

## **I.C.E. in Africa: the relationship between people and the Internal Combustion Engine in Africa**

### **Summary of research proposal**

In Africa there is a vast field of study which has never been systematically researched or analysed. In the past hundred years this field has become so pervasive as to now pass us by unnoticed. This is the field of the interaction between people and the Internal Combustion Engine (ICE). Internal combustion engines are those in which motive power comes from the explosion of vapour –usually a petroleum distillate- in a cylinder, and are to be found in virtually every generator, pump, motor-vehicle, and boat on Earth.

Through four case studies, and informed by Actor Network Theory (ANT), the research project seeks to integrate ICE technology within a framework of analysis that explores the interrelationship between people and ICE technology over time in African societies.

THE AIM OF THE PROJECT is to explore the socio-historical and cultural relationship that has developed between people and ICE in Africa, and to examine how ICE has shaped socio-historical processes.

USING HISTORICAL AND ANTHROPOLOGICAL METHODS, the (I.)mobile and (II.) stationary applications of ICE technology in interaction with people will be examined in:

- I.) **a.** the social history of the motor-car in Zambia, and **b.** the relationship between motorised transport and perceptions of the Hajj pilgrimage to Mecca.
- II.) **c.** The social history of Tamale, an African town in Ghana through the lens of ICE-technology, and **d.** the manner in which ICE-technology is used in the drive for money in rural Burkina Faso.

THE PROJECT WILL RESULT in the publication of books and articles, and will make a significant and innovative contribution to the fields of history and cultural anthropology by putting the relationship between people and ICE-technology in Africa on the academic map and future research agendas.

Keywords: Technology, Society, History, Power, Africa

### **Description of the proposed research**

#### **I.C.E. in Africa: the relationship between people and the Internal Combustion Engine in Africa –**

The socio-historical and cultural context of the symbiotic relationship between people and ICE-technology in Africa

INTRODUCTION. In Africa there is a vast field of study which has never been systematically researched or analysed. In the past hundred years this field has become so pervasive as to now pass us by unnoticed as a simple fact of everyday life, much as the clothes that we wear, and the food that we eat. **This is the field of the interaction between people and the Internal Combustion Engine (ICE). Internal combustion engines are those in which motive power comes from the explosion of vapour –usually a petroleum distillate- in a cylinder, and are to be found in virtually every generator, pump, motor-car, train, boat and bus on Earth.**

In the present the majority of Africans live in sprawling urban conglomerates, serviced by water, electricity, and transport, all dependent on ICE-technology. Likewise, Africa's export earnings, be they in mining, agriculture, or industry, are thoroughly dependent on ICE-technology, and deeply vulnerable to the vagaries of world markets in technology, commodities and oil. However, the pervasive interaction between people and ICE extends beyond mere economics and into all levels of human experience. Through four case studies, and informed by Actor Network Theory (ANT), the research project seeks to analyse the interrelationship between people and ICE-technology over time in African societies.

## **2a. Research topic**

### **2a.1. Overall aim**

THE AIM of the proposed project is to:

- explore the socio-historical and cultural relationship that has developed between people and the Internal Combustion Engine in Africa
- examine the manner in which ICE-technology applications have shaped socio-historical processes and are constitutive for social activities and interactions in Africa.

Within the last century the societies of Africa have become totally dependent on a technology that is wholly foreign in origin, yet has come to affect all forms of everyday life in Africa. The manner in which ICE-technology has come to permeate and shape all forms of social interaction in Africa has not been studied before, and is the research objective of this project.

### **2a.2. Key objectives**

The two prime forms of interaction between people and ICE-technology (mobile and stationary applications) will be investigated within the context of four specific case studies (see **Ad 2.**). This will provide us with insight into the manner in which people interact with ICE, as well as, the manner in which social interactions between people are shaped by ICE.

PUBLICATION is envisaged as a series of books and articles covering the relationship between people and ICE applications in Africa at the level of the state (postdoc), urban centre (PhD), rural setting (visiting fellow), and continental (visiting fellow). An edited volume will result from an international workshop on the topic.

### **2.a.3 Scientific Background**

THE HIDDEN YET EVER PRESENT nature of ICE-technology in everyday life has led historians and social scientists to overlook the relationship between people and ICE in Africa. Yet, the introduction of ICE-technology is arguably the single most important factor for change in Africa in the twentieth century. In sub-Saharan Africa, with the exception of sectors of the Sahel and southern Africa, Tsetse fly and horse-sickness made the use of draught animals impossible and dictated dependence on human power (Diamond; Ford; Kjekshus). Consequently ICE-technology was of greater consequence in Africa than elsewhere on earth, if only because it entailed a radical transformation from human powered society to externally powered society.

In dealing with ICE-technology there has been a tendency to see this as being the domain of the political and economic elite, yet its impact stretches far beyond the elite and into the everyday lives of people in the smallest villages at the furthest reaches of African states.

Though it is the stereotypical *Wabenzi* (2004), the rich Mercedes car owner, who is known beyond Africa, it is the motor-cycle, bus, mammy- and pickup-truck that truly traverse African states, and accelerated the already extensive travel of

Africans. Motorised travel led to new ways of seeing and dealing with the world (Gewald 2002; Schivelbusch; Urry). The continent may possess but a minute proportion of the world's motor-vehicles (Moriarty and Beed), yet it is precisely because of the scarcity of transport that they assume such importance in so many fields of human experience.

ICE-technology radically changed African economies. Increased mobility stimulated the exploitation of neglected resources. Yet, how this affected African societies; how people anticipated and dealt with the economic possibilities; what new entrepreneurial and technical skills developed, and which came to an end, are questions that remain to be answered. Commissioned studies have sought to examine the impact of transport in the formal economy (World Bank). However very little has been done on the relationship between motorized-transport and the informal economy in which the majority of Africans make a living (Berry; Grieco; Wainaina).

More than on any other continent motor-vehicles gave form, content, and unity to states created by colonial whim. African states depend on motor-vehicles for the extension of their control; from the rapid transfer of government employees through to tax collection and border patrols. Yet, with the exception of a single highly exoticising contribution (White), no research exists on the interaction between people and motor-vehicles, at the level of politics and social stratification.

ICE-technology determines Africa in more ways than mobility alone. Its cities, in which the majority of Africans live, would not be able to exist without water pumps, electricity generators, and transport, all of which are powered by ICE-technology. In African states where the steady supply of water and electricity have long ceased to be the domain of the state, elites employ their own water pumps and electricity generators thereby guaranteeing access to potable water, air conditioning, and a whole host of other things necessary for comfortable living and status. Seen in this light, it is clear that ICE-technology is central to the issues of status and power in Africa. Nonetheless, no material exists which explicitly investigates this fundamental interaction between people and technology, let alone the manner in which people utilise their access to forms of ICE-technology to further their social position.

NEW TECHNOLOGIES that developed in northern Europe and North America in the 1800s were integrally linked up to western dominance in the world (Adas). More recently authors such as Braun, Postman, and Stivers, have, as Charlie Chaplin in *Modern Times*, sought to emphasize the human dimension of scientific and technological development.

The insight, that both technology and society are human constructs, led to the development from the late 1980s onwards of theory that sought to integrate human and non-human into the same conceptual framework. An attempt was made to devise a way of looking at the world in which the technology/society divide, that had hitherto existed within academia could be overcome. Within the theory, which has become known as Actor-Network Theory (ANT), both human and non-human actors -or actants- were granted ability to transform society (Bijker; Callon; Latour; Law; Woolgar). For Callon science and technology are more than actants that bond society together:

Science and technology lie at the heart of social asymmetry. Thus technology both creates systems which close off other options and generates novel, unpredictable and indeed previously unthinkable, options (1991: 132). Central to Actor-Network Theory is its interdisciplinary approach to research in the social sciences, humanities, and technology studies. Aware of the fact that ANT is not a single orthodoxy or fully consistent body of writing, the research to be conducted

in this project, is influenced by ANT.

Studies have consistently failed to look at the role of ICE-technology within African societies, let alone allowed for the influence of ANT. The conceptualisation, design, and manufacture of the Internal Combustion Engine occurred within the very specific socio-cultural setting of northern Europe in the second half of the nineteenth century; a socio-cultural setting that did not exist in Africa. The very design of technology may contain within it important social assumptions and political arrangements (Bijker; Latour; Law). When ICE-technology was introduced into Africa, it brought along these specific assumptions and arrangements, which could be at variance to those that existed in Africa. To gain understanding as to the development of Africa and its people in the course of the 20<sup>th</sup> Century it is necessary that we investigate the relationship between people and the technology that has come to influence and affect all aspects of everyday life.

#### **2a.4. Originality of the topic**

The overview above indicates that the relationship between people and ICE-technology is all-pervasive. Nevertheless, practically no research has been conducted, consequently there is an enormous lacuna in our understanding of Africa. The proposal indicates a vast, as yet untouched, territory of investigation, in which the problematisation of the all-pervasive relationship between people and ICE-technology is fundamental. The cases within the research project provide near ideal settings for studying the relationship at a number of levels and settings (see **Ad 2.**).

#### **2a.5. Significance**

The proposed project, by opening a timely, novel and relevant field of discourse within the disciplines of Social History and Cultural Anthropology in Africa, will have considerable impact. The project will lay the solid basis for further work on the interaction between people and ICE-technology in Africa, and initiate further theoretical innovation. Crucial contacts for future collaboration will be established and deepened during this project.

This research, to be conducted in the least technologically advanced continent, Africa, will bring to the fore the wide-ranging impact and effect that the introduction of technology into human society can have. This will provide us with insights into the manner in which people interact with technology. Insights that, given our own society in which technology suffuses and influences evermore forms of human interaction, bear significance beyond Africa.

#### **2b. Approach or methodology**

The identification and analysis, in four specific cases, of the manner in which people and ICE-technology interact in African societies, allows us to move beyond a mere description of technology in society, to a fuller appreciation of the symbiotic interaction and mutual dependence that exists between people and ICE-technology.

The analysis of society and technology with reference to Actor Network Theory is in its infancy, and nowhere is this more so than in Africa. Based on historical and anthropological methods, and informed by ANT, perspectives are developed that allow for the analysis of the interaction between people and ICE-technology within societies in Africa, at the local, state, and continental level. Accepting that technology acts in a symbiotic relationship which transforms human society, the development of technologies, as well as the ways in which they are incorporated and adapted, are to be analysed as socio-historical processes and cultural practices. It are these processes and practises, the symbiotic relationship between people and ICE-technology, that the research project will be investigating.

The main sources for the research will be archival. Though archives will appear to be primarily concerned with the economic and legislative aspects of ICE-technology, a store of information relating to the social will be found between the lines. Comparable research is the archival work by Glassman on popular consciousness on the Swahili coast in the nineteenth century.

The research will involve interviews in urban and rural settings. In this it will be comparable to the work of Akyeampong (1996), on the social history of alcohol in Ghana, which was based on archives and substantial interviews. In previous work the researcher has combined oral testimony with archival material, the project will seek to replicate this successful approach (Gewald 1999a; 1999b).

Essentially the research project consists of four inter-related and complementary ventures(see **Ad 2.**), which investigate the manner in which societies interrelate with technology in the past and in the present. This will allow for the testing of the hypotheses:

- An essential division exists between mobile and stationary applications of ICE-technology.
- Mobile ICE applications changed social, cultural, and economic relations within and between societies, and transformed ways of viewing the world, as well as ideology and religious perceptions.
- Stationary ICE applications transformed and have come to determine the economic and social structures and relations of African communities

In seeking to investigate the impact, influence and effects of the interaction between people and ICE applications, both mobile and stationary, upon human society in varying settings in Africa, the research is divided into two prime inter-related and complementary research ventures:

#### I.) Mobile

- a.) The social history of the motor-car in Zambia
- b.) The relationship between motorised transport and perceptions of the Hajj pilgrimage to Mecca

#### II.) Stationary

- c.) The social history of Tamale, an African town in Ghana through the lens of ICE-technology
- d.) The manner in which ICE-technology is used in the drive for money in rural Burkina Faso

It is believed that in this manner the research will provide an introductory overview of the mutually re-enforcing interaction that existed between people and ICE-technology in Africa in the 20<sup>th</sup> Century.

### 2.c Innovation

The project is innovative in that it:

- examines a field of research that has hitherto been overlooked.
- situates technology within a socio-historical and cultural setting.
- develops cross-disciplinary initiatives in research and theory.

## Ad 2. Operationalisation: Individual projects within ICE in Africa

### I. MOBILE:

The hypothesis, *Mobile ICE applications changed social, cultural, and economic relations within and between societies, and transformed ways of viewing the world, as well as ideology and religious perceptions*, is to be tested in two research endeavours.

#### a. Social History of the Motor-vehicle in Zambia: NWO Vidi postdoc project

[Urry] suggests that ...[we] abandon ...[our] ideas of the car as a thing, a simple object of production and consumption, and look at it as a system of interlocking social and technical practices that has reconfigured civil society. (Gartman 2004, 169)

Aim: To write a social history documenting the far-reaching transformation of Zambian societies engendered through the introduction of the motor-vehicle.

Zambia's history in the 20<sup>th</sup> Century provides the ideal case in which to study the interaction between human society and ICE-technology. At the beginning of the century, the deadly Tsetse fly ensured that all goods were transported by human power, and societies were geared to this (Gann). This changed with the introduction of motor-vehicles. Research conducted elsewhere suggests that the introduction of motor-vehicles radically transformed not only northern European and American societies (Donatelli; Gartman 1994; Miller; Urry 2000, 2004) but also African societies (Gewald 2002). Zambia lies at the origin and very heart of African urban sociology, yet the manner in which the introduction of the motor-vehicle changed social, cultural, and economic relations within and between Zambian societies remains to be researched (Schumaker; Werbner).

Zambia's 20<sup>th</sup> Century macro economy has experienced booms and intermittent periods of stagnation. The development from the 1920s onwards of what were the world's richest known copper reserves led to the rapid urbanisation of the country (Ferguson 1999). It is doubtful that the urbanisation would have been possible without the presence of the motor-vehicles (Powdermaker). At independence Zambia was the most urbanised country on the African continent, that invested heavily in the development of a social welfare state, and had a large car-owning middle-class. Drop in copper demand and the oil crisis of the early 1970s ended the boom, and Zambia entered into a recession that has yet to lift. (Duncan et.al.; Ferguson 1999; Palmer; Rakner). The interaction between people and ICE-technology in relation to fluctuating economic conditions is wryly illustrated by a Zambian who noted:

"Car owning remains a dream. A decade ago, young men in gainful employment were able to buy cars of all models. That era is gone, gone never to return again" (Ferguson 1999, 1)

By researching the archival, oral and published source material, available in Europe, and southern Africa, the validity of the hypothesis can be tested, and a social history written which will provide an answer to the question:

How and in what manner did the day to day life of people in Zambia change with the introduction of the motor-vehicle in the 20<sup>th</sup> Century?

The second part of the hypothesis, the manner in which *mobile ICE applications transformed ways of viewing the world, as well as ideology and religious perceptions*, is to be explicitly examined in:

**b. The relationship between motorised transport and perceptions of the Hajj pilgrimage to Mecca from West Africa: Visiting fellow**

THE HAJJ, a duty for every Muslim, is intended as a difficult passage with spiritual and religious significance, in which all believers are equal. Until the 20<sup>th</sup> century, pilgrims from West Africa travelled to Mecca on their own feet or on the backs of animals. From the 1920s onwards motor-vehicles came to be used in the Hajj. It stands to reason that travelling by motor-vehicle transformed the manner in which Africans experienced and came to think of the Hajj.

Throughout the world travelling by foot is given spiritual significance (Amato); *vide* the ever popular pilgrimages to St. Compostela in Spain. Seen in this light, the complaints of colonial administrators extended beyond the perceived loss of insight into local conditions, engendered by the coming of the car, into the metaphysical (Allen). Motorised travel transformed perceptions of the world (Schivelbusch; Urry; Gewalt), yet the manner in which it transformed perceptions of religious experience has not been systematically researched.

In ongoing long-term post-doctoral research on the history of the west-African Hajj, the visiting fellow, in conjunction with the research project, will explore the relationship between motorised transport and perceptions of the Hajj pilgrimage to Mecca from West Africa in the 20<sup>th</sup> Century. In this manner an aspect of the interaction between ICE-technology and religious perception within human society will be studied.

## II. STATIONARY

The hypothesis, *Stationary ICE applications transformed and have come to determine the economic and social structures and relations of African communities*, is to be tested in two research endeavours.

### c. The social history of the town of Tamale, Ghana through the lens of ICE-technology: Associated PhD Project

“... in order to understand domination we have to turn away from an exclusive concern with social relations and weave them into a fabric that includes non-human actants, actants that offer the possibility of holding society together as a durable whole”.

(Latour 1991: 103)

Aim: To write a social history of an African town through the lens of ICE applications

Thoroughly dependent for its very existence on ICE-technology, Tamale is the regional capital in the arid savannah of northern Ghana. Founded in the early 1900s by British colonial administrators, who introduced ICE-technology, the town has grown into the urban centre of northern Ghana. In contrast to other administrative centres in the region, such as Kano in Nigeria, Tamale did not exist prior to its colonial founding. With over 300.000 residents, Tamale is currently the fastest growing settlement in West Africa. At the hub of northern Ghana's road system, linking Burkina Faso to the Atlantic seaboard, it is the centre for manufactured goods and regional marketing for the surrounding savannah, where residents are involved in farming, cattle production, and cotton growing.

The interaction with, and deployment of, various forms of ICE-technology by colonial, post-colonial, and Dagbon elites, have all served to shape the town and its inhabitants. In an environment where control of ICE-technology determines access to water, food, and electricity, control of ICE-technology is far more than a mere technological matter. Callon has noted that, “technology lie[s] at the heart of social asymmetry” (1991: 132). This is particularly true in Tamale, where access to ICE-technology, is a matter of power, indeed, of life and death. As such, one can use the many and varied applications and uses of ICE, from water pumps to grain mills, as a lens through which to describe and analyse the social history of Tamale town in the twentieth century.

Being an administrative centre, and lying within the kingdom of Dagomba, there is a rich corpus of material dealing with Tamale and its ethno-historical context (Oppong; Staniland; Wilks 1975). In combination with archival and oral information,

the research would seek to describe and analyse the social history of the town of Tamale in northern Ghana through the lens of ICE applications. In this manner the way in which through time ICE applications in interaction with people have come to shape or transform relations of power between people can be tested and examined.

**d.) The manner in which ICE-technology is used in the drive for money in rural Burkina Faso: Visiting fellow**

As part of ongoing long-term post-doctoral anthropological research, the manner in which ICE applications transformed and came to determine economic and social structures and relations within African communities, will be examined in the context of rural Burkina Faso.

The focus of this project is on local quests for making money in Burkina Faso, in the province Sanmatenga, *Land of Gold*, where alluvial gold is found. Small scale alluvial gold mining has a long and distinguished history in west Africa (H. Gewalt; Wilks 1992). However, from the early 1990s, specialist knowledge resulting from the use of drilling rigs used in geological prospecting, has ensured that local communities are in turmoil and often lag one step behind as they struggle to participate in possible windfalls, often with disastrous results, *vide* the failure of communities to plant crops in anticipation of mining profits (Luning pers. comm.). Different ICE applications are central to the ways in which social groups are able to grasp opportunities at these sites, where exploitation depends on access to transport facilities, pumps, generators, and increasingly sophisticated mining equipment and privileged knowledge.

The research requires anthropological and archival field work. A special emphasis will be on the history of mining projects in the region. The focus of fieldwork is on the actors at gold mining sites in the region of Maane and their access and control of varying forms of ICE-technology and privileged knowledge. Effects of uneven access will be central. In this manner insight will be obtained into the manner in which differentiations in access leads to uneven accumulation of money and forms of brokerage.

This fieldwork builds upon extensive anthropological research that has been done in the region over the last fifteen years (Luning 1997), and will result in a grounded and socially situated anthropology of the drive for money at sites of alluvial gold mining in Sanmatenga.

SOURCES, CONVERGENCE AND DIVERGENCE. The four projects are accommodated within the same theoretical framework and with their emphasis on extracting information from archival and oral sources they share much in terms of methodology. The research will allow for the testing of the hypotheses, with feedback and interaction envisaged throughout the project specifically within a final workshop. Nevertheless the Postdoc and PhD projects will, as indicated, eventually lead to separate monographs, to be complemented by significant contributions provided by the visiting fellows and an edited workshop volume.

**Literature References**

Select Bibliography

Key publications of relevance to the proposed research and referred to in the proposal are marked with an **S**.

**S.** Adas, Michael (1989)

*Machines as the Measure of Men: Science, Technology, and Ideologies of Western*



*Dominance*, Ithaca: Cornell University Press.

- S.** Akyeampong, Emmanuel Kwaku (1996)  
*Drink, Power, and Cultural Change: A Social History of Alcohol in Ghana, c. 1800 to Recent Times*, Oxford: James Currey.
- S.** Allen, Charles (1980)  
*Tales from the Dark Continent*, London: Macdonald Futura Publishers.
- S.** Amato, Joseph A. (2004)  
*On Foot: A history of walking*, New York: New York University Press.
- Bernard, H. Russell and Pertti J. Pelto (1972)  
*Technology and Social Change*, New York: Macmillan.
- Berry, Sara S. (1983)  
*From peasant to artisan: motor mechanics in a Nigerian town*, Boston: Working papers/African Studies Center, Boston.
- Biagioli, Mario (1993)  
*Galileo, Courtier: the Practice of Science in the Culture of Absolutism*, Chicago: University of Chicago Press.
- Biagioli, Mario ed. In consultation with Peter Galison (1999)  
*The Science Studies Reader*, New York, N.Y.: Routledge.
- S.** Bijker, Wiebe Eco and John Law eds. (1992)  
*Shaping Technology / Building Society: Studies in Sociotechnical Change*, Cambridge, Mass.: MIT Press.
- S.** Bijker, Wiebe E. (1995)  
*Of Bicycles, Bakelites, and Bulbs: Toward a Theory of Sociotechnical Change*, Cambridge, Mass.: MIT Press.
- Braak, Hans van de (1995)  
*The Prometheus Complex: Man's Obsession with Superior Technology*, Amersfoort: Enzo Press.
- Braun, Ernest (1995)  
*Futile Progress: Technology's Empty Promise*, London: Earthscan Publications.
- Bridgstock, Martin ed. (1998)  
*Science, Technology and Society: An Introduction*, Cambridge: Cambridge University Press.
- Brottman, M. ed. (2001)  
*Car Crash Culture*, New York: Palgrave.
- S.** Callon, Michael; J. Law & A. Rip (1986)  
*Mapping the dynamics of science and technology : sociology of science in the real world*, Basingstoke: Macmillan.
- S.** Callon, Michael (2004)  
*Actor-Network Theory*, What is actor-network theory?, University of Colorado at Denver, School of Education, Internet document:  
[http://carbon.cudenver.edu/~mryder/itc\\_data/ant\\_dff.html](http://carbon.cudenver.edu/~mryder/itc_data/ant_dff.html)  
Accessed 23 November 2004.

- Carrabine E., B. Longhurst (2002)  
 "Consuming the car: anticipation, use and meaning in contemporary youth culture", in *The Sociological Review*, May 2002, vol. 50, no. 2, pp. 181 – 196.
- S.** Diamond, Jared (1997)  
*Guns, Germs and Steel: A Short History of Everybody for the last 13,000 years*, London: Random House.
- S.** Donatelli, Cindy (2001)  
 "Driving the Suburbs: Minivans, Gender, and Family Values", in *Material History Review* 54, pp. 84 – 95.
- S.** Dummet Raymond, E. (1998)  
*El Dorado in West Africa. The Gold Mining Frontier, African Labor, and Colonial Capitalism in the Gold Coast, 1875 – 1900*, Oxford: James Currey.
- S.** Duncan, Alex, Hugh Macmillan and Neo Simutanyi (2003)  
*Zambia: Drivers of pro-poor change: an overview*, DFID (Zambia) March 2003.
- Dyson, George B. (1997)  
*Darwin among the Machines: The evolution of global intelligence*, Reading, Massachusetts: Perseus Books.
- Feenberg, Andrew (1999)  
*Questioning Technology*, London: Routledge.
- Ferguson, Eugene S. (1992)  
*Engineering and the Mind's Eye*, Cambridge, Mass.: MIT Press.
- S.** Ferguson, James (1999)  
*Expectations of Modernity: Myths and Meanings of Urban Life on the Zambian Copperbelt*. Berkeley & Los Angeles: University of California Press.
- S.** Ford, J. (1960)  
 "The influence of Tsetse flies on the distribution of African cattle", in *Proceedings of the First Federal Science Congress*, Salisbury.
- S.** Ford, J. (1971)  
*The Role of the Trypanosomiasis in African Ecology*, Oxford: The Clarendon Press.
- Freund, P. (1993)  
*The Ecology of the Automobile*, Montreal and New York: Black Rose Books.
- S.** Gann, Lewis Henry (1958)  
*The birth of a plural society : the development of Northern Rhodesia under the British South Africa Company, 1894-1914*, Manchester : Manchester University Press.
- Gartman, David (1994)  
*Auto Opium: A Social History of American Automobile Design*, London: Routledge.
- Gartman, David (2004)  
 "Three Ages of the Automobile: The Cultural Logics of the Car", in *Theory, Culture & Society*, Vol. 21, No. 4 – 5, pp. 169 – 95.
- S.** Gewald, Henk (1999 – 2001)  
*Anglogold* internal memoranda regarding gold prospects 1999 – 2001.
- S.** Gewald, Jan-Bart (1999a)

*Herero Heroes: A Socio-Political History of the Herero of Namibia 1890 – 1923*,  
Oxford: James Currey.

- S.** Gewald, Jan-Bart (1999b)  
"The Road of the Man Called Love and the Sack of Sero: The Herero-German War and the Export of Herero Labour to the South African Rand" in, *The Journal of African History*, Vol. 40, 1999, No. 1.
- S.** Gewald, Jan-Bart (2000)  
"*We Thought we Would be Free*": *Socio-Cultural Aspects of Herero History in Namibia 1920-1940*, Cologne: Rüdiger Köppe Verlag.
- S.** Gewald, Jan-Bart (2002)  
"Missionaries, Hereros, and Motorcars: Mobility and the Impact of Motor Vehicles in Namibia before 1940", in *International Journal of African Historical Studies*, Vol. 35, No. 2 – 3 (2002) p. 257 – 285.
- S.** Glassman, Jonathan (1995)  
*Feasts and Riot: Revelry, Rebellion, and Popular Consciousness on the Swahili Coast, 1856 – 1888*, London: James Currey.
- S.** Grieco, Margaret, et. Al. (1996)  
*At Christmas and on rainy days: transport, travel and the female traders of Accra*, Aldershot: Avebury.
- Grint, Keith and Steve Woolgar eds. (1997)  
*The Machine at Work: Technology, Work and Organisation*, Cambridge: Polity Press.
- Howe, John (1995)  
"Urban mobility and private car dependency: (South) Africa's choice", in *Urban Forum*, vol. 6, no.2, p. 1 – 19.
- Jasanoff, Shiela ...[et al.], eds. (1995)  
*Handbook of Science and Technology Studies*, Thousand Oaks, Ca.: Sage, Society for Social Studies of Science.
- S.** Kjekshus, H. (1977)  
*Ecology Control and Economic Development in East African History*, London: Heinemann.
- Koshar, Rudy (2004)  
"Cars and Nations: Anglo-German Perspectives on Automobility between the World Wars", in *Theory, Culture & Society*, Vol. 21, No. 4 – 5, pp. 121 – 144.
- Keren, Gideon (1996)  
*Technology, Society and Myopia*, Eindhoven: Technische Universiteit Eindhoven.
- Latour, Bruno (1988)  
*The Pasteurization of France*, Cambridge, Mass.: Harvard University Press.
- S.** Latour, Bruno (1991)  
"Technology is society made durable", in John Law (ed) *A Sociology of Monsters: Essays on Power, Technology and Domination*, London: Routledge, pp. 103 – 31.
- S.** Law, John ed. (1986)  
*Power, Action, and Belief: A New Sociology of Knowledge?*, London: Routledge and Kegan Paul.

- S. Law, John ed. (1991)**  
*A Sociology of Monsters: Essays on Power, Technology and Domination*, London: Routledge.
- S. Law, John (1994)**  
*Organizing Modernity*, Oxford: Blackwell.
- Law, John and John Hassard eds. (1999)  
*Actor Network Theory and After*, Oxford: Blackwell Publishers.
- Law, John and Anne Marie Mol eds. (2002)  
*Complexities: Social Studies of Knowledge Practices*, Durham, N.C.: Duke University Press.
- Lente, Harro van (1993)  
*Promising Technology: The Dynamics of Expectations in Technological Developments*, Delft: Eburon.
- S. Luning, Sabine (1997)**  
*Het binnenhalen van de oogst: Ritueel en samenleving in Maane, Burkina Faso*, Leiden: CNWS.
- Mackenzie, Donald and Judy Wajcman eds. (1999)  
*The Social Shaping of Technology*, Buckingham: Open university Press.
- S. Miller, Daniel (2001)**  
 "Driven Societies", in D. Miller (ed.) *Car Cultures*, Oxford: Berg., pp. 1 – 33.
- Misa, Thomas J., Philip Brey, and Andrew Feenberg eds. (2003)  
*Modernity and Technology*, Cambridge, Mass.: MIT Press
- Moriarty, Patrick and Clive S. Beed, (1989)  
 "Transport in tropical Africa", in *The Journal of Modern African Studies*, vol. 27, no. 1, p. 125 – 132.
- Murphie, Andrew and John Potts (2003)  
*Culture and Technology*, Basingstoke: Palgrave Macmillan.
- S. Opong, Christine (1973)**  
*Growing up in Dagbon*, Tema: Ghana Publishing Corporation.
- Palmer, Robin (2001)  
*Land Tenure Insecurity on the Zambian Copperbelt, 1998: Anyone Going Back to the Land?*, Oxfam GB March 2001.
- Postman, Neil (1992)  
*Technopoly: The Surrender of Culture to Technology*, New York: Knopf.
- S. Powdermaker, Hortense (1960)**  
*Copper Town : changing Africa : the human situation on the Rhodesian Copperbelt*, New York, NY: Harper and Row.
- S. Rakner, Lise (2003)**  
*Political and Economic Liberalisation in Zambia 1991 – 2001*, Stockholm: Nordic Africa Institute.
- Russell, Colin Archibald (1983)  
*Science and Social Change: 1700 – 1900*, London: Macmillan.

- Salomon, Jean-Jacques, Francisco R. Sagasti, and Céline Sachs-Jeantet (1994)  
*The Uncertain Quest: Science, Technology, and Development*, Tokyo: United Nations University Press.
- S.** Schivelbusch, Wolfgang (1987)  
*The Railway Journey: The Industrialisation of Time and Space in the 19<sup>th</sup> Century*, Los Angeles: University of California Press.
- Shinn, Terry, Jack Spaapen and Venni Krishna (1997)  
*Science and Technology in a Developing World*, Dordrecht: Kluwer Academic Publishers.
- S.** Shumaker, Lyn (2001)  
*Africanizing Anthropology: Fieldwork, networks, and the making of cultural knowledge in Central Africa*, Durham: Duke University Press.
- S.** Staniland, Martin (1975)  
*The Lions of Dagbon: political change in Northern Ghana*, Cambridge: Cambridge University Press.
- Stivers, Richard (2004)  
*Shades of Loneliness: Pathologies of a Technological Society*, Lanham, MD: Rowman & Littlefield.
- Taussig, Michael (1980)  
*The devil and commodity fetishism in South America*, Chapel Hill, N.C. University of North Carolina press.
- Tenner, Edward (1996)  
*Why Things Bite Back: Technology and the Revenge of Unintended Consequences*, New York: Knopf.
- Terry, Jennifer and Melodie Calvert eds. (1997)  
*Processed Lives: Gender and Technology in Everyday Life*, London: Routledge.
- Urry, John (1990)  
*The tourist gaze : leisure and travel in contemporary societies*, London: Sage.
- S.** Urry, John (2000)  
*Sociology beyond Societies: Mobilities for the Twenty-first Century*, London: Routledge.
- S.** Urry, John (2004)  
 "The 'System' of Automobility", in *Theory, Culture & Society*, Vol. 21, No. 4 – 5, pp. 25 – 39.
- S.** *Wabenzi*  
 The Wabenzi Tribe of Africa  
 African Insights – April 2002- E-Zine Newsletter  
<http://kabiza.com/OutofAfrica-Too-MonthlyNewsletter-April-2002.htm>  
 Accessed 23 November 2004
- S.** Wainaina Jemimah (1981)  
 "The 'parking boys' of Nairobi" in *African Journal of Sociology* (1981), vol. 1, no. ½, pp. 7 – 45.
- S.** Werbner, Richard P. (1984)

- "The Manchester School in South-Central Africa", in *Annual Review of Anthropology*, Vol. 13 (1984), pp. 157 – 185.
- S.** White, Luise (2000)  
"Why is petrol red?", in *Speaking with Vampires: Rumor and History in Colonial Africa*, Berkeley and Los Angeles: University of California Press.
- S.** Wilks, Ivor (1975)  
*Asante in the nineteenth century: The structure and evolution of a political order*, Cambridge: Cambridge University Press.
- S.** Wilks, Ivor (1992)  
*Forests of Gold: Essays on the Akan and the Kingdom of Asante*, Athens: Ohio University Press.
- Woolgar, Steve and Keith Grint (1997)  
*The Machine at Work: Technology, Work and Organization*, Cambridge: Polity Press.
- S.** World Bank (1981)  
*Accelerated development in Sub-Saharan Africa: An agenda for action*, Washington DC: World Bank.
- S.** World Bank (1994)  
*Adjustment in Africa: Reforms, results, and the road ahead*, Oxford: Oxford University Press.
- Yearley, Steven (1988)  
*Science, Technology, and Social Change*, London: UnwinHyman.