuries as a manufacturing centre, bedrooms in houses in the Quarter were converted into workrooms, and then many buildings were converted fully to manufacturing or were knocked down and replaced by factory buildings. As Birmingham boomed as a manufacturing city, four groups of industries developed: guns, jewellery, toys and metal working. Some of these industries, like the manufacture of jewellery and the making of guns, tended to locate in specific areas (Figure 2(a)). Manufacturing industry continued to grow in the 20th century, and new so-called 'metal-bashing' industries developed, some of which were also located in the Jewellery Quarter, such as the manufacture of washing machines. However the main manufacturing industry in the area continued to be the making of gold and silver jewellery.

The Jewellery Quarter, as well as the rest of Birmingham, felt the full force of the decline of manufacturing in Britain in the 1970s, with many of the businesses making metal



Figure 2(a): The location of the Jewellery Quarter in Birmingham; (b): the location of new developments in the Jewellery Quarter; (c): the pattern of land use in St Paul's Square



products closing down leading to an increasing number of derelict factories. A number of people left the area as well. However the area was considered to have considerable potential for regeneration, because of its location within walking distance of city centre offices and its unique mix of residential properties, small workshops and retail shops selling jewellery, clocks, watches and antiques. There are also offices and a small entertainment/cultural zone containing bars, clubs, restaurants and art galleries. Figure 2(c) shows the pattern of mixed land use in St Paul's Square, which is typical of the Jewellery Quarter as a whole and which makes it such a distinctive area. Today there are approximately 700 jewellery-related businesses in the Quarter, 400 of which manufacture jewellery, accounting for 25% of Britain's jewellery production.

### Regeneration through organisations supported by central government – the Hylton Street Development

Regeneration in the Quarter has been encouraged by central government-funded organisations (public partners)

working in combination. One such example of this approach is the Hylton Street Development (Figure 3). The location of this development is shown in Figure 2(b). This will involve the spending of £2.5 million on the redevelopment of a Grade 2 listed building in the Jewellery Quarter (to the left of the picture), to provide 13 living and working units specifically created for jewellery designers and manufacturers to rent. The properties will have separate workshops and living space, with between one and three bedrooms. In the past it was felt that graduate designers and potential manufacturers of jewellery had moved out of Birmingham because of a lack of suitable and affordable units to live and work in. This scheme hopes to reverse that trend. The project is being funded by a partnership of different government-funded agencies and illustrates how these can work together to bring about regeneration in an area. These agencies are:

- Advantage West Midlands. This is one of the nine Regional Development Agencies in England which used government funds to try and

encourage sustainable economic development. (Regional Development Agencies were abolished by the Coalition Government in September 2010 and will be replaced by new bodies called Local Enterprise Partnerships. It is not yet possible to say what effects that might have on this development.)

- The Housing and Communities Agency (HCA). This was set up by the government in December 2008. This Agency has considerable powers and currently has a budget of £5 billion annually. Its aims are to support the development of high-quality housing, improve the infrastructure of areas and develop schemes for regeneration in England.
- Urban Living. This is one of nine Housing Market Renewal Pathfinder organisations set up and financed by the government's Department of Communities and Local Government to develop specific localities. Urban Living covers parts of Birmingham and Sandwell in the West Midlands. These organisations have a 15-year programme to improve

housing in neighbourhoods where there is a shortage of affordable housing.

As well, an organisation called Midland Heart is also involved in the Hylton Street development. This is a housing and regeneration group dating back to the 1920s which owns or manages 32,000 properties across the West Midlands. Its aim is to develop affordable rented housing.

### Regeneration through local government – the role of Birmingham City Council

The Jewellery Quarter has not benefited from any of the large-scale central government initiatives such as Property Led Regeneration or City Challenge. However local government has been particularly active in the area. Birmingham City Council has long been an important player in the drive to rebrand the Jewellery Quarter by re-imaging and regeneration. The Council fund the administrative support for, and are an important member of, the Jewellery Quarter Regeneration Partnership, which meets twice a year. Membership of this body includes representatives from businesses in the Quarter as well as residents. This body has produced a Jewellery Quarter Regeneration Charter, which has two aims. The first is to develop a vibrant atmosphere in the Quarter which will attract people to live, work and spend their leisure time there. Secondly, the Charter wants the Quarter to act as a 'honey pot' for creative businesses, ranging from jewellery businesses to arts and media. One of the ways the Council

will look to achieve these aims will be through improved marketing of the area by:

- providing an information centre
- developing a website to attract visitors
- providing a tourism guide
- working with other agencies on joint initiatives to liaise with TV and radio, hotels, conference organisers and travel operators.

### The Big City Plan

The Council's latest plans for the area are part of its Big City Plan, announced in October 2010 to redevelop 2000 acres of land in the city centre with the aim of creating 50,000 jobs. As part of this Plan, Birmingham Council has approved a scheme for the building of a new public square (the Golden Square) on land at the corner of Warstone Lane and Vyse Street (Figure 2(b)), which it is hoped will become a new centre for the Jewellery Quarter. Construction of this £1.5 million development will begin in the summer of 2011 and the aim is to complete it by spring 2012. The square will be divided into three parts: a plaza where public events such as concerts and farmers' markets as well as temporary exhibitions can be staged, a grassed area containing orchard trees, and a promenade. There will also be a canopy at the entrance to the square which will be decorated with gold leaf to reflect the importance of jewellery making in the area. The project will be funded from the Heritage Lottery Fund, which distributes money from the National Lottery to schemes which are important to Britain's heritage.

### Regeneration through non-government organisations like Friends Groups

There are few green spaces in the Quarter, two of the largest being Key Hill and Warstone Lane Cemeteries (Figure 2(b)). Key Hill cemetery is a rare example of an early Victorian garden cemetery. It was opened in 1836 in a former quarry and is the oldest non-churchyard cemetery in Birmingham. Local residents have formed themselves into a Friends Group (a not for profit volunteer organisation) to try and refurbish and maintain the cemeteries, which have become derelict due to long-term neglect. To help bring this about, a scheme has been developed whereby residents can 'adopt' old graves which have not been maintained for many years and then plant flowers and bulbs. The group has also secured funding to restore the Icknield Street entrance gates to Key Hill cemetery, which are of artistic and architectural merit. The Friends also hold regular clean-up sessions and are carrying out research into the history of the cemeteries and the people buried there. It is hoped that the cemeteries can also be used as a place of exercise for residents. This group is supported by Birmingham Council and other regeneration groups like English Heritage.

### Private organisations and regeneration

There are several examples in the Jewellery quarter of schemes funded by private developers, looking to make money from renting or selling work spaces, housing and offices. These firms are hoping to profit

Figure 3: The Hylton Street Development



Figure 4: The Newhall Square scheme



from these developments while also playing an important part in the regeneration process, by improving building quality and by bringing people into the area. An example of a private developer looking to create work units is the Society for the Protection of Artistic and Cultural Enterprise (SPACE). This organisation has redeveloped part of the Big Peg building (Figure 2(b)). This building was built originally as a modern office building in 1960 but it had become rather run down in recent years. The SPACE Company (using finance from banks as well as public funds and grants) has refurbished the building, creating new offices and workspaces for arts, media and creative enterprises, including 70 penthouse studios. The building also houses a restaurant and the Big Peg Gallery which hosts art exhibitions.

Two other developments to create housing and offices are the St Paul's Place development and the Newhall Square scheme on Newhall Street and Charlotte Street (Figure 4). The St Paul's Place development (developed by Chord Developments) has seen the renovation of the Thomas Walker Building, a former buckle-making factory, into a series of 177 luxury apartments as well as office space surrounding a landscaped communal courtyard. The development covers 7700 square metres. This development also contains a residents' car park created underground. The Newhall Square scheme is a larger development projected to cost £63 million and covering 9500 square metres. It consists of a mix of apartments (234 are planned), retail units, a car park, offices and a Travelodge Hotel (100 beds) which has already opened (Figure 4). As part of this development, a large public square (as large as five tennis courts) is under construction on land which is next to a canal. This development is on the site of the former Museum of Science and Industry, which closed in 1997.

### The role of individual residents in regeneration of the Jewellery Quarter

Residents of the Jewellery Quarter have set up the Jewellery Quarter Neighbourhood Forum, which aims to give local residents a say in issues affecting the Quarter and also works to improve quality of life in the area.

A group of residents have organised a Jewellery Quarter Farmers Market (called 'The 24 Carrots Farmers Market'), which takes place once a month with the primary aim of increasing the number of people visiting the Quarter. This Forum is also the prime mover in trying to secure World Heritage status for the Jewellery Quarter. A World Heritage site is a location listed by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) as a site of special physical and cultural significance; this would raise the profile of the Jewellery Quarter enormously, both in Britain and abroad.

### Gentrification

Individual residents also help to regenerate the area, indirectly through the process of gentrification. This involves regeneration through improvement of the quality of housing in an inner city area. It is regeneration brought about by individuals or groups of individuals, not agencies or the government. Like most inner city areas, the Jewellery Quarter was an area of factories and housing mixed together in an unplanned way. Much of the housing was of poor quality, and over time had become occupied by people from low income groups, who could not necessarily afford to maintain it. However the area is close to Birmingham city centre which has been benefiting from re-urbanisation, or the movement of people back into city centres due to urban regeneration, and has become an increasingly popular as a place to live for young well-paid professional people who want to live close to work and the entertainment attractions found in the city centre. The good railway links found in the city centre are also an attraction, as New Street

station is within walking distance and from here people can easily reach airport in London and Birmingham.

Improvement has taken place as a result of the renovation of old housing by new residents, or by the conversion into housing of former non-residential property (see above for examples of this), or by a combination of both.

Gentrification can lead to a change in the character of an area. As the residents are now wealthier, they have more money to spend in bars and restaurants and high-order shops selling expensive products. This tends to make the area more attractive to wealthier people, so a positive multiplier effect can result which can lead to a sustained improvement in the wealth of the area. The development of bars and restaurants in St Paul's Square can be seen as evidence for this. Gentrification can also lead to an increase in house prices, which can price some low-income residents out of the market. As well, with the development of housing for single people or couples, families with children can often find it difficult to find suitable housing. It is hoped that the building of new affordable housing developments might prevent this happening in the Jewellery Quarter.

## FOCUS QUESTIONS

1. With reference to inner city areas, suggest what evidence can be used to show decline, and give the reasons why decline has taken place.
2. Explain what is meant by gentrification, and using an example/s, suggest how effective it has been in the regeneration of urban areas.
3. Using examples of inner city areas, describe the roles of different players who are involved in attempts to rebrand these areas.
4. Using examples, suggest how political factors can affect land use in urban areas.