

Dedication

Russell Black was born on June the 20th, 1930 in La Rochelle, France, from Scottish parents. This dual origin is certainly a major characteristic of Russell's personality. He spent his first ten years in France, in La Rochelle, Pau and Niort. His father, initiator of the use of hollow glass floaters for fishing nets of trawlers in the twenties, encouraged his intellectual interests in many areas and in particular science.

After the fall of France in June 1940, the family escaped by sea to the U.K. This switch of countries at the tender age of 10 years old strongly stimulated the critical mind of the young Russell: depending on which side of the Channel you are, the Napoleonic episode is not exactly taught in the same manner! After obtaining his Scottish Higher Leaving Certificate in 1946, he hesitated between going to Art School or to University. He finally decided for the latter but remains throughout an enthusiastic water-colour painter. He became in 1950 Bachelor in Science at the University of Aberdeen with First Class Honours in Geology.

Strongly impressed by three months fieldwork in Nigeria carried out during his studies, he opted for a job in the Colonial Service and returned to Nigeria to the Geological Survey at Jos. He acquired an excellent knowledge of Hausa, the main Northern Nigerian language, which allows him to mingle closely with the local population. He conducted a series of survey works such as hydrological drilling at Maiduguri, and a study of Pb–Zn mineralization in the Benue valley. However, his main scientific interest was related to the Jurassic mineralized alkaline ring complexes of the Jos plateau. He obtained a PhD degree in Aberdeen in 1958 with a study focused on the intricate Rop ring complex. He was also co-author

of the first Memoir of the Geological Society devoted to the Nigerian Younger Granites. For this Memoir, all figures are drawn by him in a manner which combines his artistic and scientific inclinations.

During this decade in Nigeria, Russell wove excellent contacts with fellow geologists from the 'Afrique Occidentale Française' (AOF) and visited Aïr, in the Niger Sahara. This probably prompted his shift to the 'Service de Géologie et de Prospection Minière de l'AOF'. After a few months in Dahomey in 1959, he was put in charge of the geological mapping of the ring complexes in the Damagaram region in Southern Niger (1959–1960). He spent the next three years mapping and prospecting the Aïr massif (60 000 km²; October 1960–June 1963). His studies involved not only the alkaline ring complexes which in this region are remarkable by their number, dimension and presence of anorthosite, but also and mainly the superbly outcropping Pan-African granite–gneiss basement. As officer of the 'Ordre National du Niger', Russell returned to the BRGM in France in 1964 where he finalized the huge amount of work accomplished during his Niger campaign (control of 3 to 4000 samples) and succeeded in setting up a 1/500 000^e geological map of this *terra incognita*, which remains to this day a reference contribution. During this period Russell also turned towards other fundamental geological problems. In 1966 and 1967, he published two papers which have definitively marked the history of Pan-African studies; indeed he demonstrated that the Pan-African is in fact a true orogeny, and not a thermal event as considered by most at the time. This conclusion was endorsed during the fifth Colloquium on African Geology which he organized in Clermont-Ferrand.

During the same period, he was already impressed by the differences which exist between intraplate magmatism located within cratons and that found within mobile belts.

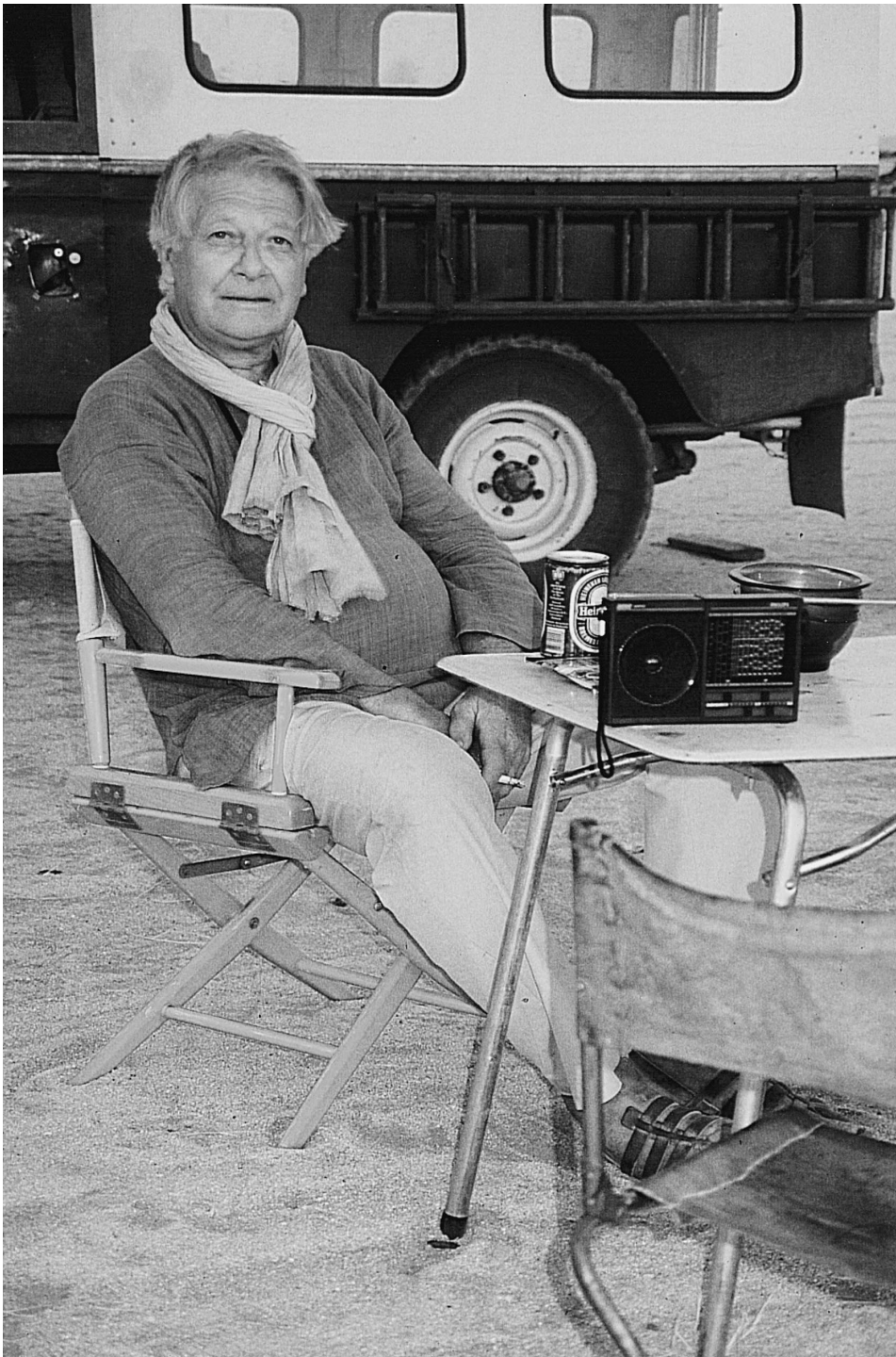
However, after a few years in Europe, the longing for Africa was too strong. He took up a position as Professor of Geology in Leeds which provides a detachment in Addis Ababa. In the period 1970–1974, he collaborated with the CNRS-CNR team in Northern Afar, discovering Tertiary alkaline plutonism. Moving to the south, his mapping proved that the major part of the Afar is not oceanic crust but stretched continental crust displaying structures he predicted to be those of trailing continental margins. This period also coincided with his marriage with José, whom he had met in Nigeria in 1953.

In 1974, anticipating the arrival of political upheavals in Ethiopia, he decided to come back to Europe and join the CNRS in Montpellier to set up the 'Centre Géologique et Géophysique' (CGG). The idea was to focus the CGG on a project of geological mapping on the eastern margin of the West African craton in the Malian Sahara of the Adrar des Iforas. This region is made of a Pan-African granite–gneiss basement and metavolcanic rocks cut by alkaline ring complexes, a situation which is of course of great interest to Russell. At the head of a brilliant, creative and efficient team of geologists, work was carried out in close collaboration with CGG geophysicists. Alternating long periods of field work with laboratory tasks, they clearly demonstrate, in 1979, that the Trans-Saharan Pan-African belt complies with the modern plate tectonics requirements. This constituted the starting point of numerous international publications culminating, in 1982, with the presentation of a 1/500 000^e geological map of the Adrar des Iforas. This was a period of intense contacts with numerous scientists making stays at the CGG which at that moment was one of the main centres of African Geology in the world.

At the beginning of the eighties and after the end of the successful Iforas project, Russell Black moved to the Laboratory of Petrology of the University of Paris VI as Directeur de Recherches of the CNRS. In 1991, he joined the Laboratory of Mineralogy of the National Museum of Natural History. During these last fifteen years, he developed his ideas concerning alkaline rocks and the Pan-African orogeny (which

led him to present the first coherent geodynamical synthesis of the Tuareg shield) as well as establishing links between African and European laboratories. Supervisor to several African theses, he cooperated with several institutions such as CIFEG, UNDP or UNESCO. This period also corresponded to the establishment of our tight, regular and friendly collaboration which has led to strong and important emulation. This association between a younger geologist with access to modern facilities and a wily African veteran has been built on reciprocal consideration and respect. Russell Black is an exceptional guide, with all the meaning of that word. The essential lines of Russell's thoughts in geology are based on important observations gained from long periods of field work in different well exposed regions. As in the case of the Aïr mapping (60 000 km² of continuous outcrops), the only sensible method of tackling such a huge problem is, following Russell Black, to make precise and detailed observations in key cross-sections, rather than trying to see the whole rapidly. This approach necessarily leads to interpolations which, however, rest on a strong basis. A conclusion of such an approach is, for instance, that alkaline ring complexes all have similar characteristics, differing only by variable proportions of rock-types, whatever their geotectonic environment, post-collisional (Iforas), intraplate (Aïr and Nigeria) or ocean opening (Afar), suggesting an ubiquitous source. Detailed studies also show that these complexes, often considered as 'atectonic', are always linked to reworking of major lithospheric structures. The study of the Pan-African orogeny in the Tuareg shield, in particular Aïr, will confirm the major role played by subvertical shear zones. From there also, the concept of terrane mobility in the Saharan Precambrian will be developed, and the revision of the major notions in geology that are cratons and mobile belts, differing fundamentally not in their crustal nature, but in their lithospheric structure.

These last years, Russell and myself have discussed a lot and it has been great fun studying the Tuareg shield post-collisional environment. This Special Issue devoted to post-collisional magmatism aims, through the number and the quality of its authors, at establishing a current state of the problem and, through the numerous questions which have arisen, to build a basis for future studies.



La Géologie est un art, pas une technique, encore moins un travail

RB

Some selected publications of Russell Black (chronological order):

Jacobson, R.R.E., MacLeod, W.N. and Black, R., 1958. Ring complexes in the Younger granite Province of Northern Nigeria. *Mem. Geol. Soc. Lond.*, 1, 72 pp.

Black, R., 1963. Note sur les complexes annulaires de Tchouni-Zarniski et de Gouré (Niger). *Bull. Bur. Rech. Géol. Min.* 1: 31–45.

Black, R., 1965. Sur la signification pétrogénétique de la découverte d'anorthosites associées aux complexes annulaires sub-volcaniques du Niger. *C. R. Acad. Sci. Paris*, 260: 5829–5832.

Black, R., 1966. Sur l'existence d'une orogénie riphéenne en Afrique occidentale. *C. R. Acad. Sci. Paris*, 262: 1046–1049.

Black, R., 1967. Sur l'ordonnance des chaînes métamorphiques en Afrique occidentale. *Chronique des Mines*, 364: 225–238.

Black, R., Joujou, M. and Pellaton, C., 1967. Notice explicative de la carte géologique au 1:500 000^{ième} de l'Aïr (République du Niger). *Dir. Mines Géol.*, Niamey, 52pp.

Black, R. and Girod, M., 1970. Late Palaeozoic to Recent igneous activity in West Africa and its relationship to basement structure. In: T.N. Clifford and I.G. Gass (Eds), *African magmatism and tectonics*, Oliver and Boyd, Edinburgh, pp. 185–210.

Black, R., Morton, W.H., Rex, D.C. and Shackleton, R.M., 1972. Sur la découverte en Afar (Ethiopie) d'un granite hyperalcalin miocène: le massif de Limmo. *C. R. Acad. Sci. Paris*, 274: 1453–1456.

Black, R., Morton, W.H. and Varet, J., 1972. New data on Afar tectonics (Ethiopia). *Nature*, 240: 170–173.

Black, R., Morton, W.H. and Rex, D.C., 1975. Crustal attenuation in Afar. In: A. Pilger and A. Rösler (Eds), *Afar depression of Ethiopia*, Schweizerbart'sche Verlagsbuchhandlung, 1, 55–65 (one map included).

Black, R., 1978. Propos sur le Pan-Africain. *Bull. Soc. Géol. Fr.*, 20, 843–850.

Black, R., Caby, R., Moussine-Pouchkine, A., Bayer, R., Bertrand, J.M.L., Boullier, A.M., Fabre, J., Lesquer, A., 1979. Evidence for late Precambrian plate tectonics in West Africa. *Nature*, 278: 223–227.

Fabre, J., Black, R., Caby, R., Leblanc, M. and Lesquer, A., 1982. Carte géologique et gravimétrique de l'Adrar des Iforas au 1:500000^{ième}. Ministère de l'Energie et des Mines, Direction Nationale de la Géologie et des Mines, République du Mali, Bamako.

Liégeois, J.P., Bertrand, H., Black, R., Caby, R. and Fabre, J., 1983. Permian alkaline undersaturated and carbonatite province and rifting along the West African craton. *Nature*, 305: 42–43.

Black, R., Lameyre, J. and Bonin, B., 1985. The structural setting of alkaline complexes. *J. Afr. Earth Sci.*, 3: 5–16.

Ba, H., Black, R., Benziane, B., Diombana, D., Hascoet-Fender, J., Bonin, B., Fabre, J. and Liégeois J.P., 1985. La province des complexes annulaires alcalins sursaturés de l'Adrar des Iforas, Mali. *J. Afr. Earth Sci.*, 3: 123–142.

Liégeois, J.-P. and Black, R., 1987. Alkaline magmatism subsequent to collision in the Pan-African belt of the Adrar des Iforas. In: J.G. Fitton and B.G.J. Upton (Editors) *Alkaline igneous rocks*, The Geological Society, Blackwell Scientific Publications, 381–401.

Liégeois, J.P., Sauvage, J.F. and Black, R., 1991. The Permo-Jurassic alkaline province of Tadhak, Mali: geology, geochronology and tectonic significance. *Lithos*, 27: 95–105.

Black, R. and Liégeois, J.-P., 1993. Cratons, mobile belts, alkaline rocks and continental lithospheric mantle: the Pan-African testimony. *J. Geol. Soc. London*, 150: 89–98.

Liégeois, J.P., Black, R., Navez, J. and Latouche, L., 1994. Early and late Pan-African orogenies in the Aïr assembly of terranes (Tuareg shield, Niger). *Precamb. Res.*, 67: 59–88.

Black, R., Latouche, L., Liégeois, J.P., Caby, R. and Bertrand, J.M., 1994. Pan-African displaced terranes in the Tuareg shield (central Sahara). *Geology*, 22: 641–644.

Liégeois, J.P., Navez, J., Hertogen, J. and Black, R., 1998. Contrasting origin of post-collisional high-K calc-alkaline and shoshonitic versus alkaline and peralkaline granitoids. The use of sliding normalization. *Lithos*, this volume.