TABLE I.

Showing the Relations of the Alluvial, Aqueous, Volcanic, and Hypogene Formations of different ages.

Periods.		Formations.		Some of the Localities where the Formations occur.
I. Recent.	A.	Alluvial.	. . . . .	Beds of existing rivers, &c., vol. ii. ch. xiv.
		Aqueous.	*a.* Marine.	Coral reefs of the Pacific, vol. ii. ch. xviii.
			b. Freshwater.	Bed of Lake Superior, &c., vol. i. ch. xiii.
		Volcanic.	. . . . .	Etna, Vesuvius, vol. i. ch. xix. xx. xxi.
		Hypogene.	*a.* Plutonic.	*Concealed;* foci of active volcanos, vol. iii. ch. xxv.
			b. Metamorphic.	*Concealed;* around the foci of active volcanos, vol. iii. ch. xxvi.
II. Tertiary.	1. Newer Pliocene. B.	Alluvial.	. . . . .	Loess of the Rhine—gravel covering the Newer Pliocene strata of Sicily.
		Aqueous.	*a.* Marine.	Val di Noto, Sicily.
			b. Freshwater.	Colle, in Tuscany.
		Volcanic.	. . . . .	Val di Noto, Sicily.
		Hypogene.	*a.* Plutonic.	*Concealed;* foci of Newer Pliocene volcanos—underneath the Val di Noto, vol. iii. p. 107, and ch. xxv.
			b. Metamorphic.	*Concealed;* near the foci of Newer Pliocene volcanos—underneath the Val di Noto, vol. iii. p. 109, and ch. xxvi.
	2. Older Pliocene. C.	Alluvial.	. . . . .	Norfolk? vol. iii. p. 173.
		Aqueous.	*a.* Marine.	Subapennine formations.
			b. Freshwater.	Near Sienna, vol. iii. p. 160.
		Volcanic.	. . . . .	Tuscany, vol. iii. p. 159.
		Hypogene.	*a.* Plutonic.	*Concealed;* foci of Older Pliocene volcanos—beneath Tuscany.
			b. Metamorphic.	*Concealed;* probably near the same foci.
	3. Miocene. D.	Alluvial.	. . . . .	Mont Perrier, Auvergne—Orleanais, vol. iii. p. 217.
		Aqueous.	*a.* Marine.	Bordeaux. Dax.
			b. Freshwater.	Saucats, near Bordeaux, vol. iii. p. 207.
		Volcanic.	. . . . .	Hungary, vol. iii. ch. xvi.
		Hypogene.	*a.* Plutonic.	*Concealed;* foci of Miocene volcanos—beneath Hungary.
			b. Metamorphic.	*Concealed;* probably around the same foci.
	4. Eocene. E.	Alluvial.	. . . . .	Summit of North and South Downs? vol. iii. p. 311.
		Aqueous.	*a.* Marine.	Paris and London basins.
			b. Freshwater.	Isle of Wight—Auvergne.
		Volcanic.	. . . . .	Oldest volcanic rocks of the Limagne d'Auvergne, vol. iii. ch. xix.
		Hypogene.	*a.* Plutonic.	*Concealed;* foci of Eocene volcanos—beneath the Limagne d'Auvergne.
			b. Metamorphic.	*Concealed;* probably near the same foci.

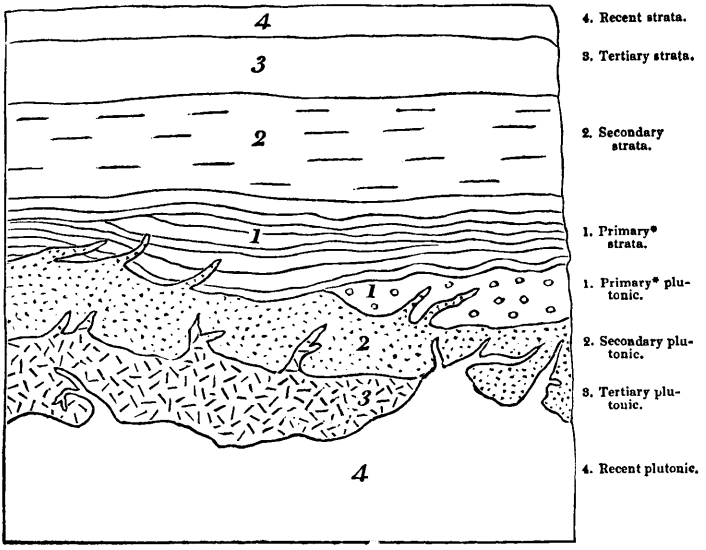
TABLE I. *continued.*

Periods.	Formations.		Some of the Localities where the Formations occur.
III. Secondary.			
1. Cretaceous group. F. Table II.	Alluvial.		
	Aqueous.	*a.* Marine.	Wiltshire. North Downs. Flamborough Head.
		b. Freshwater.	
	Volcanic.	. . . . .	Northern flanks of the Pyrenees? near Dax?
	Hypogene.	*a.* Plutonic.	
		b. Metamorphic.	
2. Wealden group. G. Table II.	Alluvial.	. . . . .	Portland 'Dirt-bed.'
	Aqueous.	*a.* Marine.	
		b. Freshwater.	Weald of Surrey, Kent, and Sussex, vol. iii. ch. xxi.
	Volcanic.		
	Hypogene.	*a.* Plutonic.	
		b. Metamorphic.	
3. Oolite group. H. Table II.	Alluvial.		
	Aqueous.	*a.* Marine.	Oxford. Bath. Jura chain.
		b. Freshwater.	
	Volcanic.	. . . . .	Hebrides?
	Hypogene.	*a.* Plutonic.	*Concealed;* beneath the Hebrides.
		b. Metamorphic.	
4. Lias group. I. Table II.	Alluvial.		
	Aqueous.	*a.* Marine.	Lyme Regis. Whitby. Aberthaw.
		b. Freshwater.	
	Volcanic.	. . . . .	Hebrides?
	Hypogene.	*a.* Plutonic.	
		b. Metamorphic.	Alps? ch. xxvi. p. 371. Valorsine in Savoy?
5. New Red Sandstone group. K. Table II.	Alluvial.		
	Aqueous.	*a.* Marine.	Cheshire. Staffordshire. Vosges. Westphalia (Muschelkalk).
		b. Freshwater.	
	Volcanic.	. . . . .	Near Exeter, Devon.
	Hypogene.	*a.* Plutonic.	
		b. Metamorphic.	*Concealed;* beneath Devonshire?
6. Carboniferous group. L. Table II.	Alluvial.		
	Aqueous.	*a.* Marine.	Clifton. Dudley. Mendip. [Fife.
		b. Freshwater.	Coal measures of Somersetshire and
	Volcanic.	. . . . .	Forfarshire. Edinburgh. Durham. High Teesdale.
	Hypogene.	*a.* Plutonic.	*Concealed;* beneath Edinburgh, Northumberland, Durham.
		b. Metamorphic.	Near the Plutonic rocks of the same period.

DIAGRAM

Shewing the relative position which the Plutonic and Sedimentary Formations of different ages may occupy;
(in illustration of TABLE I.)

No. 91.



In the above diagram an attempt is made to shew the inverted order in which the sedimentary and plutonic formations may occur in the earth's crust; subterposition in the plutonic, like superposition in the sedimentary rocks, being for the most part characteristic of a newer age. By aid of this illustration, and what we have said in Chap. 25 and 26, the reader will comprehend why so large a portion of the plutonic rocks of later periods are concealed, and why the more ancient of this class have risen nearest to the surface, so as to have been denuded in some regions and exposed to view.

* The primary formations here mentioned are those, whether stratified or unstratified, which are older than the carboniferous deposits.

TABLE II.

Showing the Order of Superposition, or Chronological Succession, of the principal Sedimentary Deposits or Groups of Strata in Europe.

This Table is referred to in the Glossary, and includes the Secondary Formations alluded to in this Work, but not described in detail.

Periods and Groups.		Names of the principal Members and general Mineral nature of the Formation.		Some of the Localities where the Formation occurs.
I. Recent Period.	A	The deposits of this period are for the most part concealed under existing lakes and seas.		
		Consolidated sandy and gravelly beds (*a*), travertin limestones (*b*), calcareous sandstones with broken shells (*c*), coral limestone, consisting of corals, shells, &c. (*d*)		*a*. Delta of the Rhone. *b*. Tivoli, and other parts of Italy. *c*. Shore of island of Guadaloupe. *d*. Coral reefs in Pacific, &c.
II. Tertiary Period.	B Newer Pliocene.	Marine. *Limestone*, sands, clays, sandstones, conglomerates, marls with gypsum; containing *marine* fossils (*a*).	Freshwater. Sands, clays, sandstones, lignites, &c.; containing *land* and *freshwater* fossils (*b*).	*a*. Sicily, Ischia, Morea? *b*. Colle in Tuscany.
	C Older Pliocene.	*Subapennine marl, Subapennine yellow sand, English 'crag,'* and other deposits, as in B, containing *marine* fossils (*a*).	Similar deposits to B; containing *land* and *freshwater* fossils (*b*).	*a*. Subapennine formations, Perpignan, Nice, Norfolk and Suffolk. *b*. Near Sienna, &c.
	D Miocene.	*Faluns of the Loire*, and other deposits of similar mineral composition with B and C, containing *marine* fossils (*a*).	Similar deposits to B and C; containing *land* and *freshwater* fossils (*b*).	*a*. Touraine, Bordeaux, Valley of Bormida, Superga near Turin, Basin of Vienna. *b*. Saucats, twelve miles south of Bordeaux.

TABLE II. *continued.*

Periods and Groups.		Names of the principal Members and general Mineral nature of the Formation.		Some of the Localities where the Formation occurs.
II. Tertiary Period, *continued.*	E Eocene.	*Calcaire Grossier* (*a*), *plastic clay*, sands, sandstones, &c., with *marine* fossils (*b*).	*Calcaire siliceux*—sandstones and conglomerates, red marl, green and white marls, limestone, gypseous marls, —with land and freshwater fossils (*c*).	*a.* Paris basin. *b.* Paris, London, and Hampshire basins, Isle of Wight. *c.* Paris Basin, Isle of Wight, Auvergne, Velay, Cantal.
III. Secondary Period.	F Cretaceous Group.	1. *Maestricht Beds.*—Earthy white limestone with siliceous masses, resembling chalk (marine).		St. Peter's Mount, Maestricht.
		2. *Chalk with flints* (marine).		North and South Downs, and parts of the intervening Weald of Kent, Surrey, and Sussex. Isle of Wight, coasts of Hampshire and Dorsetshire, Yorkshire, North of Ireland.
		3. Chalk without flints (marine).		
		4. *Upper green sand* (marine).—Marly stone, and sand with green particles; layers of calcareous sandstone.		
		5. *Gault* (marine).—Blue clay, with numerous fossils, passing into calcareous marl in the lower parts.		
		6. *Lower green sand* (marine).—Grey, yellowish, and greenish sands, ferruginous sands and sandstones, clays, cherts, and siliceous limestones.		
	G Wealden Group.	1. *Weald clay* (freshwater).—Clay, for the most part without intermixture of calcareous matter, sometimes including thin beds of sand and shelly limestone.		1, 2. Extensively developed in the central parts of Kent, Surrey, and Sussex. 3. Isle of Purbeck, in Dorsetshire.
		2. *Hastings sands* (freshwater).—Grey, yellow, and reddish-brown sands, sandstones, clays, calcareous grits passing into limestone.		
		3. *Purbeck beds* (freshwater).—Various kinds of limestones and marls.		

TABLE II. *continued.*

Periods and Groups.		Names of the principal Members and general Mineral nature of the Formation.	Some of the Localities where the Formation occurs.
III. Secondary Period, *continued.*	H	1. *Portland beds* (marine).—Coarse shelly limestone, fine-grained white limestone, compact limestone — all more or less of an oolitic structure; beds of cherts.	Isle of Portland, Tisbury in Wiltshire, Aylesbury.
		2. *Kimmeridge clay* (marine).—Blue and greyish-yellow slaty clay, containing gypsum, bituminous slate (Kimmeridge coal).	Near Kimmeridge on coast of Dorsetshire—Sunning Well, near Oxford.
		3. *Coral rag* (marine).—Calcareous shelly freestones, largely oolitic; coarse limestone, full of corals; yellow sands; calcareous siliceous grits.	Headington, near Oxford—Farringdon, in Berkshire—Calne and Steeple Ashton in Wiltshire—Somersetshire.
	Oolite, or Jura Limestone Group.	4. *Oxford clay* (marine).—Dark blue tenacious clay with septaria, bituminous shale, sandy limestone (Kelloway rock), iron pyrites, gypsum.	New Malton, in Yorkshire—Lincolnshire — Cambridgeshire — Huntingdonshire, and midland counties—abundantly near Oxford—Somersetshire—Dorsetshire.
		5. *Cornbrash* (marine).—Grey or bluish rubbly limestone, separated by layers of clay.	Malmsbury, Atford, Wraxall, Chippenham.
		6. *Forest marble* (marine).—Calcareo-siliceous sand and gritstone; thin fissile beds of limestone, with clay partings; coarse shelly limestone.	Whichwood Forest, Oxfordshire—Frome, south-east of Bath.
		7. *Great oolite* (marine).—White and yellow oolitic calcareous freestone, coarse shelly limestone, layers of clay. Oolitic limestone, with remains of land animals, birds, amphibia, plants, sea-shells (*a*).	Kettering, in Northamptonshire—Bath—Burford, in Oxfordshire—Bradford, in Wiltshire. (*a*) Stonesfield, near Woodstock, Oxfordshire.
		8. *Inferior oolite* (marine).—Fuller's earth, soft freestone, sand with calcareous concretions.	Cotteswold Hills — Dundry Hill, near Bristol.
		Limestones of various qualities, clays, sands, and sandstone, containing the same fossils as those occurring in the series of the oolitic group of England, constitute the main body of the Jura chain of mountains, and cover vast tracts of country in Germany.	

TABLE II. *continued.*

Periods and Groups.		Names of the principal Members and general Mineral nature of the Formation.	Some of the Localities where the Formation occurs.
III. Secondary Period, *continued.*	I Lias Group.	*Lias* (marine).—Blue, white, and yellow earthy limestone, usually in thin beds, interstratified with clay, often slaty and bituminous. Dark blue marl, with a few irregular rubbly limestone beds—sandy marlstone.	Lyme Regis, in Dorsetshire, and in many parts of Somersetshire, Gloucestershire, Warwickshire, Nottinghamshire, and Yorkshire—in Sutherlandshire, the Hebrides, and North of Ireland. In France, and, to a considerable extent, in Germany.
	K New Red Sandstone Group.	1. *Keuper*, or *variegated marls.*—Red, grey, green, blue, and white marls, sandstones, conglomerates, and shells, containing gypsum and rock-salt.	Neighbourhood of Vosges mountains, and many parts of Wurtemberg and Westphalia, and other parts of Germany.
		2. *Muschelkalk* (marine).—Grey, blue, and blackish limestone, with many fossils, particularly encrinites; siliceous layers and nodules; magnesian limestone, marls of different colours, gypsum, and rock-salt.	Extensively developed in Germany and France. Hitherto no beds in England have been identified with the formation.
		3. *Variegated sandstone.* — Red, white, blue, and green siliceo-argillaceous sandstone, often micaceous, and containing gypsum and rock-salt.	Nottinghamshire — Yorkshire. It is uncertain whether the variegated sandstone of England belongs to the Keuper formation of Germany, or to the variegated sandstone which lies under the Muschelkalk in Westphalia, Wurtemberg, the Vosges, &c.
		4. *Magnesian limestone* (marine).—Compact shelly limestone, yellow magnesian limestone, marl slate, red marl, and gypsum.	Nottinghamshire, Derbyshire, Yorkshire, Durham, Northumberland. Departments of Saone and Loire, Hartz mountains, Thuringia, Westphalia.
		5. *Red conglomerate.*—Sandstones, conglomerates, sands, and marls.	Neighbourhood of Exeter—Yorkshire — Durham—Westphalia—Wurtemberg—Vosges mountains.

TABLE II. *continued.*

Periods and Groups.		Names of the principal Members and general Mineral nature of the Formation.	Some of the Localities where the Formation occurs.
III. Secondary Period, *continued.*	L Carboniferous Group.	1. *Coal measures* (freshwater ?).—Sandstones, grits, conglomerates, clays with ironstone, shales, and limestone, interstratified with beds of coal.	Northumberland, Durham, Yorkshire, Lancashire, Derbyshire, Staffordshire, Gloucestershire, Somersetshire, South Wales Valleys of the Forth and Clyde. District of Liege, Westphalia, Silesia, Bohemia, &c.
		2. *Mountain limestone* (marine).—Grey, compact, and crystalline limestone, abounding in lead ore in North of England, and alternating with coal measures in Scotland.	Mendip Hills, Somersetshire, Derbyshire, Yorkshire, Lancashire, Westmoreland, Durham, Northumberland, Lanarkshire, Linlithgowshire, many parts of Ireland. North-west of Germany, Belgium, North of France.
		3. *Old red sandstone.*—Coarse and fine siliceous sandstones and conglomerates of various colours, red predominating.	Extensively developed in Shropshire and Herefordshire, Brecknockshire, Dumfriesshire, Forfarshire. Silesia, Bohemia.
		4. *Grauwacke* and *transition limestone* (marine).—Coarse and fine slates, sandstones, and conglomerates —crystalline limestones.	Westmoreland, Cumberland, Wales, Somersetshire, Devonshire, South of Scotland, South of Ireland. North of France, North-west of Germany, &c.