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The Least Provocative Path:
An ANT Lens on Development Project Formation and Dissolution

TOM SCOTT-SMITH

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The Least Provocative Path: *An ANT Lens on Development Project Formation and Dissolution*

Tom Scott-Smith
University of Oxford
Email: tom.scott-smith@qeh.ox.ac.uk

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Abstract

This paper uses Actor-Network Theory to examine the success and failure of development projects. Rejecting the common view that projects succeed on the basis of their superior objectives, planning and implementation, the paper proposes an alternative perspective drawn from Actor-Network Theory: that success or failure is a product of the alliances that are mobilised, rather than the inherent qualities that are possessed. This argument is illustrated with reference to a 1970s development project, which involved the extraction of protein from plant leaves in order to provide a nutritional supplement for diets in Nigeria. By drawing on archival sources, the paper reconstructs the main actors involved in the project, analyses what caused them to become involved, and then turns attention to how these alliances fell apart.

1. INTRODUCTION

In 1971 the board of Christian Aid sat down to agree the funding of a new project. This involved the manufacture of a high-protein food-supplement in Nigeria, derived from plant leaves. It was presented as a modern, technical solution to malnourishment, an important scientific advance in the fight against hunger. The food supplement was extracted from plants by crushing leaves, boiling the leaf juice, and then filtering and drying the protein that coagulated on the surface of the liquid. The outcome of this process was a powder known as 'leaf protein concentrate' (or LPC), which could be added to fortify the existing diet. A teaspoon of this powder might be added to porridge, or the cooked greens, or the relish that was eaten with the main meal. It was claimed that this product would help local people eat a more balanced diet, and would reduce the incidence of nutritional deficiency diseases in the local area.

There were high expectations for food supplements like this in development organisations of the time. Leaf protein seemed to offer a rational, technological, and modern solution to nutritional problems, with the advantage of economy and efficiency. After all, the leaf protein would be extracted from local plants, the process world be overseen by a local university, and the final product would help fill a protein-gap in local diets, which had been an object of widespread concern for over a decade. The Christian Aid board decided to offer a modest grant to research the viability of the project, and within a few years it was providing all of the project's costs. Funding continued throughout the 1970s, and extra resources, both human and material, were provided to expand its scope. By 1979, however, the project was looking increasingly untenable: machines for processing the leaves were broken and left to rust, crops were untended and going to seed, irregularities were noticed in reports, and the whole concept behind the project itself was being questioned. By the early 1980s, Christian Aid had finally cut its links and funding, and the project fell apart.[1]

[1] The sources on which this research are based are held the archives of Christian Aid, School of Oriental and African Studies, London, UK; boxes CA4/A/1, CA4/A/2, CA4/A/3, CA2/D/26 and CA4/D/27. Although these archives are freely available for consultation by the public, there are some

The key question when recounting projects like this is 'how did it fail?' How was so much money spent, with so much hope, to so little avail? There are many ways of answering this question, but the approach taken in this paper is to apply Actor-Network Theory (ANT) to examine the project life cycle. ANT suggests that development projects succeed or fail not on the basis of any inherent superiority or inferiority, but on the basis of the extent and durability of the alliances they create. In other words, a successful project manages to convince more people to support its aims, it manages to involve more institutions in funding, it manages to mobilise more experts in implementation, and it makes greater use of material objects that give the project a more durable physical form. This network of durable, extensive alliances explains the success of a project, and is not a mere product of the project's inherent value or validity. Furthermore, this network of alliances is created not because a project is 'right' or wrong', but because people and things are convinced that the project can advance their own interests, according to the role in the project they have been assigned.

This paper will use the leaf protein project in Nigeria to illustrate how ANT can be applied to development. The paper begins by outlining the main characteristics of Actor-Network Theory, defending the applicability of this theory to development studies, and suggesting that its value lies in the way it allows us to rethink the notion of success. Next, I describe the nature of the documentary data used in this particular study, justifying the use of archives to explore issues in development studies, and summarising the strengths and weaknesses of these documents as source material. In the final section I offer a narrative description of the leaf protein project, drawing on the project archives. This narrative explores how the project formed, how it was maintained for around a decade, and how it eventually fell apart, drawing on the theoretical reflections made in the first part of

ethical issues involved in citing them. In correspondence with former project workers, it became clear that no warning had been given that personal memos from this era were now in the public domain, and there was little awareness at the time of writing that all comments and correspondence would eventually be made public. With respect to the wishes of former project workers, I have decided to anonymise the authors of the archival documentation cited in this paper. All authors are referred to by their initials, and in the first reference of each author I have added a brief description of the person's post. This should allow the reader to get a sense of the author's expertise and positioning, and allow some assessment of the evidence from the perspective of credibility and bias. If full details of authors are required, all original documents with complete details are available at the SOAS special collections.

the paper. The conclusion of this paper ties together the main advantages and drawbacks of ANT as a way of examining development projects.

2. ACTOR-NETWORK THEORY

Actor-Network Theory (ANT) first emerged within the field of Science and Technology Studies, in the work of authors such as Bruno Latour (1987), Michel Callon (1986), and John Law (1992). In its original formulation, ANT was concerned with examining the nature of scientific facts, suggesting that facts are created by a network, which gives them credence and acceptance. The robustness of a particular fact is determined by all the people and things that cooperate in its acceptance, and undermining this fact would involve breaking up this cooperation. This approach involved a central provocation, which reversed the way that science is usually viewed. Rather than starting from the idea that people are persuaded about facts because the facts are true, ANT suggested that facts are true because people are persuaded. In other words, facts do not exist in the natural world, just waiting to be discovered; rather, they are the product of a network that cooperates to maintain the truth of a given fact or discovery (for more introductory comments on this central idea, see Latour, 2005; Law, 1992; Law & Hassard, 1999).

ANT involved not just a scepticism of things that are generally accepted, but also a deep-seated inquisitiveness about the process that leads to this acceptance. It had applications far beyond the narrow sphere of science and technology, and was quickly adapted to examine the formation not just of facts, but also of institutions, ideals, political arrangements, concepts, theories, machines, plants, categories and identities. In each case, the intention of ANT was to open up the 'black box' which keeps these things outside the realm of everyday discussion and maintains them in the realm of the 'taken for granted'. In the field of science the black boxes are 'established facts', whose controversies have been shelved and which are now accepted as truth. Within other fields, the 'black boxes' might be categories such as 'race' and 'nation', institutions such as 'banks or 'libraries', abstract ideas such as 'money' or the 'individual', and even the idea of 'the social' itself (Latour, 2005). All

these objects, institutions, and categories are regularly mobilised in everyday discourse, and are usually treated as relatively unproblematic descriptions of phenomena in the world. ANT seeks not only to unpack these conventions, but also to examine how these conventions gained widespread acceptance.

A crucial task of ANT is to explain the size and scale of the various actor-networks, or, to put this another way, to examine why some actor-networks are more successful than others. What makes some facts more widely accepted than others? What makes some institutions more powerful than others? What makes some political communities more stable than others? What makes some businesses more profitable than others? In each of these cases, ANT suggests that the success of the actor-network can be attributed to the extent of its alliances. The more people and things that work to maintain the network, the more successful it will be. This idea is significant, as I shall explain, because it detaches notions of success from objectively measurable validity, and explains success instead through the mobilisation of allies.

There are three elements, in particular, which ANT has identified as key to building large and successful actor-networks. The first returns us to the idea of 'black boxes' - although with regard to their closing rather than their opening up (Latour, 1987). Large and successful actor-networks are built on a greater number of closed black boxes, which contain the ideas, relationships, categories, and objects that are essential to the maintenance of the network. To stabilise themselves, large actor-networks place things and relations in a situation where they are taken for granted, in 'black boxes' where they are beyond contestation. The more elements that can be placed in this situation of agreement or indifference – ideas, habits, rituals, relationships, forces, objects and so on – the larger the actor-network can become. Successful actor-networks construct themselves on these black boxes, which are essentially just other actor-networks that have reached a high degree of stability in their own right.

The second element that creates a strong actor-network is the process of 'translation' (Callon, 1986). This concerns how one actor translates the wills of other actors into a single, larger will. Translation is usually described in terms of some central actor playing the role of an 'obligatory passage point', through which other

actors can realise their own aims and objectives. The central actor imposes and stabilises the identity of others actors, ascribes a set of roles for them, and ultimately positions itself where it can speak on behalf of others. The end result is a situation where the interests of various actors are aligned, and the actor-network can speak as a whole. The process of translation, if it is successful, results in an actor-network that has included many other actors by articulating what they want and the necessity of their cooperation. Translation is a process that involves consent, cooperation, and complex power relations.

The third element that creates a strong actor-network is the involvement of material objects (Callon & Latour, 1981). ANT insists that actor-networks are built not just on human associations, but also on the involvement of non-human allies. Objects, machines, symbols, signs, technology, artwork, logos, animals and plants are all enrolled into a strong actor-network, and form a crucial part of its strength. In fact, it can be argued that these non-human allies actually give actor-networks their most durable form. After all, human associations are weak and can be replaced: people die, they move jobs, they change opinions, they shift places, and so on. In order to outlive the transient lives and capriciousness of humans, an actor-network must be built on associations that last longer than the interactions that originally formed them. This, in many cases, involves making these interactions concrete by enrolling material objects – such as contracts, insignia, or pieces of technology – which embody and further the aims of the actor-network. Bruno Latour (1992) has argued that these material objects from the modern-day 'missing masses', are so often ignored by sociologists. These 'missing masses' have countless impacts on our lives: influencing our actions, blocking them, authorising them, rendering them possible, encouraging them, and so on. They are therefore crucial to building a strong actor-network, but are rarely acknowledged or examined.

As should be clear, ANT is a very grand theory, which attempts to examine how pretty much anything can hold together and gain influence. This arrogant ambition, of course, is ANT's great weakness, because it leads to inevitable flaws. In particular, ANT offers no theory of the actor, as it falls back on describing anything and everything as an actor (or 'actant', which has become the accepted term); it places humans and non-humans ostentatiously on an equal footing, which raises the

hackles of nearly all scholars in both the human and natural sciences, whilst providing no account of what distinguishes an actant and what allows them to act; it offers no explanation of *why* networks are formed and maintained in the first place, preferring to focus on describing *how* it happens; and from the perspective of constructivism, ANT offers too much to determinists and positive philosophers of science, appearing simply as 'distributed essentialism' and thus playing a game of 'epistemological chicken' (Amsterdamska, 1990; Collins & Yearley, 1992; Lee & Brown, 1994).

Despite the persuasiveness of many such objections to ANT, these arguments do not undermine its real advantage as a heuristic device. ANT is, at heart, a *provocation*, which forces us to look at situations in new ways, and insists that we suspend the assumptions we have always held dear. For example, it makes us put aside our preconceptions about the division between nature and society, and it asks us to examine situations as if there were no significant differences between humans and non-humans. It provocatively asks how it has become accepted that humans have more agency than dogs, which have more agency than scallops, which in turn have more agency than doors. It makes us look at how attributes like agency are distributed, by giving everything an equal weight in analysis. It forces us to take the role of objects and other 'inanimate' objects seriously.

This kind of provocation also forces us to re-examine how we understand success. In particular, it challenges the idea that success can be objectively defined. Whether it comes to facts, institutions, ideas, or political arrangements, ANT requires us to move beyond the idea that things are successful because of their inherent strength and validity, and instead, it makes us to see how these things become successful through bringing other things on board as allies. This provides opportunities for some very illuminating analyses, which move us beyond the positivist search for objective truths but keeps us more grounded than a purely post-structuralist analysis would allow. Such an approach is particularly welcome in development studies, which tends to be divided between the adherents of an economic approach that reduces the world to rational choice, and a post-development approach that reduces everything to discourse and culture. Actor-

Network Theory offers a fresh way of understanding development, which transcends these divisions and interprets development success in an original way.

3. ACTOR-NETWORK THEORY AND DEVELOPMENT

Given the ambitious aims of ANT, there are number of ways it could be used within development studies. It could be applied to the whole concept of 'development', it could be applied to particular institutions such as the 'World Bank', or it could be applied to certain approaches such as 'participatory rural appraisal'. In this paper, however, I focus at the level of the *development project*: my intention is to examine development projects as actor-networks, which rely on mobilising allies in order to succeed. The larger and more influential development projects, I argue, are those that have managed to mobilise more extensive and more durable alliances, and the smaller and less successful development projects are built on restricted and weaker alliances.

This view of success is quite different from the prevailing perspective amongst development practitioners. Success is usually defined in terms of project objectives, and is explained by the project's inherent qualities. Projects are seen to succeed because they have a set of universally-good characteristics, which can be replicated in different contexts. This includes having the right kind of aims, articulating objectives in a certain way, setting up the right kind of organisational structure, using the right kind of implementation plans, and so on. Such a view of success gives rise to panoply of different handbooks and guidelines, which inform practitioners how to run a successful development intervention. Although these differ by degree, most emphasise the importance of project cycle management, and the use of a structural template for development organisations and interventions (for illustrations of this approach, see Cracknell, 1996; Crawford & Bryce, 2003; Diallo & Thuillier, 2005; for an example handbook, see UNDP, 2009).

We might call this way of seeing success the 'development validity' approach, as it draws attention to the connection between success and aims. In scientific method, validity concerns whether a study can answer the questions it sets out to

answer, and whether there is good evidence to declare well-founded conclusions. Similarly, 'development validity' concerns whether a project can achieve what it sets out to achieve, and whether there is good evidence to declare well-founded success with respect to these aims. A good development project, according to this perspective, is a valid one: it is a project that is structured in a certain way, formally able to meets its stated objectives, producing measurable outcomes that can be verified using certain indicators. Seeing success in terms of validity presents development as a controllable and measurable intervention, contributing towards a set of aims that are widely approved. It is most associated with logical framework analysis in project design, which has been subject to some criticism, but it is also apparent in less strictly rationalist approaches, which still view success through the narrow framework of a project planning cycle (Bakewell & Garbutt, 2005; Fowler, 1995; Gasper, 2000; Smith, 2000; Wallace, 2000).

Influenced by Actor-Network Theory, I propose an alternative view of project success, which can be called the 'development associability' approach. According to this view, a successful development project is not a valid one, but one that is built on *extensive associations*. At the base of this approach is the provocative reversal brought by ANT to the examination of science: the idea that people are not persuaded by facts because the facts are true, but that facts are true because people are persuaded. This view of facts suggests that they do not exist in a separate world 'out there', to which we are seeking access, and they do not have some inherent or universal quality that makes them facts. Rather, facts become true by virtue of the alliances mobilised in their support, including the number of people that become convinced of them, the awards that are conferred on them, the journals that publicise them, the technology that is based on them, and so on.[2]

The same can be said of development. People are not persuaded by a particular development project because it is successful; development projects are successful because people are persuaded. 'Success', like facts, cannot be thought of

[2] It should be clarified that ANT is not a constructivist view of science, but one that combines elements of both determinism and constructivism. ANT argues that the influence of any scientific claim cannot be seen as reflecting any intrinsic quality of the natural world (the determinist position), nor can it be fully explained by the social and political circumstances of its construction (the constructivist claim); rather, the influence of a fact or claim derives from a networked combination of both these elements.

as something inherent, something that exists independently out there in the world. The success of a project is not an objective state of affairs: it does not reside in a set of inherent qualities, a universally good project management system, or some formula for success that can be followed. Instead, the success of a project is something that occurs when enough people are persuaded by it, by convincing enough people of the project's value.[3] The 'development associability' approach, therefore, refuses to link success with any purely formal achievement of aims. Success in development projects, by this view, is a matter of how strong and how wide the associations around the project are constructed. These associations are created in many different ways, but in this paper I discuss three: the closing of black boxes, the process of translation, and the enrolment of material objects. Each of these has been introduced in the previous section, and are drawn directly from ANT, but they are elaborated here to demonstrate their application in development.

First of all, a large and successful development project is constructed on a series of closed black boxes. Each of these black boxes is an actor-network in its own right, which might equally be opened up to scrutiny; however, it is crucial for the success of a development project that they are treated as closed. A successful project, after all, relies on a great many things being taken for granted. The institutions that implement the project must be operational and solvent (their employees must come to work every day, their computers must function, their email must be answered, and money must come in and out); the technology used in the project must be effective at fulfilling the role it has been ascribed (cars must be running, banks must transfer cash, and buildings must not fall down); the people involved in the project must continue to be cooperative and willing (governments must not block the implementation of the project, beneficiaries must take part in at least some limited way, and workers on the project must fulfil their assigned roles); the aims of the project must be widely accepted as valuable (a range of people, from academics, to donors, to colleagues must accept that this project intends to do

[3] This is not to say that having a clear plan, logframes, good organization, and so forth do not contribute to project success: in fact, they do, but *not* because they are objective qualities of success – these things only contribute insofar as they convince certain, key people (such as donors) to come on board as allies.

something good); even the concept of 'development' itself must be politically viable, widely circulated, and generally acknowledged as being important. The list of black boxes on which a project is built is, in principle, endless, but the more elements that are inserted into the realm of the taken for granted, the more successful the project will be.

Second, a large and successful development project will build its alliances using the process of translation. This involves the mobilisation of different actants, the alignment of their interests, and the representation of wider communities to speak as a single will. Large and successful development projects are able to define roles for people, stabilise identities, and speak on people's behalf. Callon and Latour's memorable description not only captures this process well, but also seems particularly apposite to development. Large and successful actor-networks, they point out, "tell you what you want, what you will be able to do in 5, 10 or 15 years, in which order you will do it, what you will be glad to possess, and of what you will be capable…" (1981, p. 288). Indeed, the successful development project does this not just for its beneficiaries, but for all of its 'stakeholders'. It sweeps along donors, development workers, partner organisations, and governments, articulating the desires, expectations and intentions of each, and bringing them into line. Through a complex process of minute power relations, it determines what other actants want to do, and of what they will be capable.

Third, large and successful development projects involve nonhuman allies, which give the project a durable and material form. Development projects often do this by building infrastructure, such as schools, hospitals, roads, and so on, which outlive the human relationships involved in the initial stages of a project. Nothing announces the intention of a development project more than the mobilisation of cranes and cement mixers; nothing indicates the success of a project more than the ability to point to something material and declare a concrete achievement. In addition, development projects use images and designs to announce their presence. The distribution of leaflets, the flying of flags, and the construction of billboards all play a role in making a project material, especially when they feature an easily recognisable logo, snappy legend, and a description of the project concerned. The logframes, reports, strategic plans, and annual reports also contribute, as these are

key material manifestations of any project. Such lasting project identity is also given a material form through the objects development workers use in their day-to-day lives: the four-wheel drive vehicles they manoeuvre, the clipboards they hold, the questionnaires they proffer, and the offices they sit within. All these material objects are crucial to development projects, as they outlive the purely personal relationships involved, they help mobilise allies, and they give the network a more tangible form.

4. ACTOR-NETWORK THEORY AND ARCHIVAL SOURCES

Despite its name, ANT is not really a theory, but a methodological approach (Latour, 1999). It aims not to *explain* the world, but rather to *describe* the world in great detail, and, in particular, to describe the associations that make up an actor-network. This is usually achieved through interviews and detailed ethnographic observation, but in this paper I will use historical sources instead. Drawing on the archives of a 1970s leaf protein project (which I outlined in the introduction) the next section of this paper will put this theory into action: describing the formation and dissolution of a development actor-network, looking at the alliances that allowed it to come together, and examining the forces that eventually drove it apart. Before I turn to this description, however, I would like to discuss the implications of using archival sources in this way.

Archival sources offer two key advantages when applying ANT to development projects. First of all, they offer a much wider variety of perspectives. When researchers set out to examine a development project, they are often limited by the barriers development agencies erect in order to maintain a positive public image. Scholars are usually granted access only to a limited range of documents, many of which are already in the public domain, and most of which only offer a rather monolithic view of the implementation process. If they turn to ethnographic observation or interview, researchers frequently find themselves faced with guarded responses, a repetition of positive results, or jargon-laden explanations of events. What usually remains outside of the scholar's reach, therefore, are the everyday records of the project as it unfolds: the private memos, personal instructions,

progress reports, and meeting minutes that show the diverse politics of development projects. These usually feature forthright opinions, personal rivalries, and struggles for influence; they also tend to portray the uncertainties, mistakes, and contingencies of the development intervention. This, of course, is the reason they are usually withheld from view, but it is also what makes them so important for studying processes of development. These documents help us uncover the full complexity of a project, and the way the actor-network is formed. They may not be available if they are requested from development agencies today, but they are often widely available in project archives.[4]

Second, archives offer a much more complete view of the project lifecycle. Whereas ethnographic methods usually allow only a snapshot, a single slice of a project's life, a comprehensive archive allows a view of the development project in its entirety: from the manner in which it was first proposed, to the events that contributed to its eventual dissolution. Only the most assiduous, persistent, well-resourced ethnographer could observe a project directly throughout its whole lifecycle, and this is made harder the longer the project operates; but a well-kept archive allows us to examine a project idea from its original inception to its eventual conclusion, making such sources particularly valuable for understanding how development projects succeed and fail, and examining how development projects form and break apart.

This is not to say that archives are perfect sources; of course, they have their problems, just like all data, but some of the limitations that have been traditionally been posited for documentary sources – especially for historians – can become strengths from the perspective of ANT. One of the key issues in historical method is *bias*: the problem that historical sources can only offer an incomplete and very partial account of the past. For most scholars of history, this is a central preoccupation (Appleby, Hunt, & Jacob, 1994; Evans, 2004; Green & Troup, 1999; Marwick, 2001; Tosh, 2006), but from the perspective of ANT, bias is actually what we are looking for. Our central aim in ANT is to trace the different actors that are

[4] Of course, this range of opinions and documents is only available when the archive is well-kept, comprehensive and accessible. The archive examined in this article has been chosen precisely because it is so extensive in scope and rich in content.

involved in a project, and to accept their viewpoints as the legitimate reflection of their concerns. To put this another way, our aim in ANT is not the forensic reconstruction of the past, but an examination of how interactions are formed. We are not concerned with how bias affects historical knowledge or the facts of history, because our focus is on 'following the actors', and this means not simply looking at what people have done in the past, but also looking at what they have thought, seen and believed.

Historical documents can be very good at gleaning this kind of information, and in many documents can be better than interviews or ethnography. In the archives we can read, analyse and interpret words that were written in rapid, unguarded moments, with little awareness of the researcher's haunting gaze. Each letter and memo is a statement of opinion, an articulation of belief, a declaration of intent, an act of negotiation, or an attempt at enrolment or dismissal, and our aim as researchers using ANT is to follow these shifting alliances from person to person. We concentrate on what is created and dissolved by words in the archive, and the advantage of historical sources is that these intentions and results are more visible, because the concern of their author is focused on the present, rather than on the possible purposes of researchers in the future. The ignorance of the historical actor about the intentions of our research therefore unburdens us: there are less problems of reflexivity, less bias deriving from the presence of the researcher, and no need for full disclosure and informed consent. There is, in short, a more direct articulation of the actor's perspectives, we can enjoy a more direct relationship with their opinions, motivations and beliefs.[5]

However, this does not mean we can access *all* opinions and beliefs in documentary sources. Even in those archives that contain startling arrays of records and diversity of opinions, some voices remain notably absent. The archive of this leaf

[5] These unguarded opinions and perspectives are less common in the archives of more recent projects. This is partly a result of the professionalisation and bureaucratisation of aid, but it is also affected by recent events such as the Wikileaks affair and freedom of information legislation. It has become increasingly clear to even the most lowly administrator that documents they have authored may come back to haunt them. As a result, the honesty and diversity of perspectives that characterises many development agency archives from the 1960s-1980s, does not extend to the present day, and there might be only a small window of projects that are amenable to analyses such as this one. I am grateful to Richard Heeks for this observation.

protein project, for example, contains perspectives from many different people (donor agency staff, project workers, local employees, academics, publishers, the media, senior management, African and European perspectives, men and women, young and old...) but there is a complete absence of the largest, most important group: the Nigerians who would eat the leaf protein, the intended beneficiaries of the project. This does not necessarily weaken the analysis. After all, this is an examination of the leaf protein project as an actor-network, focussing on the perspectives of the different actants that were enrolled. As will be shown below, the 'beneficiaries' of the project were manifestly *not* enrolled in the project, they did *not* participate in the actor-network except in the minds and imaginations of others. So there is no trace of their opinions in the project record simply because there was no involvement of them in the project itself; indeed, this absence itself tells an important story, and, as we shall see, is a key reason for the project falling apart.[6]

5. ACTOR-NETWORK THEORY APPLIED

Let me now turn to the example: the leaf protein project in Nigeria. The idea, to recap, was to produce a local food supplement to prevent malnourishment, which would be derived from the leaves of common plants. This project, like all projects, involved the formulation of a *problem*, and the articulation of a particular *solution*. The problem involved a particular formulation of malnourishment, which saw protein as the main deficiency in local diets. The solution involved providing this nutrient in the most economical manner available: as a widely available supplement, extracted from ordinary plant leaves. These two elements, the problem and the proposed solution, form the first two black boxes on which the project was built. In order for the project to succeed – or, for that matter, even be considered – the problem it addressed needed to be widely understood as pressing, and the solution it proposed needed to be considered viable. In short, the project needed to put

[6] In principle, there may be important actors who played an important role in the project, but who left no trace at all in the archival records, but this is both unlikely and unavoidable, and, in any case, no more of a problem than that faced in any other research method.

these two elements outside the realm of contestation, and into the realm of the taken for granted.

5.1. The formation of a development project

How was this done? To examine the formulation of the 'problem' first of all, the project was addressing an issue that had been circulating within international development circles for some time. This was the idea of a 'protein gap', a widespread deficiency of protein in developing country diets, caused by a reliance on starchy staples and a lack of resources to buy meat. This view of the problem was already in a black box, closed off, and the subject of widespread consensus backed by considerable authority – it therefore required little effort on the part of the project to have it accepted. Since 1935 there had been a label for the particular condition of protein deficiency, which had been termed 'kwashiorkor' and given a clinical description (Williams, 1935, 1973); since the early 1950s there had been a number of authoritative reports on the 'protein gap', including an influential study commissioned by the World Health Organisation (Brock & Autret, 1952); since 1955 there had been an arm of the United Nations devoted to the issue, known as the Protein Advisory Group (Ruxin, 2000); there were also many projects devoted to the issue of protein deficiency, and a whole industry with its interests bound up in the provision of dried skim milk surpluses to developing countries (Newman, 1995). The 'problem' of protein deficiency, could, for the moment, be treated as settled.[7]

The 'solution' proposed by the project, however, was more recent: it was also treated as a closed black box, but enjoyed a far smaller network, and far less agreement. Although the idea of extracting protein from leaves had been around for centuries, it only became of widespread and realistic interest during the Second World War, when Cambridge scientists started researching technological solutions to possible food shortages in Britain. During the course of unconnected research into

[7] That the project built on this widespread notion of a protein gap is evident in the initial proposal and the meeting minutes of its early committee. See file CA4/A/2/10, particularly the minutes of the inaugural meeting of the advisory committee, entitled 'Posho Mill project for the production of leaf protein', 22nd June, 1973, and file CA4/A/1, particularly the project application form, entitled 'Posho Mill project' undated (c. 1972).

plant viruses, a biochemist named N.W. Pirie had begun tasting the protein produced when centrifuging a mass of chloroplasts from the sap of plant leaves. Pirie thought this could become the basis of a new food product, and by the 1960s examining leaf protein became a core part of his scholarly work (Morrison & Pirie, 1961; Pirie, 1966).[8] This was an era of modernization, when science and technology was thought to offer great hopes for human progress, so the idea of a cheap form of new protein was taken up rapidly amongst communities of scientists and then in wider society. It featured in a number of newspaper and magazine articles, and became disseminated through popular science books, such as Elizabeth Huxley's *Brave New Victuals* (1965). Through these channels it also came to the attention of development agencies, who reacted with great interest.[9] When the proposal for a leaf protein project in Nigeria emerged, therefore, this particular solution to the problem of the 'protein gap' was already a significantly strong actor-network in its own right: an ideal black box on which to build the project.[10]

On the basis of these foundations, the project needed to recruit new allies to its cause. Through the process of translation, it convinced a number of different 'actants' that their own interests could be aligned with the project, and that the project articulated their (sometimes unformulated) wishes. This was easier with a foundation of black boxes: it was simpler to engage the interests of others once the problem and solution could be treated as closed. But to get off the ground and to hold together as a network, the project needed to speak for others and act as a whole, which involved the cooperation of five main groups of actants.

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[8] For an account of this history, see N.W. Pirie in Conversation with Dr W. S. Pierpoint, 27 June 1988, at Film and Sound Online, Biochemical Society Collection: http://edina.ac.uk/purl/isan/0028-0000-2657-0000-0-0000-0000-0. See also Fowden and Pierpont (1997).

[9] This is demonstrated in the carefully pasted newspaper cuttings and enthusiastic annotations in the archives of several development agencies; see the cuttings in the file CA4/A/1 and similar interest expressed in the Oxfam archives, Bicester, UK, file DIR/2/3/2/57. A whole new NGO, 'Find Your Feet', was devoted to the cause of leaf protein, and became a crucial actor in persuading Christian Aid to fund the project.

[10] There were, of course, other black boxes the project relied upon: the authority of science, the network of donor institutions, the whole idea of 'development', the availability of postal services, the services of banks and so on. This list could be elaborated in detail, but the point is to illustrate that this particular project was constructed on a series of other actor-networks of various strength, which were treated as matters of consensus.

The first group was the community of scientists and engineers, who had authoritative knowledge of leaf protein and its extraction from leaves. From the very start, the project relied heavily on biochemists at the University of Ife, and more informal support from Pirie and his colleagues at Rothamsted. Later on, a food technologist from the UK was also employed on the project, assisting in the development of engineered machinery to process the leaves. The involvement of this community of experts was crucial to the project's success, as their role was to provide a source of authority which would affirm the existence of the protein gap and the value of LPC as a solution – in effect, to keep the black boxes closed. As for the alignment of their own interests, it is likely there was a level of personal concern with the practical implications of science and the uses it could be put to helping others, but above all there was an overriding concern with research outputs.[11] The project provided the community of experts with an opportunity to author articles in peer-reviewed journals, which allowed them to further their research objectives and enhance their reputations.[12] This preoccupation with publication is evidenced in committee meeting minutes, which contain plans for the production of papers, listed by title, prospective author, and expected completion date.[13]

The second actant was the donor, who was again essential to project success; as any development practitioner knows, little can be done without money. The project donor – Christian Aid – took a relatively hands-off approach to implementation. This was partly out of necessity, as only two project officers were

[11] The wider interest in how science could assist society comes through in a selection of documents authored by experts - for example in the core objectives section on page 8 of the summary report 'Leaf Protein Research in Nigeria' by O.L.O, a biochemist at the University of Ife who consulted on the project (box CA4/A/3/1). But in general, the community of experts articulated their involvement in the project using the language of research and scientific (rather than social) interest. This is evident throughout the rest of the report cited above, as well in the other correspondence and memoranda in file CA4/A/3/1.

[12] Authoring journal articles is the currency on which academic careers are built, but it has also been argued by Latour and Woolgar (1986, pp. 45-63), that the production of written inscriptions is a central purpose of science.

[13] See, for example, the leaf protein advisory committee minutes, dated 10th April 1976, and the memo 'papers to be written', dated 20th January 1976, in box CA4/A/2/11. A large number of papers were in fact published (Fafunso & Oke, 1976; Oke, 1971, 1973; Olatunbosun, 1976; Olatunbosun, Adadevoh, & Oke, 1972) but many did not match the intended outputs that were set out in project documents. It is hard to determine exactly how the academic papers and the practical leaf protein development project were linked, although the desire of the experts to produce papers is certainly evident in meeting minutes, and is likely to be a key reason for their involvement. Their discourse certainly stresses research outputs, as the document cited in footnote 11 can testify.

employed for the whole of Africa, and the lack of telecommunications during this period meant a reliance on written reports and postal services. But this distance from the day-to-day activities of the project was usual for donors of the time, who, in place of direct involvement, tended to require two main things. First, they requested a flow of documentation that met their own internal requirements (mostly in the form of reports on project activities, topped and tailed with project design proposals and evaluation reports). Second, they required a flow of funds in and out of their books.[14] The requirements of the donor, therefore, revolved around the submission of written inscriptions that summarised recent project activity, and the transfer of finances to the implementing team.

In view of this rather restricted institutional role, it is tempting to view the donor simply as a vast machine that process paperwork and cash: absorbing various forms of documentation that are carefully filed, whilst issuing funds in return. This is not to say that individual employees in the organisation were not captured by the ideals of the project, and committed to working to help other people; nor is it to suggest that the donor organisation as a whole was not publicly committed to a set of ethical principles and broader developmental aims. It is simply to argue that in terms of their concrete activities, the content of the documents in agency archives revolves around either acquiring reports, or distributing cash. Their concern always comes back to the transfer of written inscriptions for money. The higher aims or ideals are rarely, if ever, cited or defined; from the archives, it seems that mobilising the alliance of the donor always required making sure that just two central requirements were met.[15]

The third group of actants were the beneficiaries; that is, the people who would actually eat the leaf protein. Given their centrality to the success of the

[14] Minutes of the Christian Aid board from 1972 to 1982, in box CA2/D/26 and CA2/D/27. As the body that released any funds to projects, these two requirements are laid out clearly, and drive the rest of the organisation's activities. It was the board who required the necessary reports before issuing cash, and although individual project workers may have had a more complex relationship with the operations of the project, and may have sought more detailed assurances in other ways, they were mostly involved in ensuring that the necessary reports were compiled for the board, and they were committed to the continuation of the project through this cyclical flow of documentation and cash.

[15] This perspective also arises from research into the 'aid chain', which reveals how donors are concerned primarily with upwards accountability (the submission of reports), and the pressure to spend money: in short, they are often more concerned with growth and the flow of finances than with what actually happens on the ground (Bebbington, 2005; Bornstein, 2003; Wallace, 2000).

project, it is remarkable that they were never fully enrolled. The process of translation usually requires that representatives of a certain group are consulted and then formally engaged, but there is no evidence of consultation in any of the plans, meetings or reports from the leaf protein project.[16] This is not to say that the importance of their cooperation was not recognised; in fact it was obvious to everyone that if people did not eat the protein, the project would have no purpose. But their enrolment took place through a set of assumptions about how they would act, rather than through direct consultation.

It was assumed, for example, that it could be easiest to convince local people of the value of LPC if it were associated with health, presented as a kind of medicine, and distributed through government clinics. Hence, the local hospital became the main distribution centre for the finished product, and its beneficial effects on health were emphasised.[17] It was also assumed that the dried leaf protein powder could be easily integrated into local diets and lifestyles. The character of LPC, it was claimed, meant that it could be treated like any other condiment, and be easily added to soups, stews and relishes, which were always eaten with starches and which absorbed and disguised the powder well.[18] In addition, it was assumed that local people would respond to a series of advertisements that appeal to their best interests. As a result, a number of posters were drafted, which suggested to mothers that LPC would prevent kwashiorkor and allow the 'normal, healthy growth of post-weaning children'; separate advertisements were also drafted for school children, featuring a photograph of a footballer and the claim that eating leaf protein will 'make you strong!' These advertisements appealed to the familiar, declaring that the product was 'the concentrated goodness of the leaves that you like', and explaining

[16] A review of all committee meeting reports and correspondence between project workers reveals no involvement from beneficiary groups in the project planning and inception, although statements were frequently made on their behalf, stating what may appeal to local people, and what would not. One mention of 'local acceptability trials' seemed not to have taken place. Later in the project, there were plans to involve beneficiaries in clinical trials to see the impact of the protein on physical characteristics, but there is no evidence that this took place. Even so, these plans reveal how LPC was conceived as a medicinal intervention *onto* people, rather than a social intervention that *involved* them.

[17] 'Minutes of the third meeting of the advisory committee', 13th October 1973, file CA4/A/2/10

[18] First three meetings of the advisory committee, comments by O.L.O; 'Some questions of distribution', by J.N. (director of the local faith-based partner organisation hosting the production of the leaf protein); undated, but covering letter dated 1977, both in box CA4/A/2.

that the product was the protein 'taken from' the leaves that 'grow all around you'.[19] This can be seen as the project attempting to enrol local people as allies by appealing to their own interests, desires, and habits, even though this group were never directly represented in project committees.

The fourth group of actants were the leaves. In order for the project to succeed, the leaves had to be convinced to be broken down into pulp, have their juice extracted, and their protein filtered off and dried. They not only needed to allow this to happen, but they also needed to produce a form of leaf protein that was attractive in appearance, relatively appetising, durable and portable. The project staff expended considerable energy convincing the leaves to cooperate in all these ways. Different types of leaves were experimented with, which all gave different results; their yields and the character of their proteins were carefully recorded. Eventually a combination of two, more cooperative leaves, was decided on. The soto leaf, which was a variety of local spinach, formed one half of the protein mix, because it cooperated by growing extremely fast and surviving well in the fields. The cowpea leaf formed the other half of the mix, because it produced a much lighter coloured protein, which was considered more aesthetically pleasing to the potential consumers. Beyond this negotiation with the different types of leaves, the remaining process of translation involved naked power, brute force. The leaves were compelled into cooperation by changing their form from pulp, to juice, to protein curd, to dried powder, using machines and mills.[20]

Finally, the project enrolled labels, logos, and imagery: components that lent the final protein concentrate even greater durability. Even after someone had eaten the LPC, the label and name should remain as an idea in their minds, and the packaging would outlive consumption by serving as a reminder on the floor. The plan was to distribute the LPC in cellophane bags with a bold, bright label, with a name that would become as recognised as 'Cow and Gate'. Various possibilities were raised. 'Agunmu' was suggested, but then rejected on the basis of its 'unfortunate

[19] 'Leaf Protein project report', Appendix 2, by P.F (a food technologist on the project and full-time project worker based in Ibadan), undated, but covering letter dated 1977, box CA4/A/3.

[20] 'Preliminary report of the leaf protein trials', by P.F, dated July 1977; 'the production of a processing unit for the production of dried leaf protein concentrate', undated, file CA4/A/3/1.

local associations': it was a word for certain ground herbs used in traditional medicine, which did not match the modern, technologically advanced self-image of the project. 'Milki Dudu' (black milk) was also considered, on the basis that the dark powder of the LPC might be associated with the white powder of dried milk, which had already inserted itself into the consumer choices of local people. Other names, including 'concentrated goodness of leaf' were also considered and then rejected for being too cumbersome. Eventually, 'Sokotein' was decided upon, a portmanteau of 'protein' and 'soko', which was one of the two plants used in production of the concentrate.[21]

5.2. The dissolution of a development project

To summarise the argument so far, the formation of this project involved several steps. First, its foundations were built on a series of black boxes, crucial ideas and discoveries that were treated as closed: the 'problem' of a protein gap, and the proposed solution of a leaf protein concentrate. Second, the project enrolled a number of important allies by appealing to their desires and interests: the community of experts, the donor agency, the beneficiaries, the leaves, and the machinery. Third, the nonhuman allies were able to give the project a more durable form than purely human relationships would allow: the leaves and curd, mills and vats, knives and hoes, and the packet of leaf protein concentrate with logos and designs all allowed the project to insert itself into world in a more stable, lasting form.

So what caused this project to fall apart? Following the approach of ANT, we can explain the failure of this project by the *reversal* of the processes explored above – the reopening of black boxes on which it was built, and the dissolution of alliances that held it together.

The black boxes on which the project had been based became leaky over a number of years. The idea of the 'protein gap', in particular, became increasingly questioned. In 1974 the Lancet published an influential article entitled the 'great

[21] Reports of the advisory committee, particularly 22nd June 1973 and 2nd March 1977, box CA4/A/2/11.

protein fiasco', arguing that widespread protein deficiency in the developing world never existed, stating that the core problem people faced was hunger, not protein deficiency, and suggesting that an alliance of interested parties had allowed the idea of a protein gap to go unexamined for so long (McLaren, 1974). Anthropologists joined the debate, arguing that the preoccupation with protein deficiency was the result of cultural factors, a Western 'love-affair' with meat that did not reflect the lifestyles of the majority world (Diener, 1984; Diener, Moore, & Mutaw, 1980). Environmentalists and nutritionists also opened this particular black box, arguing that the preoccupation with meat and protein was wasteful and inefficient, and had no noticeable benefits to diets (Lappé, 1971). The problem, it soon emerged, was a lack of energy, or to put it more simply, a straightforward lack of food. The idea of the protein gap was slowly undermined.

In a similar process, the 'black boxed' *solution* to protein deficiency was also opened up, and the viability of leaf protein as a method for alleviating malnutrition came into question. A gradual change in attitude took place, which was in part the consequence of modernization's declining fashionability, in part a realisation that top-down scientific solutions had limits, and in part a growing awareness of the disadvantages of leaf protein itself. This new ambivalence towards leaf protein is illustrated by the comments of a scientist originally from the University of Ife, who had been involved in the early stages of the project. In the minutes of a meeting from the early 1980s, he declared that LPC had no advantages over any other source of protein, and that local people 'might as well just grow a few more beans'.[22] Such a sentiment was echoed by others, who pointed out that leaf protein involved a far more laborious process to extract, and, in addition it carried risks and uncertainties for human consumption.[23]

[22] Memo addressed to S.H. (the Christian Aid project officer responsible for West Africa) based on conversations with Professor G.H (formerly dean of technology at the University of Ife), 24th November 1980, file CA4/A/2/12.

[23] The focus of many experts shifted to the use of leaf protein for animal feed rather than for human consumption, and concerns were raised in correspondence with project officers; see for example, letter from W.A, (Panels coordinator for proposals to the Intermediate Technology Development Group) to B.W (Christian Aid projects officer), dated 30th October 1979, in file CA4/A/2/12. Even as early as 1974 there was the hesitation to publicise the pilot, on the grounds that 'there has been an unfortunate history of 'wonder-foods' that have been introduced [to Nigeria]', see letter to C.W. (a Christian Aid projects officer) from J.N, dated 17th August 1974.

It was not just the black boxes that became leaky. In addition, the alliances that held the project together slowly fell apart. This was partly due to poor translation in the first place: the beneficiaries of the project, as I have explained, were never fully brought on board through the enrolment of representatives. But it was also due to the breakdown of relationships, and the failure of the project to keep the interests of actants aligned. The community of experts and scientists, for example, moved their attention to other things, especially as the main academic papers had been written, and the generation of new data from the project was on the wane. Committee meetings became more sporadic, and reports appeared to become a montage of previously published research.[24] In a similar way, the main engineering tasks had been completed. Machines had been constructed that were functional, the production process had been refined, and the LPC product proved edible and relatively economical to produce. The role of the food technologist, in particular, had been successfully discharged, and his placement in Nigeria came to an end.[25]

It was not just the community of experts whose alliance with the project disintegrated; the relationship with the donor fell apart as well. The donor, I have argued, acted as a processing centre that absorbed paperwork and spat out funds. Their interests in the project relied on this transaction, and once the paperwork dried up and the funds failed to be spent, their enthusiasm for the project diminished. What is particularly interesting when reading the archival documents is the sheer patience the donor had, as long as reports were regularly being submitted, money regularly being spent, and receipts and meeting minutes submitted. Despite the weakness of other relationships – between project and beneficiaries, say, or project and scientists – the donor relationship could be sustained through the document-finance transaction. Even the increasingly leaky black boxes did not disrupt this relationship, and the bond between donor and project was only weakened when reports stopped arriving and when money stopped moving through

[24] Letter from G.D (food technology consultant to the project, formerly employed at Rothamsted) to B.W., dated 12th October 1979, file CA4/A/2/12.

[25] Letter from P.F. to B.W, dated 4th July 1977, file CA4/A/2/11; 'leaf protein production project, handing over notes' by P.F, undated c. August 1977, file CA4/A/3/1.

the books.[26] By 1978, there was around £30,000 of unspent funds in Christian Aid bank accounts, and a further £30,000 that had been pledged but not requested. Repeated requests for reports and planning were sent out without any detailed response.[27] Christian Aid was trying hard to continue the project and spend the money that had been allocated, but ultimately the donor's interests in keeping project funds moving through accounts were not being met, and in the absence of paperwork and funding churning through its system, the relationship between the donor and the project withered away.

The other key alliance that fell apart was with the leaves. Although report after report insisted that leaf protein would be useful for human consumption, the leaves would not cooperate with this central aim of the project. They had been ascribed two roles that they refused to accept: their transformation into a new protein-rich, long-life form, and the use of this form in human diets. The problem was that the dried form of leaf protein concentrate had an 'unappetising dark colour', it was 'gritty' and altered the texture of stews and soups, it tasted a bit like 'pond weed', and it made stools green, which often scared the mothers who were asked to feed it to their children.[28] As a result, the project workers resorted to distributing the LPC as fresh curd, rather than a dried powder. This could be frozen immediately after production – until it was transported to hospital clinics – but this fresh curd, by its nature, was perishable, it could not easily be packaged, the name and chosen branding could not easily be used, and it had to be eaten relatively quickly. The durability of the LPC thus came into question, as it now had a much shorter life and less stable material form. This curd also proved to be rather limited

[26] Scepticism about the protein gap and the value of leaf protein concentrate was not entertained by any Christian Aid staff in the archives, and even when exposed to the sceptical views of academic actants, attempts to continue with the project persisted (see memo, op cit, footnote 22). Concern instead centred around the lack of reports being delivered, and the lack of budgets requesting finance; both were perceived to be a result of personal politics and local mismanagement, rather than systemic problems with the whole project (see correspondence between B.W and P.F, dated 1st October 1979, file CA4/A/2/12).

[27] See letter from B.W. to E.A (director of the local host organisation for the project), dated 27th April 1978, file CA4/A/2/12, and subsequent requests in the same file. Also, papers for the Christian Aid board, box CA2/D/27, with the final update from the project bemoaning lack of reports.

[28] These comments come from, in order, interview with P.F, 11th January 2011; minutes of advisory committee, 26th November 1977, file CA4/A/1; interview with B.W, 7th January 2011; O.L.O in minutes of advisory committee meeting, 22nd June 1973, file CA4/A/2/10.

in use: since it couldn't easily be transported, it could only be used for the therapeutic feeding of severely malnourished children in the local hospital. For a time, it replaced mashed beans that were previously used, but had many more limitations. Unlike other sources of protein, it couldn't be cooked in different ways; compared with egg, which can be baked, whipped, fried, boiled, and so on, leaf protein can only be added to food. And since it changed the colour, taste and texture of this food in ways that were unfamiliar to people, it was never particularly popular.

6. CONCLUSION

So what changed between the start of the project and its end? What happened that altered its fortunes so profoundly? The answer is: not much. Nothing revolutionary occurred that caused the failure of the project, but there was, instead, a gradual dissolution of alliances that held the whole idea together. There was no scientific breakthrough that completely overturned the assumptions the project was based on; rather, there was a growing scepticism about the idea of the protein gap and the viability of human food based on leaf protein. The leaves did not suddenly rebel against attempts to make them edible and useful for humans; rather, the limitations of their protein gradually became apparent, and complaints about their colour, texture, and taste flowed in. There was no sudden drying up of funds, or cutting of relationships from the donor to the project committee; rather, there was a gradual process where the interests of each party failed to be advanced by the project: the donor was not receiving its documents or enjoying the turnover of funds, and the scientists no longer needed the projects to write their papers. In each of the elements that make up this ANT analysis – the opening and closing of black boxes, the process of translation, and the enrolment of non-human allies – we are given a complex, subtle picture of the project, seen through the lens of constantly shifting alliances. ANT does not provide us with an all-encompassing theory, a grand narrative, or a set of revolutionary or replicable causes of success or failure: it offers a patient, painstakingly detailed description.

The advantage of ANT for examining project success and failure is this detail: it allows us to move beyond the narrow concern with stated aims, and look at the wider context of ideas, institutions, individuals and objects that all contribute to the process of development. It also gives us a much-needed scepticism about any claim that development projects have an inherent, objective validity. After all, the history of development has been one of successive grand answers, profound discoveries, ultimate solutions, 'eureka' moments, all of which offered new and exciting ways to better the human condition. It has provided grand answers with often noble, attractive intentions, but these answers and these intentions are rarely treated with sufficient scepticism. The answers proposed, the solutions suggested, the ideas proffered all tend towards the simplistic – they reduce the complexities of the world into a set of technical solutions or project procedures that can be achieved by institutions. But the great advantage of Actor-Network Theory is that it reminds us of the sheer complexity of the world, the way that each 'black box' is built on a succession of other black boxes, and it allows us, with careful analytic work, to examine this bit by bit, and open up black boxes one at a time.

The great disadvantage of this approach to examining projects is its amorality. By stressing the prevalence of power in the building of successful actor-networks ANT appears to legitimise this power, or, at the very least, it appears to be agnostic about this power. As Langdon Winner (1993) originally pointed out, such an approach is both elitist (in that it follows the most powerful actors), and amoral (in that it offers no tools to ethically evaluate the status quo). In development projects this combination is particularly troubling. As one respondent to this paper suggested, the use of ANT to examine development appears to lead to the maxim 'anything goes': if success is determined by alliances, then whatever causes alliances to be built must be an acceptable formula for success. To put this another way, ANT extracts any *moral* notions from success, leaving it as a purely formalistic (and even tautological) notion. This results in a situation where we must judge huge development projects as a 'success' because they have constructed extensive

alliances, even if we view them as completely horrific from a moral point of view – such as, to give just one example, the mass sterilisation campaigns in 1970s India.[29]

This issue is less troubling than at first glance, partly because it helps us clarify what we mean by 'success', but also because it allows us to see the ways in which ANT is useful, and the ways in which it is not. After all, adopting ANT as framework for research does not preclude our forming independent moral judgements on issues; indeed, it may actually be useful to detach our moral judgements from our description of affairs. ANT is very good for descriptions and detailed analytic work, but it is less good for tackling moral questions, and as long as we keep this in mind it remains an extremely useful tool. We must accept that ANT cannot help us determine what ethics we should follow, because this is not the primary intention of such an approach, whose advantage is really its strong metaphysical and ontological foundations (Harman, 2009).[30]

In this emphasis on description over judgement, ANT has some important applications in Development Studies. One of the main contributions of ANT is to offer a new framework for examining project success and failure – something I have termed in this paper the 'associability' rather than 'validity' approach to success. But ANT also allows us to observe a central dynamic that cuts across all development projects: that to be large and extensive, development projects must take the least provocative path. It may be rather obvious that the strength and longevity of a project is a product of the alliances it builds; but it is less obvious that building alliances is best achieved by *not* challenging powerful structures and powerful actors, but rather by bringing them on board. By attending to the process of project lifecycle, ANT highlights the element of amorality that always exists in the pragmatic negotiations of development actors, the constant dance between what is right, and

[29] I am grateful to Henrik Ernstson for helping clarify this point

[30] To clarify this, consider the contribution of ANT to more explicitly moral questions. Although ANT would be of no help in answering how we should act, it *would* help to answer how we have come to adopt certain frameworks for moral decision-making. ANT offers a critical perspective on the very idea of morality: it helps us understand why certain moralities have become so widely accepted, how moral norms move from person to person and gain salience, and how moral norms have changed over time. Its concern, then, is with the production of morality as an actor-network, not with the practicalities of choosing between different moral positions. But understanding this production does not preclude our choosing a moral position on any issue, and understanding the way that networks operate may actually help us redefine, refine and re-articulate our own ethical positions. I am grateful to a conversation with Geoff Walsham for helping me clarify this position.

what will succeed. It reminds us that projects usually succeed by accepting dominant assumptions, by being non-threatening, by being tame rather than radical, by forming alliances with powerful actors, and by avoiding some of the largest structural problems that keep social divisions in place. Perhaps this, in the end, is why development has failed to transform the inequalities of the world and made such little impact in response to the billions of dollars invested: because, as Marxists had always claimed, it ends up reproducing dominant interests and accepting dominant ideas rather than challenging them. And perhaps this also why the *potential* of ANT for development goes far beyond the modest applications in this paper – which, after all, has provided only one illustration of its uses, based on a rather small leaf protein project in 1970s Nigeria[31] – since it can offer a new framework for analysing why development as a whole has so often failed to live up to expectations.

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[31] It should be emphasised that the size of the project and its existence in the past does not undermine the central argument of this paper. In fact, the principle of 'generalised symmetry', which is widespread within ANT, explicitly requires that we offer exactly the same attention on marginal projects, on failures, on 'invalid' science or 'incorrect' discoveries as we do on successes, huge international projects, scientific breakthroughs and technological marvels. Both can illustrate and illuminate; both can equally show how networks operate.

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