

## THE GUATEMALA EARTHQUAKE OF 4 FEBRUARY 1976: SOCIAL SCIENCE OBSERVATIONS AND RESEARCH SUGGESTIONS\*

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### INTRODUCTION

It is very difficult to say that any specific country is a “typical” member of that group of more than one hundred nations called “underdeveloped,” that group including as it does such diversities as Chile and Saudi Arabia, Burma and Zaire. But in the sense that all such countries share Dudley Seers’ definition of underdevelopment – acute poverty, unemployment, and inequality – Guatemala can be considered typical [1]. Thus, while our specific observations concern the Guatemalan earthquake disaster, we will attempt to make appropriate points about the whole problem of earthquakes/disasters in underdeveloped countries in general. The organization of this article reflects that double intent: an extended first section profiling the Guatemalan earthquake and a con-

cluding second section which serves as both a summary and as a vehicle to explore the research implications of our Guatemalan observations.

### I. GUATEMALA

At 3.02 a.m. local time on 4 February 1976 the Central American nation of Guatemala was struck by a devastating earthquake – 7.5 on the Richter scale – which, together with a large aftershock two days later, resulted in widespread destruction, the deaths of more than 22,000 people, injuries to 75,000 more, and a homeless population of at least 1,000,000 [2]. In human terms this was the most destructive earthquake suffered by Guatemala in a long history of natural disaster and was even more destructive than the Managua, Nicaragua earthquake of 1972 [3].

The earthquake occurred along the Motagua fault which runs roughly NE–SW across the most heavily populated parts of Guatemala. The epicenter of the main shock was about 115 kilometers northeast of Guatemala City, and ground breakage was observed for more than 240 kilometers along the fault. Movement

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\*The present article is a revised version of a field report submitted by the authors to the Earthquake Engineering Research Institute (EERI) of Oakland, California after a one-week (February 21–28) reconnaissance visit to Guatemala. Using a draft version of the EERI *Social Science Field Guide* our charge was to profile the disaster from the perspective of social science and suggest further research possibilities. These are our observations, which we now wish to share with a larger audience in the hope that they might be useful to those interested in the human and organizational response to disaster generally, and in the Guatemala earthquake specifically.

was also detected on a number of secondary faults, several of which extend into the outskirts of Guatemala City. There were hundreds of aftershocks with that largest being approximately 6.0 on the Richter scale – causing further damage, especially to already weakened structures – occurring on 6 February. There was no significant volcanic activity associated with the earthquake [4].

### Background

Guatemala has a population of approximately 5,500,000 with a society characterized by what is often called a “dual structure”: a large, relatively modern, urban center, and a backward, antiquated, rural hinterland of villages and small market towns. Indeed, Guatemala City dominates the country politically, socially, economically and – in a sense – culturally with a population approximately ten times that of the next largest regional city (Quetzaltenango).

Transport and communication between Guatemala City and the rural areas is difficult, especially in the rainy season (April to October, roughly) when many of the smaller highland towns are isolated for weeks at a time. It is the conventional wisdom that one goes back in time 200 years upon leaving the capital and going 100 miles (or less) into the rural areas. This is a classic Latin American pattern, reinforced in Guatemala by the fact that the rural areas are predominantly Indian in population – non-Spanish speaking and non-Western in outlook, diet, dress, and lifestyle. This ethnic division is one of the historical continuities of Guatemalan society, the importance of which should not be minimized and to which we will return below [5].

The history of Guatemala is marked by major disasters. The first capital established by the Spaniards at Ciudad Vieja was destroyed by a flood in 1541. Antigua, the second capital, was officially occupied in 1553 but destroyed by an earthquake in 1773. Following this disaster, the capital was moved to the present

site of Guatemala City, which has also been subjected to frequent earthquakes, the most severe of which was in 1917 when the city was virtually destroyed. The 1976 earthquake is simply the latest addition to this infamous, and continuing, list.

### Indios and Ladinos: Two Cultural Worlds

The disaster and its aftermath have brought into sharp focus one of the fundamental characteristics/problems of Guatemalan society: the cultural split between the dominant, westernized, Spanish-speaking *ladinos* and the proud, traditional, but oppressed Indians (*indios*). Such a situation is not at all uncommon in many underdeveloped countries and has exact parallels in several Latin American nation-states from Mexico to Chile, but it is especially the case along the Andean cordillera of South America.

Guatemala is generally considered to have a population which is approximately (all data are questionable on this matter) 3 percent “white”, 40 percent “*mestizo*” (mixed blood), and 57 percent “Indian”. But this is a racial classification and misses the point. The division in Guatemalan society is *cultural*, not racial, and for all intents and purposes there are only two parts of the society: *ladino* and *indio*.

A *ladino* in Guatemala may be either white, *mestizo*, or Indian by blood. The decisive characteristics lie in cultural attributes: Spanish-speaking; westernized dress, diet, and orientation; and urbanized (in Guatemala meaning Guatemala City, any departmental capital, or any of the larger market towns as a residence). It is also a common characteristic for *ladinos* to look down on Indians as inferiors.

To be “*indio*” in Guatemala is to be rural; Indian language speaking; dressing and eating traditionally; identifying with a specific locale and extended family; and non-western philosophically. Approximately one-half of Guatemala’s population could be thus classified.

Although long-run cultural attrition is against

them, the Indians of Guatemala are proud and generally resist efforts to “*ladino-ize*” them. Their perception is that the *ladino* society oppresses and exploits them. Rural land ownership patterns heavily favoring the *ladino* attest to the validity of this perception, for example. The Indians view the *ladino*/town/modern culture as alien and have as little to do with it as possible. Needless to say, the national, departmental, and town power structures are the almost exclusive province of the *ladino*, thus reinforcing the alienation of the Indian who only sees the *ladino* in terms of buyer of labor, economic intermediary, tax collector, policeman, or army conscriptor.

The earthquake and its aftermath brought many Indians into intense and often unwilling contact with the *ladino* culture. Food, water, and medical care were most often the causes for such contact, but even here the gap between the cultures was demonstrated. We heard several stories, from reliable sources, of Indians being brought — more or less forcibly — to hospital facilities for treatment, being treated, and then not returning for follow-up measures such as changing bandages, getting new casts, corrective surgery, etc. The ultimate in culture shock, however, was revealed in one story which was often repeated, with variations: an Indian badly hurt by a collapsed roof or wall was semi-consciously loaded aboard a helicopter and flown to a field hospital, such as that of the U.S. 43rd Medevac. For the first time he was alone (helicopters do not bring family members along), away from familiar surroundings, in pain, and among strange people who did not speak his language and who were doing absolutely incomprehensible things to him. For all the Indian knew this was Hell — literally; psychological trauma was often a serious post-operation problem. The point is that the disaster has laid bare and increased many of the tensions inherent in Guatemalan society. Many friction points between Indian and *ladino* that were hidden or sublimated by public avoidance are coming to the surface as a result of the earth-

quake, the emergency period, and reconstruction. The situation bears close watching.

As an aside, it may well be that in the long-run it is the poorer *ladinos* who suffer most from this disaster. The Indians are alienated and accustomed to a type of local self-sufficiency, and they draw regularly on their large extended family for resources, both moral and material. The poorer *ladinos*, however, have made the transition to a “modern” society but have not reaped significant benefits thereby. In other words, they have nothing to fall back on if the power structure fails them, which it is likely to do given the scale of the disaster. One final example of the difference between the two cultures might highlight this point. There will not be a significant orphan problem for Indian communities, as the extended family will take care of its own. But there will be, in fact already *is*, a serious orphan problem among *ladinos*: relatively little family structure on which to rely and insufficient government resources to take care of them [6].

#### Perspectives

There are two general approaches that might have been taken in profiling the 1976 Guatemalan earthquake and suggesting further research on it. The criterion under which we were supposed to work was “relevance to the United States,” but this would tend to concentrate our effort on Guatemala City, the national government, and certain emergency organizations — for it is only in the capital city that one finds structures and organizations similar to those in a developed country.

In human terms, however, this was not a Guatemala City disaster. It was a large-scale national disaster (casualties were reported in 17 of the nation’s 22 administrative subunits called “departments”) and primarily affected villages and small towns in the rural areas. The direct physical effects of the earthquake on the capital were relatively slight. As such, the central government and emergency organiza-

tions headquartered in Guatemala City tried to respond to the disaster, limited by the weak physical infrastructure (transportation and communication especially) of the country. Furthermore, although the central government and foreign donors were important in the emergency period (which lasted about two weeks in this case) and will be important in the reconstruction phase, it was our feeling that much of the "action" was and will remain local, using local resources. This will be even more pronounced during the rainy seasons of the next few years when many towns are traditionally on their own anyway.

In short we had a dilemma. The nature of the earthquake and its effects made it only marginally relevant to the United States but concomitantly quite relevant to at least other countries in Central and South America. As we were drawn increasingly into the rural areas we became convinced that earthquake research should not be limited by arbitrary "relevancy" criteria. But reflecting our dilemma, this profile tries to deal with both perspectives, relevance to the U.S. and relevance to the Third World. Let us begin with the human toll, the casualties.

### Casualties

The geographic distribution of casualties (dead and injured) shows a concentration essentially in four departments — Chimaltenango, Guatemala, Sacatepéquez, and El Progreso — which together account for more than 85 percent of the total national casualties (see Table I). This percentage can be increased significantly by adding just one town, Joyabaj, from the department of Quiché.

The rural nature of the earthquake is obvious from these data. Despite early reporting, Guatemala City was relatively lightly hit, with casualties less than 1 percent of the urban population. As outlying areas reported in, however, the picture changed dramatically with the most affected departments counting casualties as high as 24 percent (Chimaltenango), 13 percent (El Progreso), and 10 percent (Sacatepéquez). It should also be noted that the department of Guatemala (including the capital) reaches 2 percent casualties, again indicating predominant effects in the rural areas.

Chimaltenango department was utterly devastated. One of every four people in the

TABLE I

Casualties, by Department

	Population	Casualties			Casualties as percentage of population	Dead as percentage of population	*Material damage (percentage)
		Dead	Injured	Total			
Chimaltenango	195,000	13,754	32,377	46,131	24	7	90
Guatemala	1,100,000	3,350	16,094	19,444	2	<1	40
El Progreso	73,000	2,001	7,662	9,663	13	3	80
Sacatepéquez	100,000	1,551	8,842	10,393	10	2	80
Quiché	300,000	831	5,672	6,503	2	<1	40
(Joyabaj)	(32,000)	(600)	(5,497)	(6,097)			
Zacapa	105,000	693	1,998	2,691	3	<1	20
Total other departments	3,700,000	598	3,907	4,505	<1	<1	—
Total nation	5,500,000	22,778	76,552	99,330	2	0.4	—

\*Estimates only.

department was either killed or injured, and this one department alone accounts for 46 percent of the national casualty total and for 60 percent of those killed. Further, as we will see below, 97 percent of the population of Chimaltenango was classified as homeless after the earthquake.

Table II presents further data on various townships (*municipios*). Ninety-two reported casualties or significant damage, and from the total list we selected for inclusion in the table any township that had casualties of 10 percent of the population or higher. Chimaltenango department contributes 12 such townships,

TABLE II

Casualties, by selected township

Department Township	Population	Casualties*			"Material damages"*** (percent)
		Dead	Injured	Total	
<b>Chimaltenango</b>					
Chimaltenango City	20,194	600	3,000	3,600 (18)	75
Comalapa	18,163	3,200	5,000	8,200 (45)	90
Parramos	3,237	200	900	1,100 (34)	90
Patzicia	10,585	811	2,248	3,059 (29)	90
San Andrés Itzapa	8,447	150	728	878 (10)	90
San José Poaquil	9,795	1,000	2,657	3,657 (37)	90
San Martín Jilotepeque	33,066	2,920	6,000	8,920 (27)	100
Santa Apolonia	4,182	900	844	1,744 (42)	85
Santa Cruz Balanyá	2,903	100	600	700 (24)	80
Tecpán	24,101	3,023	7,000	10,023 (42)	100
El Tejar	3,039	50	900	950 (31)	85
Zaragoza	7,317	366	1,000	1,366 (19)	100
<b>Guatemala</b>					
Guatemala City	700,504	1,195	5,550	6,745 (.9)	45
Chuarrancho	6,985	42	1,789	1,831 (26)	60
San Pedro Sacatepéquez	10,714	720	1,667	2,387 (22)	100
San Raimundo	9,225	118	1,543	1,661 (18)	60
<b>El Progreso</b>					
El Progreso City	11,048	1,300	3,500	4,800 (43)	95
El Júcaro	6,197	372	2,538	2,910 (47)	100
Morazán	7,080	134	570	704 (10)	100
<b>Sacatepéquez</b>					
Antigua	26,945	277	1,251	1,528 (6)	25
Jocotenango	3,426	118	582	700 (20)	30
Magdalena Milpas Altas	2,921	135	584	719 (25)	50
Pastores	4,592	127	567	694 (15)	30
Sumpango	10,232	315	1,303	1,618 (16)	100
Santiago Sacatepéquez	7,943	218	1,247	1,564 (18)	40
San Antonio Aguas Calientes	3,866	113	544	657 (17)	50
San Bartolomé Milpas Altas	1,513	27	246	273 (18)	40
San Lucas Sacatepéquez	4,344	157	1,170	1,227 (28)	40
San Miguel Dueñas	4,215	7	524	531 (13)	30
Santo Domingo Xenacoj	2,759	57	560	617 (22)	70
<b>Quiché</b>					
Joyabaj	32,134	600	5,497	6,097 (19)	95

\*Figures in parentheses indicate total casualties as a percentage of the township population. Guatemala City and Antigua are included because they are the most important cities in the affected area.

\*\*Estimates only.

Sacatepéquez 10 more, Guatemala 3, El Progreso 3, and Quiché 1.

One of our primary interests was trying to narrow down the exact causes of death and injury in this earthquake. Conversations with medical personnel in both urban and rural areas indicated that the primary cause was crushing due to the collapse of adobe-wall dwellings (usually one-story) with roofs of heavy beams covered with heavy tile. These were deathtraps. The walls could not stand much lateral movement and collapsed, often bringing the roof down with them, and together crushing those beneath. The chief of orthopedic surgery at Roosevelt Hospital in Guatemala City estimated that 85 percent of the operations performed after the earthquake were for the repair of broken and crushed bones, especially vertebrae. The number of such operations was so high that a six-month inventory of supplies was exhausted in 72 hours. After that it was pure improvisation by the hospital staff, including using toilet paper covered with paste for casts [7].

### Homeless

Data on the number of people homeless are by department and are, frankly, less reliable

TABLE III

Homeless, based on 1973 Population Figures

Department	Population			Homeless as % of combined urban/rural population
	Urban	Rural	Homeless	
Chimaltenango	74,129	120,606	189,192	97
Guatemala	929,209	178,977	434,934	39
Sacatepéquez	72,367	27,621	44,594	46
El Progreso	19,182	53,949	46,092	63
Quiché	34,471	264,215	56,232	19
Zacapa	30,432	75,337	59,044	56
Totónicapan	24,399	142,419	78,037	47
Baja Verapaz	18,852	88,105	46,006	43
Izabal	31,316	138,502	37,431	22
Jalapa	32,628	85,446	36,131	31
All Others	611,206	2,106,913	16,748	<1
Total Nation	1,878,191	3,282,030	1,044,441	20

than the casualty date. Table III presents the data that we could collect. While important and reasonably consistent with the picture of the earthquake given by the casualty data, some of the figures seem high.

“Homeless” figures for some areas may include people who were inadequately housed *before* the earthquake but who were then counted as technically homeless. Furthermore, translation/conceptual difficulties may be present in that the distinction between “damaged” (*dañado*) and “destroyed” (*destruido*) homes may have become blurred.

The surprises in Table III are the relatively high numbers of homeless reported for the departments of Zacapa, Totónicapan, Baja Verapaz, Jalapa, and Ízabal. Referring back to Table I on casualties, these departments did not seem to be that hard-hit. Discussions with engineers who had been to these more distant areas resolved our problems about the unusual casualty-to-homeless ratio, however. Most of these departments are much lower in altitude than the high casualty areas and are characterized by lighter construction. There was thus considerable damage but fewer deaths and less severe injuries.

We also have some data on “property damage” in Guatemala City, by zones (see Table IV).

TABLE IV

Property Damage, Guatemala City, by Zones. Apparently any Property that Suffered Visible Damage

Zones	Percentage Estimate of Property Damage
6	85
5	80
3	70
19	40
9	40
2	30
11	30
12	20
14	20
17	20
18	20

The figures are early and apparently “eyeball” estimates, only. They correspond to our impressions if the translation of “damage to property” in Spanish becomes “property damage” in English, a subtle but real difference. For example, it could be that in Zone 6 there was damage of *some sort* to 85 percent of the structures, but only in that sense does 85 percent seem accurate. We eventually did at least a cursory examination of all zones listed in Table IV.

In terms of accounting for the distribution of the more than 6,700 casualties in Guatemala City proper, the figures on property damage do not seem out of line, especially if viewed as zone-by-zone comparisons. Our conversations indicated that the vast majority of deaths and injuries occurred in the lower income and slum areas of the city – Zones 3, 5, and 6 – where the structures were again of adobe with heavy tile roofs.

There was some “damage” to structures in Guatemala City that might bear a closer look under the “relevancy to the U.S.” criterion, however. A number of modern multi-story buildings suffered minor structural damage but could not – or would not – be used because elevators were not functioning, stairways were blocked, utility services were out, or there was

other non-structural damage. That is, these buildings were physically intact but functionally useless. The best example was the 15-story “*Triángulo*” building downtown which housed, among other organizations, the offices of the United Nations Disaster Relief Organization (UNDRO). Weeks after the earthquake UNDRO was still operating out of tents on the grounds of a telephone company substation, across from the United States embassy and out of the downtown area, due in part to the functional impairment of the *Triángulo* itself but also because there was marked reluctance by the employees to move back into a high-rise for purely psychological reasons.

#### Emergency Services: Guatemala City

The reconnaissance disclosed that there were few major problems affecting emergency response organizations in Guatemala City, except for the hospitals. Fire services, police, military forces, telephone, water, power, and other similar services suffered relatively little damage and were able to respond effectively, at least in and around the city. Damage to utilities was restricted mainly to distribution systems in the most heavily affected areas. In most cases service was restored at least partially within one to three days, except in the very hardest-hit neighborhoods where they were not fully operational at the time of our visit. Due to numerous small leaks, however, water pressure was still low throughout the city.

The structure of the national government, centered in Guatemala City, showed some disorganization in the first hours after the earthquake but recovered rather quickly, and the National Emergency Committee (NEC) held its first meeting in the morning of 4 February. The NEC was a kind of “super ministry” headed by the Minister of Defense and directly responsible to the president. Some early personnel and organization problems reduced the initial effectiveness of the NEC, but overall it must be said that the Guatemalan government responded

surprisingly well to the disaster, at least in the emergency period, despite their limited capabilities, especially in the rural areas.

The impact of the earthquake on the hospitals in Guatemala City was a different matter and is worthy of much further study.

There are two major and several minor hospitals or clinics with hospital facilities in the city. The major hospitals are the modern 400-bed Roosevelt Hospital (the reference facility for all doctors in the country) which appeared to have suffered no major structural damage from the earthquake and the General Hospital (San Juan de Dios) of 1800 beds which was heavily damaged and evacuated to an industrial exposition park. Other significant hospital evacuations were those of the Social Security Hospital (200 beds) and the Military Hospital. The Social Security Hospital set up in tents on its own grounds and moved back into its buildings after one month. The Military Hospital also went to tents and to a new section under construction but nearing completion at the time of the earthquake.

The hospital which bore the brunt of handling the casualties was Roosevelt, and although it did not appear to suffer major structural damage it did have troublesome functional problems (emergency generator out, water pump cracked, etc.) and displayed all the difficulties of an overloaded – 5,000 people treated in five days, by one estimate – medical facility: insufficient or unusable (not sterile) surgical theaters, exhausted supplies, exhausted staff, inappropriate or misplaced medical supplies sent in from outside Guatemala, etc. Of critical importance was the rapid exhaustion of such staple surgical needs as X-ray film, tetanus vaccine, antibiotics, anesthetics, plaster, cloth, and “Harrington” rods (used in surgery on fractures). Overall, however, Roosevelt Hospital functioned as well as could be expected under the circumstances, and the staff kept the situation under control. There was considerable insight shown about the non-medical needs of patients brought in from the rural areas:

receiving the bulk of those injured in outlying departments, Roosevelt attempted to group patients by home town in makeshift wards and thereby helped to reduce the psychological trauma among those who were experiencing their first “confrontation” with modern medicine.

#### **Emergency Services: Outside Guatemala City**

As should be expected, transportation, communications, utilities, and emergency services in general were massively disrupted outside Guatemala City. Confounding a popular myth and conforming to research findings, public order did not dissolve and there was little panic or looting. There were scattered reports, sometimes confirmed, sometimes denied, sometimes both, of “immobility” in certain towns – not burying their dead, for example – but these were the exceptions rather than the rule. Most towns dug out, buried their dead (mass graves in many cases), cared for their injured with almost non-existent facilities, and tried to get help.

If there was one outstanding problem that affected almost all towns outside Guatemala City it was that they were cut off for days from sources of assistance, except for what could arrive by air. The road system in Guatemala is characterized, like most of those in Latin America, by a primary route between towns but few, if any, secondary routes. The same situation holds for communications and utilities, where these exist. Basically, such services are a “modern” overlay on a primitive base, and once the major links were broken all these towns could do was wait – and suffer accordingly.

Our own observations are sketchy but indicate that airborne medical teams and/or supplies were the first to arrive in these towns, then (after anywhere from a day to a week) badly needed water supplies or purification units, and then everything else. As one might expect especially in Guatemala, it appears that



local military units were the first to re-establish communications with their headquarters in Guatemala City, and the military came to dominate the emergency period both locally and nationally.

### **The International Relief and Supply Problem**

Emergency aid and relief supplies came to the assistance of Guatemala from foreign sources in a number of ways: financial contributions to the United Nations Disaster Relief Organization (UNDRO) to be applied to its programs, sometimes with stipulations by the donor country; materials and organizations such as medical teams, sent directly on a bilateral basis by other countries (e.g. Mexico, the U.S., Nicaragua, Honduras and others); large quantities of donated goods forwarded by a wide variety of charitable, professional, and ad hoc organizations; and finally, redirection and augmentation of resources for already existing programs within the country, such as those operated by USAID and CARE.

The major problem arose, as it has in many major disasters, with the flood of goods from relatively unorganized sources, especially ad hoc groups. There are tremendous costs associated with the collection, transport, sorting, cleaning (if needed), distribution, and cultural acceptability of such goods. Often this takes money, labor, space, and transport vehicles away from higher priority needs. Moreover, there are conflicting reports about what is needed and wanted, which confuses potential donors and causes much ill-feeling on all sides. This is not a new problem, but it is a sensitive one. There was considerable criticism in the United States after reports began to filter back that local Guatemalan consuls in various U.S. cities made "unlimited" requests for aid when, in fact, such aid was largely unnecessary. What is lacking in criticism of this latest relief problem is an appreciation of the fact that the status of the local Guatemalan consuls at home (in Guatemala) depended in large part on their

being able to show how much "stuff" they generated from their areas, and quantity is important in such situations. Relevance and utility at the site of the disaster are secondary considerations. It should be noted, however, that the administration of relief supplies once they were in Guatemala was relatively honest. We heard very few reports of any large-scale pilferage or fraud, despite ample opportunity in the early emergency period.

We were able to explore more fully the problems associated with foreign relief to hospitals, and frankly, much of the foreign medical supplies that arrived contributed to the problem rather than to the solution. Much was unsorted, poorly packaged, unlabelled, or, more dangerously, mislabelled, and often obsolete. In one instance a box was discovered marked "Glucose solution" that actually contained an alcohol compound. It was fortunate that a medical staff member would not use it because he had never seen *pink* glucose before.

The amount of medical supplies that arrived was truly staggering. A warehouse was filled at the airport and a garage at Roosevelt Hospital. It was estimated that it would take a team of pharmacists about four months just to sort the supplies that arrived the first month, by which time even more of the medicines would be past expiration date. The tonnage was a problem in other areas as well: plaster, a critical early need, was lost in the deluge and found only weeks later. In some cases the wrong materials were sent, either from misinformation or assumptions about what would be needed. For example, some of the early planes carried burn packs, but burn injuries were virtually nonexistent.

The arrival of foreign personnel, on an ad hoc basis, was another problem. Many came to help but could not speak Spanish (much less one of the Indian languages) and did not have a source of supply. Skills without supporting facilities are useless, or worse, a drag on local people trying to function with too little equipment in the first place. Integrating foreign doctors into

the process at the height of the problem was virtually impossible. This caused further resentment.

The foreign operations that were of outstanding success were those that were largely self-sufficient: field hospitals such as those of the U.S., first-aid stations from Nicaragua, and Mexican field kitchens – with all supplies trucked daily from Mexico. Indeed, a fascinating bit of research might focus on how the Mexican public corporation “Conasupo” (a national food store chain) mobilizes, supplies, and finances an operation such as that in Guatemala where it served 100,000 meals daily in Guatemala City. It was truly an impressive operation.

Perhaps the ultimate example of a lack in communication and resulting misperception involved the sending of food to Guatemala for distribution in the rural areas. The point is that the Indian population does not share our western definition of what is “food”. We had numerous stories of various canned foods (from hams to peaches) being fed to dogs or pigs because, for an Indian, what comes in a can is not “food”. Furthermore, food was not really a critical problem in most rural areas as a good corn harvest had just been brought in, and corn is the staple of the Indian diet. *Distribution* of the existing food supplies was the problem.

## II. RESEARCH SUGGESTIONS AND OBSERVATIONS: GUATEMALA AND ELSEWHERE

As stated in the introduction to this article, this concluding section is devoted to suggesting further research on issue areas which, although specifically related to the Guatemalan case, have implications for earthquake/disaster research in underdeveloped – and especially Latin American – countries in general.

### Housing

On the national level the provision of tem-

porary and long term shelter for the more than 1,000,000 Guatemalan homeless is critical if there is not to be a significant rise in deaths attributable to indirect earthquake effects. As the rainy seasons progress there is danger of major epidemics of respiratory diseases in the areas most affected by the earthquake which, like Chimaltenango department, are high and cool. The problem of shelter poses some other difficulties for the Guatemalan government that bear watching. There was no large-scale program or organization at the national level concerned with housing before the earthquake, and the question of shelter raises the first long-range problem that, apparently, the National Emergency Committee (or its successor) must face. Research here might well focus on the ability of the Guatemalan military government to deal with a long-range and relatively complex issue that does not have the “glory” attached to it that the provision of medical care, food, and water did in the emergency period.

The housing question might also be a good vantage point from which to watch the possible re-emergence of individual ministries and their relationship to the NEC and the president. It was of interest to us that during the emergency period, the NEC was supposed to be the only channel to the president with regard to emergency activities, but we had several local sources indicate that traditionally powerful ministries (Finance and Foreign Affairs, for example) were doing their best to maintain independent lines of access. The point is that a major disaster (or more precisely, the response to it) often changes political and bureaucratic priorities and provides unparalleled opportunities to observe intra-governmental competition over newly evolving functions. The provision of both short- and long-term shelter is usually one of those new functions.

In Guatemala, a further issue of interest was the degree to which external pressures were “forcing” the national government into a housing program. We could see the beginnings

of this in the time that we were there, with CARE taking the role of initiator. In that sense, the housing question was taking on international and transnational aspects, complicating the issue even more.

One particular fact with foreboding implications is that, as we were leaving the rural areas, there were unmistakable signs that many families were rebuilding their homes — with adobe and tile. Despite their own reluctance to do so and a government campaign to discourage such reconstruction, the people were saying in effect that “the government *may* come, but the rains *will* come”. They were rebuilding with the materials available, which they knew how to use and could afford, the implications of which are grim.

#### **Medical Services**

In Guatemala, as in many less-developed countries, hospitals and related medical services in the urban areas are directly modelled on those in the United States or Europe, and as such, their experiences are often of the greatest relevance to medical services in the developed countries. For example, in Guatemala City, the General Hospital would be the logical focus for research on the process and problems of evacuation and temporary, off-site, operation, while Roosevelt Hospital was classic as an overloaded modern facility attempting to give treatment to urban residents as well as to the most seriously injured from the rural areas. Research foci might be how the various hospitals handled (1) their evacuations, (2) the influx and allocation of patients from the outlying areas and the city itself, (3) inter-hospital relations and coordination of treatment, (4) relations with field hospitals and first-aid stations, (5) the operation of temporary facilities, (6) record keeping, and (7) the arrival of foreign medical personnel and supplies. Also, it is our belief that a structural engineer should look at any evacuated facilities because, in some cases, it did not appear that damage was so great as to necessitate the drastic and disruptive step of evacuation. Our question

would be, on what basis and on whose advice was such a decision made?

The Guatemalan case has also brought up some further questions of potentially general applicability, but they are so sensitive that great care must be taken in their investigation. First, we found it perplexing that a high official in the Guatemalan Red Cross did not even know that the Military Hospital had been evacuated, much less its location at the time of our visit. Treading gently, it would be fascinating to explore what relationships there were, if any, between military and civilian medical facilities in Guatemala City prior to and during the emergency period. Second, we had conflicting reports on whether or not private doctors offered their services to emergency medical facilities. Again, this is a sensitive issue, but it should not be avoided solely for that reason.

#### **International Relief**

The Guatemalan disaster again illustrated the problems associated with the more or less unorganized influx of large and varied quantities of relief supplies. The well-motivated but often burdensome results of ad hoc, essentially private, relief efforts point up the need for policy-oriented research in this area. The problem is not so much with the established international relief agencies (CARE, Salvation Army, Red Cross, etc.) but with the deluge of donated goods that arrives, often unannounced and unexpected, at or near the scene of a disaster. Research must be done on this problem so that policy and organizational alternatives can be identified. Sooner better than later, we must develop methods to screen, sort, and if necessary divert, relief supplies as they are collected in donor areas and to define priority needs in a stricken area so that the supplies that do arrive are effective, in the appropriate amounts, and culturally acceptable.

#### **Rural Research**

Given that the major impact of the earthquake

was in the rural towns and villages, these become a primary focus of research, as it was in Guatemala. In such situations it is probably best to divide research into the town's or village's *isolated* period and then the period *after organized assistance arrived*. The questions would be the usual: What did the local authorities do? How and by whom were the dead and injured removed from the rubble, cared for and/or buried? Where was food and water found or supplied, and by whom? How and when did outside assistance arrive? What form did it take and how did it relate to on-going local efforts?

In Guatemala, it would also be tremendously interesting to see how much effort and funds are allocated to reconstruction of predominantly Indian villages versus how much is allocated for predominantly *ladino* towns, especially the *ladino*-dominated market towns which are the point of economic interaction between the two cultures. This issue could focus the latent tensions between the two sectors of the society.

At this point we would like to share some practical thoughts and observations on rural research in underdeveloped countries because in-depth research in such areas is often affected by some very practical considerations: lack of support facilities and, for sustained periods, physical isolation. In Guatemala, the damage suffered by many towns was so severe that one could not really justify consumption of the water, food, and shelter that a research team would need, even if dollars could make such resources "available". Nonetheless, extended and in-depth research is possible in even the hardest-hit towns if a team is prepared to bring enough into the field so as to be self-sustaining and thus neither a physical nor psychological burden on the local populace. Self-sufficiency is the key, however.

The periodic isolation problem of rural towns in countries with weak transportation infrastructures enhances this need for a research team to be as self-sustaining as possible. Consider the fact that in the 1970 Peruvian earthquake there was only one road up the Callejón de

Huaylas, and in 1976 in eastern Turkey, winter made the unpaved roads of the area virtually impassable. As noted previously, in Guatemala the isolation problem is largely a function of the rainy season, but contributing to the isolation of much of highland Guatemala, at least in the near future, is the probability of continuing landslides. There were hundreds caused by the earthquake itself, and the emergency road clearing that we saw undercut many hillsides and thus virtually guaranteed further slides [8]. A large number of landslides also blocked many river and stream valleys, creating major hazards as water built up behind these temporary and highly unstable "dams" and thus threatened downstream communities. Overall, the conclusion was obvious: An essentially foreign research team must be mobile and self-sufficient for both moral and practical reasons.

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Finally, reconnaissance reports are one thing but in-depth research is quite another. It is our hope that this account may stimulate some further research that will be useful, perhaps to the United States but more likely to other developing countries with social and organizational structures similar to those of Guatemala. It will be truly a sad comment if the only research formulated follows the criterion of "relevance to the U.S.," and we witness another, carbon-copy, disaster in Central or South America within the near future. In sum, most of the nations that suffer periodic earthquakes are underdeveloped, not developed like the United States, and it seems to us that social science earthquake research has an obligation to at least attempt to provide useful knowledge to these countries as well.

#### NOTES

- 1 Seers (1969: 2-6) chooses these dimensions as characteristic of underdevelopment in order to avoid reliance on simplistic measures such as gross national product or national income.

- 2 All data presented here are from the Guatemalan government and/or from the United States embassy in Guatemala.
- 3 We were part of a research team that went to that disaster as well. For the results, see Robert W. Kates et al. (1973).
- 4 We wish to thank the United States Geological Survey (1976) for this information.
- 5 For a brief description of this ethnic division, see Richard N. Adams et al. (1960: 238–57). The Mexican sociologist Rodolfo Stavenhagen (1975: 108–16 and 163–233) has also dealt with the issue. For a rather uneven and impressionistic, but firsthand, view of highland Guatemala after the earthquake, see Gerry Nadel (1976: 21–9).
- 6 A similar observation was made by Richard W. Patch (1971: 14) following the 1970 Peruvian earthquake/landslide disaster. He states that “in spite of the hardships imposed by the catastrophe, Spanish-speakers and Quechua-speakers are still very far apart. Many of the latter remain peons. Nearly all have their homes and goods undamaged and some have sufficiently large numbers of cattle to consider themselves wealthier than many now destitute Spanish-speakers of the towns. But increased interdependence has not bridged the social gulf. Quechua-speakers are ‘Indians’, Spanish-speakers are ‘people’. The greatest physical cataclysm of the Western Hemisphere has not changed this relationship.”
- 7 Our thanks to Ms. Janice Pieper, who worked at Roosevelt Hospital for six weeks sorting relief supplies, for this information.
- 8 For example, the United States Army, in its efforts to clear the main highway linking Guatemala City and the Atlantic port of Puerto Barrios, encountered 44 major slides blocking the 300 kilometer-long road and had to remove an estimated 325,000 cubic yards of debris. On this operation, see United States Agency for International Development (1976: 16–7). The road clearing that we saw was mainly in the other direction, toward the rural areas of Chimaltenango and Sacatepéquez, and it was much less sophisticated.

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