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GEOPHYSICAL BULLETIN

No. 4

DENSITY OF IRISH ROCKS

by

JOHN S. JACKSON

Scoil na Fisice Cosmaí, Institiúid Árd-Léinn Bhaile Átha Cliath
School of Cosmic Physics, Dublin Institute for Advanced Studies

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N. Falcone

DENSITY OF IRISH ROCKS

The densities of 157 rock specimens in the Geophysics Laboratory of Trinity College, Dublin, have been determined to provide data for the evaluation and interpretation of the gravity survey of Ireland. These rock samples have been collected at various times for different purposes, but, in the main, are fairly representative of the rock types occurring in this country.

The average size of each sample was about 25 ccs. and its density was determined with a Walker Steelyard Balance, weighings being taken in air and in water. Most of the samples were impervious to water and, apart from ensuring that all air bubbles were eliminated, no special efforts were taken to ensure that they were saturated. Sandstone specimens, especially of Triassic age, were the most difficult to measure since they tended to break down in water. In these cases the weighing in water was carried out after the removal of all loosely attached grains and, if a second weighing in water was necessitated by further loss of loose grains, this weighing was carried out after drying in air overnight. This procedure was repeated until satisfactory readings were obtained. Highly vesicular specimens were boiled in water for five minutes and allowed to cool in cold water before the weighing in water. This method, though satisfactory with porous rocks, was inevitably unreliable when applied to specimens which were both vesicular

and impervious to water.

In the table the reference number is that in the catalogue of the Geophysics Laboratory at Trinity College, Dublin. The locality given is intended only as a guide. The geological age of each specimen is shown but in some cases this is uncertain and indicated by a question mark after the name of the system. In a few instances the age is unknown.

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J. S. JACKSON

DENSITY OF IRISH ROCKS

County	Class	Ref.	Rock Type	Locality	Geological Age	Density g/cm^3
Antrim	Igneous	B.1	Basalt	The Maidens	Eocene	2.98
		B.2	Basalt	Giant's Causeway	Eocene	2.83
		B.6	Columnar basalt	Giant's Causeway	Eocene	2.82
		B.11	Basalt	Rue Point, Rathlin Is.	Eocene	2.81
		B.13	Dolerite	Ballycastle	Oligocene?	2.99
		B.18	Basalt	Ferris Point, Larne	Eocene	2.79
		B.19	Basalt	Black Head	Eocene	2.75
		B.20	Basalt	Rathlin (west)	Eocene	2.83
		B.22	Basalt(amygdaloidal)	Cave Hill, Belfast	Eocene	2.82
		W.8	Olivine dolerite	North Star dyke near Ballycastle	Oligocene?	2.96
	Sedimentary	W.5	Tuff (very weathered)	Fair Head, Ballycastle	Carboniferous	2.56 u
		W.23	Chalk	Cave Hill, Belfast	Cretaceous	2.59
		R.23	Limestone (very fossiliferous and slightly weathered)	Beside North Star dyke near Ballycastle	Carboniferous	2.68 u
	Metamorphic	W.4	Hornfels (Lias clay)	Portrush	Jurassic	2.70
		W.6	Hornfels (Carboniferous shale)	Lough Doo, Fair Head, Ballycastle	Carboniferous	2.72
Armagh	Igneous	B.21	Newry Granite	Goraghwood Quarry	Devonian	2.69
		B.34	Newry Granite (typical specimen)	Goraghwood Quarry	Devonian	2.71
Carlow	Igneous	W.20	Mt. Leinster Granite	Scallagh Gap	Devonian	2.68
Cavan	Igneous	B.15	Basalt	½ml. S.E. Kingscourt	Tertiary, Eocene?	2.75

DENSITY OF IRISH ROCKS - continued

County	Class	Ref.	Rock Type	Locality	Geological Age	Density g/cm^3
Cavan (contd.)	Igneous	B.49	Basalt	Shot-boring "J" (1939), Kingscourt	Tertiary, Eocene?	2.87
		B.50	Vesicular Basalt	Shot-boring "JX" (1939), Kingscourt	Tertiary, Eocene?	2.62 u
		W.1	Basalt	Shot-boring "C" (1939), Kingscourt	Tertiary, Eocene?	2.82
		W.15	Crossdoney granite	Crossdoney, near Mountnugent	Devonian?	2.67
	Sedimentary	B.37	Sandstone (M.G.)	Ardagh, near Kingscourt	Carboniferous	2.52
		W.21	Sandstone (NRS)	Glacifluvial deposit, 1ml. S.E. Kingscourt	Triassic	2.31 u
		W.28	Gannister (slightly carbonaceous)	Corratober Bridge, near Kingscourt	Carboniferous (C.M.)	2.60
Cork	Sedimentary	W.9	Sandstone (ORS)	Rathcormac, near Middleton	Devonian	2.67
		W.10	Grit	½ml. N. Ballydam, near Middleton	?	2.62
		W.11	Sandstone (ORS)	Ballinaclashy Bridge, near Middleton	Devonian	2.70
		W.12	Limestone	1ml. S. Ballyedmond House, near Middleton	Carboniferous	2.74
Donegal	Igneous	B.8	Amorphous quartz	Tory Island	Dalradian?	2.66
		B.9	Amorphous quartz	Tory Island	Dalradian	2.64
		B.12	Granite (rolled and weathered)	Arranmore	Dalradian	2.58 u
		B.43	Syenite (slightly weathered)	Fanad Point	Dalradian	2.69 u

DENSITY OF IRISH ROCKS - continued

County	Class	Ref.	Rock Type	Locality	Geological Age	Density g/cm^3
Donegal (contd.)	Igneous	W.50	Porphyritic Felsite	Near Treantaboy	Dalradian	2.95
		R.37	Diorite	½ml. N.E. Mullaghfin	Dalradian	3.00
	Metamorphic	R.6	Limestone Schist	Near Lissinisk School	Dalradian	2.72
		R.14	Gneiss	2½mls. W. Treantaboy	Dalradian	2.95
		R.30	Metamorphosed limestone	Breen (village)	Dalradian	2.71
Down	Igneous	R.45	Dolerite	Scrabo Hill	Tertiary, Eocene?	2.95
	Sedimentary	R.5	Sandstone (NRS)	Quarry near Lough Moronay, near Scrabo Hill	Triassic	2.34
		R.17	Mudstone	Quarry near Lough Moronay, near Scrabo Hill	Triassic	2.59
		R.22	Sandstone (NRS)	Scrabo Hill	Triassic	2.23
		R.24	Sandstone (NRS)	Quarry Corner, near Scrabo Hill	Triassic	2.45
		R.26	Sandstone and Marl	Scrabo Hill	Triassic	2.45
		R.31	Grit	Eden Farm, near Scrabo Hill	Triassic	2.72
	Metamorphic	R.13	Slate	Near Scrabo Hill	Silurian	2.76
		R.39	Slate	Near Scrabo Hill	Silurian	2.72
Dublin	Igneous	B.3	Granite	Bohernabreena	Devonian	2.65
		B.7	Granite (weathered)	Bohernabreena	Devonian	2.59 u
		B.10	Granite (weathered)	Rockabill (Is.)	Devonian	2.60 u
		B.14	Porphyritic diorite	Bohernabreena	Ordovician	2.99

DENSITY OF IRISH ROCKS - continued

County	Class	Ref.	Rock Type	Locality	Geological Age	Density g/cm^3
Dublin (contd.)	Igneous	B.24	Rhyolite	Blackchurch	Ordovician	2.64
		B.33	Porphyrite	Portrane	Ordovician	2.86
		W.7	Porphyrite	Bohernabreena	Ordovician	2.95
	Sedimentary	B.27	Tuff	Shennick Is.,Skerries	?	2.87
		W.43	Sandstone (ORS)	½ml. S. of Donabate	Devonian	2.67
		R.4	"Calp"	South of Rush	Carboniferous	2.65
		R.10	Conglomerate	Shennick Is.,Skerries	Carboniferous	2.78
		R.15	Sandstone	Shennick Is.,Skerries	Carboniferous	2.59
		R.16	Shale	Shennick Is.,Skerries	Carboniferous	2.82
		R.25	"Lane" Conglomerate	Between Loughshinny and Skerries	Carboniferous	2.76
		R.27	Limestone	Loughshinny	Carboniferous	2.67
		R.29	Conglomerate	Between Loughshinny and Skerries	Carboniferous	2.69
		R.34	Conglomerate	Near Rush	Carboniferous	2.70
		R.36	Limestone with band of chert	Between Rush and Loughshinny	Carboniferous	2.68
		R.38	Gritty Limestone	Kate Rock, North of Rush Harbour	Carboniferous	2.67
		R.40	"Carlyan" limestone	N. of Rush Harbour	Carboniferous	2.71
		R.44	"Holmpatrick" limestone	Holmpatrick,Skerries	Carboniferous	2.72
	Metamorphic	W.39	Granitic gneiss	South side of Glencree valley	Devonian	2.65
		B.16	Slate	Bohernabreena	Ordovician	2.62
		B.17	Mica-schist	Bohernabreena	Silurian	2.66
		W.2	Subsequent dolomitic limestone	Howth	Carboniferous	2.71

DENSITY OF IRISH ROCKS - continued

County	Class	Ref.	Rock Type	Locality	Geological Age	Density g/cm^3
Dublin (contd.)	Metamorphic	W.14	Quartzite	Howth Head	Cambrian? (Bray-Howth series)	2.65
		R.32	Dolomitic limestone	Lime-kiln Cove, near Loughshinny	Carboniferous	2.76
		R.35	"Rush" Slate	S.E. of Rush	Carboniferous	2.70
Galway	Igneous	B.23	Porphyritic Galway granite	Barna	Pre-Cambrian, Dalradian?	2.66
		B.26	Porphyritic Galway granite	Inishlackan, Roundstone	Pre-Cambrian, Dalradian?	2.68
		B.39	Microgranite (slightly kaolinised)	Roundstone	Pre-Cambrian, Dalradian?	2.60 u
		B.41	Gabbro	Between Ballynahinch and Roundstone	Pre-Cambrian, Dalradian?	2.92
	Metamorphic	B.42	Hornblende-schist	Letterdyfe Mountain, Roundstone	Pre-Cambrian, Dalradian?	2.99
		W.18	Crystalline marble	Ballynahinch, near Roundstone	Pre-Cambrian, Dalradian?	2.72
		W.19	Serpentine ("Connemara marble")	Barnaoran quarry, Owenglin River, near Ballynahinch	Pre-Cambrian, Dalradian?	2.61
Kerry	Igneous	W.45	Felsite	Bennaumore Mountain, near Lough Guitane	Devonian	2.62
	Sedimentary	B.36	Sandstone (ORS)	Lough Currane, Waterville	Devonian	2.69
		W.31	Sandstone (ORS)	Lough Guitane, near Killarney	Devonian	2.68

DENSITY OF IRISH ROCKS - continued

County	Class	Ref.	Rock Type	Locality	Geological Age	Density g/cm^3
Kerry (contd.)	Sedimentary	W.44	Sandstone (ORS)	3½mls.N.Lough Guitane	Devonian	2.69
		R.11	Grit	Near Marhinmore	Silurian	2.68
		R.41	Gritty micaceous shale	Ballynahow Commons near Dingle	Silurian	2.64
		R.42	Micaceous shale	Parish boundary between Dunquin and Ventry	Silurian	2.76
Kildare	Igneous	B.32	Porphyrite (weathered)	Hill of Allen	Ordovician	2.75 u
		W.34	Andesite	½ml.N.E.Grange Hill	Ordovician	2.90
	Sedimentary	W.13	Limestone	Seven Stars Quarry, Fonstown, near Athy	Carboniferous	2.76
		W.22	Limestone	Chair of Kildare	Bala,Ordovician	2.73
		W.26	Shale	Quarry near Ballyshannon	Ordovician	2.75
		W.32	Limestone	Chair of Kildare	Bala,Ordovician	2.72
Kilkenny	Igneous	W.36	Felsite	Quarry near Rathpatrick church in extreme south of county	Ordovician	2.61
		W.42	Diorite	¼ml. due W. Christendom House on left bank of River Suir	Ordovician	2.90
		R.2	Felsite	Near Rathpatrick church, Drumdowney Lower (T.L.)	Ordovician	2.61
	Sedimentary	W.35	Shale	Curraghlane Lower(TL)	?	2.73

DENSITY OF IRISH ROCKS - continued

County	Class	Ref.	Rock Type	Locality	Geological Age	Density g/cm^3
Kilkenny (contd.)	Sedimentary	W.38	Micaceous sandstone (ORS)	Annaleck Lower (TL)	Devonian	2.71
		W.40	Limestone	Courtnaboghilla (TL)	Carboniferous	2.71
		W.41	Sandstone (ORS)	Grannyferry	Devonian	2.73
		W.47	Sandstone (ORS)	Newrath House, ½ml. S.E. of Grannyferry	Devonian	2.77
		W.49	Sandstone (very siliceous)	1ml. N. Ballynamona, South Co. Kilkenny	Devonian	2.60
		R.3	Conglomerate (ORS)	N. of Waterford town	Devonian	2.66
		R.9	Conglomerate (ORS)	N. of Waterford town	Devonian	2.65
		R.18	Sandstone	Murtaghstown, South Co. Kilkenny	Devonian	2.73
		R.19	Sandstone (ORS)	N. of Waterford town	Devonian	2.76
		R.20	Limestone	Granny Quarry, Granny	Carboniferous	2.65
		R.21	Limestone	Quarry immediately east of Dunkitt House, Strangsmill	Carboniferous	2.70
	Metamorphic	R.33	Dolomitic Limestone (very weathered)	Granny Quarry, Granny	Carboniferous	2.62 u
Limerick	Igneous	R.1	Basalt	Carrigogunnel Castle	Carboniferous	2.81
		R.7	Basalt	½ml. south of Carrigogunnel Castle	Carboniferous	2.85
	Sedimentary	W.48	Limestone	½ml. north-west of Carrigogunnel Castle	Carboniferous	2.70
		R.8	Volcanic Ash	½ml. south of Carrigogunnel Castle	Carboniferous	2.71
		R.28	Limestone	1ml. south-west of Carrigogunnel Castle	Carboniferous	2.66

DENSITY OF IRISH ROCKS - continued

County	Class	Ref.	Rock Type	Locality	Geological Age	Density g/cm^3
Limerick (contd.)	Sedimentary	R.43	Limestone	Churchfield Graveyard near Carrigogunnel Castle	Carboniferous	2.72
Louth	Igneous	B.29	Gabbro (Eucrite)	Grange, near Carlingford	Tertiary, Eocene?	2.91
		B.30	Gabbro (Eucrite)	Grange, near Carlingford	Tertiary, Eocene?	2.90
		B.31	Gabbro (Eucrite)	Grange, near Carlingford	Tertiary, Eocene?	2.90
		B.44	Diorite	Jenkinstown	Eocene	2.97
		B.45	("Granophyre")	Bush Quarry, Bush	Eocene	2.61
		B.46	Porphyritic diorite	Jenkinstown	Eocene	2.95
		B.47	Basalt (sill)	Quarry near Greenore	Eocene	2.94
		B.48	Gabbro	Barnavave Mt., Carlingford	Eocene	3.03
	Metamorphic	W.25	Semi-baked hornfelsic limestone	Quarry near Greenore	Carboniferous	2.71
		W.27	Slate	Littoral outcrop, near Carlingford	Silurian	2.79
		R.46	Garnetiferous marble	Barnavave Mt., near Carlingford	Carboniferous	3.06
Mayo	Metamorphic	R.49	Quartzite	Cathedral Rocks, Achill Island	Pre-Cambrian, Dalradian?	2.47
		R.50	Mica-schist	Cathedral Rocks, Achill Island	Pre-Cambrian, Dalradian?	2.71
Monaghan	Sedimentary	W.3	Satin Spar	1½mls. south-west of Carrickmacross	Trias	2.28

DENSITY OF IRISH ROCKS - continued

County	Class	Ref.	Rock Type	Locality	Geological Age	Density g/cm^3
Sligo	Sedimentary	R.12	Limestone	1ml. N. Ballysadare	Carboniferous	2.71
		G.1	Limestone	Immediately north of Ballintogher	Carboniferous	2.70
		G.3	Limestone	Cashel Bir, 1ml. N. of Ballintogher	Carboniferous	2.69
	Metamorphic (& Igneous)	G.2	Garnetiferous gneiss and granite	½ml.S.W.Bunowen Bay, Lough Gill	Pre-Cambrian	3.07
		G.4	Granite and gneiss	South of Doonee Wood, Lough Gill	Pre-Cambrian	3.01
		G.7	Granite and hornblende-schist	S. slope of Killerry Mt., near Lough Gill	Pre-Cambrian	2.69
		G.8	Hornblende-schist	½ml.S.W. Bunowen Bay	Pre-Cambrian	2.98
		G.5	Quartzite	S. slope Killerry Mt.	Pre-Cambrian	2.65
		G.6	Serpentine	Slishwood, 1ml.S. of Bunowen Bay, L. Gill	Pre-Cambrian	2.55
Wexford	Igneous	R.48	Granite	Carnsore Point	Caledonian?	2.59 u
	Metamorphic	R.35	Gneiss	Kilmore Quay	Cambrian?(Bray-Howth series)	2.71
Wicklow	Igneous	B.4	Aplite	Sally Gap	Devonian	2.66
		B.5	Pegmatite	Sally Gap	Devonian	2.66
		B.28	Porphyritic lava (agglomeratic)	Cluggagh, Arklow	Ordovician	2.67
		B.38	Wicklow granite	Wicklow Gap	Devonian	2.67
		W.30	Pegmatite	North slope of Tonduff North (Mtn.)	Devonian	2.65
		W.37	Garnetiferous pegmatite (slightly weathered)	East slope of Tonduff North (Mtn.)	Devonian	2.63 u

DENSITY OF IRISH ROCKS - concluded

County	Class	Ref.	Rock Type	Locality	Geological Age	Density g/cm^3
Wicklow (contd.)	Igneous	W.46	Pegmatite (weathered)	North slope of Tonduff North (Mtn.)	Devonian	2.61 u
		R.47	Pegmatitic vein in granite	Glendalough	Devonian	2.70
	Sedimentary	W.29	Purple Shale	Outside Deerpark on Long Hill, Powerscourt	Cambrian? (Bray-Howth series)	2.63
		W.33	Olive Shale	N. side Rocky Valley	Cambrian? (Bray-Howth series)	2.69
	Metamorphic	B.40	Hornblendite	Glendalough	Devonian	3.05
		B.25	Mica-schist	Lough Nahanagan	Silurian	2.70
		W.16	Slate	Brandy Hole, Bray Head	Cambrian?	2.78
		W.17	Quartzite	Brandy Hole, Bray Head	Cambrian?	2.68
		W.24	Fault-breccia (ferruginous)	Near Cloghleagh Br., Manor Kilbride	Devonian	3.03

Note:

"u" in last column signifies that the value is unreliable due to the weathered state of the specimen.

GEOPHYSICAL BULLETINS

No. 1: THOMAS MURPHY, Provisional Results of the Gravity Survey of Central Ireland; Dublin, March 1950.

No. 2: THOMAS MURPHY, Provisional Values for Magnetic Declination in Ireland for the Epoch 1950.5; Dublin, February 1951.

No. 3: L. W. POLLAK and NUALA O'BRIEN, Frequency of the Centres of Closed Low Pressure Systems over the North Atlantic Ocean; Dublin, April 1951.

No. 4: JOHN S. JACKSON, Density of Irish Rocks; Dublin, July 1951.

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L. W. POLLAK, The Climate of Dublin City.

Address:

Meteorological and Geophysical Department,
School of Cosmic Physics,

5 Merrion Square,
Dublin, Ireland.