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Kingston-Frontenac Fallout Shelter Programme

Exercise "Take-Off"

Public Acceptance of Civil Defense (U.S.)

Digest Master Index

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Contents

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In addition to publishing articles which reflect Canadian Government policy the Digest may also publish articles by private individuals on subjects of current interest to the emergency measures programme. The views of these contributors are not necessarily subscribed to by the Federal Government.

Director: P. A. FAGUY *Editor:* A. M. STIRTON

ROGER DUHAMEL, F.R.S.C.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1965

KINGSTON - FRONTENAC FALLOUT SHELTER PROGRAMME

EDITOR'S NOTE: *The following report on the "Public Fallout Shelter Programme" for the City of Kingston/County of Frontenac, Ontario, was prepared by Mr. Gerard Bowers, City/County Co-ordinator, Emergency Measures Organization.*

Aims

(A) To provide the best possible protection against radiation from nuclear fallout for the approximately 54,000 population of the City of Kingston as the first objective, and as much as possible of the approximately 27,000 population of the County of Frontenac as the second objective.

(B) As Part II of the Kingston/Frontenac Radiological Defence Plan, to ensure the Municipal Emergency Government has available to it, accurate data on actual and expected dose rates, for the population, under fallout. This will enable decisions to be made after consultation with Zonal and Regional Emergency Government Headquarters, on the time and extent of post fallout release from shelter for the population.

Initial Development of the Programme—1963

As a result of surveys of Federal and Provincial buildings within the area of the City and County, protection factors and capacities were known, for these, by the Municipal Emergency Measures Organization early in 1963.

In the 1963/64 Kingston/Frontenac Financial Assistance Project funds were allocated for conducting a Shielding Analysis Survey of certain Municipal and Private buildings in the area and also for conducting a Residential Lodging Survey of the City.

Before these were commenced, a request was made to No. 3 Works Company, Canadian Army, Barriefield, asking for details of the protection factors and capacities of installations within the Royal Military College, Kingston, and Old Fort Henry, if such were available.

This information was provided to the Municipal E.M.O. immediately.

It was thus already known before the Municipal Shielding Analysis Survey started that there was available shelter capacity for 20,424 people in military, federal and provincial buildings with a minimum protection factor of 100 on a 12 sq. ft. per person basis in the Kingston area.

During August 1963 the Municipal Shielding Analysis Survey under the joint supervision of Messrs. W. H. Potts, Radiological Officer, Province of Ontario; D. P. Ross, Commissioner of Works, Kingston, and Prof. J. W. Brooks, Department of Civil Engineering, Queen's University, was undertaken and when the results were received back from the D.H.O. Computer Centre and analysed, it was found that the total minimum 100 PF shelter capacity available had now risen to 34,162.

Unfortunately, owing to a misunderstanding between E.M.O. and Queen's University Faculty of Applied Science, no Queen's buildings were included in the 1963 survey.

During the winter of 1963/1964 the lodging survey was completed and approximately 15,000 lodging facility cards prepared showing, of course, among other information the number of residents at each address in the city.

In view of the number and type of general construction of the buildings comprising Queen's University, and taking into account the fairly large amount of additional new construction, either under way or in the design stage in the city, it was decided to proceed with an extension to the Kingston/Frontenac Shielding Analysis Survey in the summer of 1964.

Further Development of the Programme—1964

In August 1964 the extension to the Municipal Shielding Analysis Survey was undertaken, covering all buildings on Queen's University Campus together with such new buildings under construction in the city which appeared likely to meet the 100+ P.F. specification and certain additional similar buildings which were not included in the 1963 survey for various reasons.

The data sheets on these were processed through the D.H.O. Computer Centre and the results analysed after which the total capacity of 100+ P.F. shelter was established at 61,238 on the same 12 sq. ft. per person basis.

The complete list of 100+ P.F. building areas and the capacities of these are shown on the accompanying Chart 1. The locations of these buildings are shown on the map of the City of Kingston shown with this report.

While the Shielding Analysis Survey was in progress the design of a postal information card (*see page 4*) to be sent to each residence in the city was undertaken. The main features required in the design were:

(1) It should clearly show the location of the shelter area allocated to the occupants of the residence.
(2) Pending possible later decisions on stocking of essential supplies in shelter areas in peace-time it should show the essential supplies people would be expected to bring with them.
(3) The card should give some information on how long the period of shelter might be expected to be and how the release decision would be made known to shelter occupants

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(4) The cards should be able to be mechanically stamped and addressed for ease of handling.

An acceptable design, of which 15,000 will be produced, is shown with this report.

A postal permit for printing the postal frank on the cards has been obtained and arrangements are now in progress for the production of these.

Once the overall figure of 61,238 was known, a meeting of all owners of the buildings concerned was held in the City Hall, Kingston, on 8th October 1964.

At this time the Co-ordinator explained the public fallout shelter programme to them, and officially requested their permission to both designate these areas as public fallout shelters and to so inform the population of the City of Kingston by the issue of the postal information cards.

No criticism of the Programme was forthcoming at this meeting although considerable discussion on space reservation for patients and inmates of hospitals and institutions took place. In addition questions were raised on such aspects as control of shelter populations, measures necessary to ensure areas were ready for use and open at the time of emergency, the means of ensuring communication between shelters and the Municipal Emergency Government Headquarters (M.E.G.H.Q.) and the Welfare and Medical issues involved in this type of operation.

As a result of this meeting unqualified permission has already been officially granted by the owners to the Emergency Measures Organization for approximately 50% of the total of 61,238 capacity, qualified permission has been given for 20% while the remaining 30% is withheld only on the question of space reservation (hospitals, institutions, industry) or because decisions are required to be made by some higher authority.

Future Development Required to Achieve the Aims of the Programme

Once final capacities are known as a result of the setting of space reservation figures and official permission is received for all buildings, the 15,000 postal information cards will be run through the addressograph system of the City of Kingston Assessment Department.

Work will then be started by a team in the city hall on allocating residence occupants to the shelter areas using the residential lodging survey cards and the shelter capacities. As postal information cards are completed to the capacity of each shelter the team will go on to the next shelter and so on until all occupants of residences in the city are covered.

When all postal information cards are ready they will be delivered, as addressed, by the normal postal service.

At the same time as these arrangements are being made, an intensive public information programme will be conducted, weekly, throughout the remainder of 1964, by the Co-ordinator over C.K.W.S.-T.V., C.K.W.S. Radio and C.K.L.C. Radio to ensure the population of the city is aware of the importance of keeping the card in a conspicuous place, going in emergency to the shelter area reserved for them and to no other, and above all, that this shelter programme is designed for what is of paramount importance, namely, their protection in the event of fallout from nuclear attack.

Costs

(A) ACTUAL TO DATE	
Shielding Analysis Survey 1963	
Data collection for PF determination only 2 Surveyors at $2.10/hour	$ 1,050
Determination of capacity of free areas of 100 PF Minimum Shelters	
2 Assistants at $1.50/hour	$ 240
Shielding Analysis Survey 1964	
Data collection for PF determination only 1 Surveyor at $2.10/hour*	$ 260
Determination of capacity of free areas of 100 PF Minimum Shelters	
2 Assistants at $1.50/hour	$ 240
Total to Date	$ 1,790
(B) ESTIMATED IN FUTURE	
Provision of 15,000 information cards for residences in the City of Kingston (including postage)	$ 600
Shelter distribution and insertion of location on information cards	
2 Assistants at $1.50/hour	$ 500
Handling of information cards (addressing)	$ 100
Additional unanticipated expenditures	$ 200
Total estimated cost	$ 3,190

It was found as a result of the 1963 survey experience that pre-planning by the Co-ordinator before the survey started in terms of building selection, negotiation with owners and architects, and programming the availability of drawings permitted a much better utilization of the surveyor's time.

In the 1963 survey it appeared that a substantial amount of the surveyor's time was taken up in arranging for the structural drawings to be made available.

Conclusions

(A) Under this programme protection equivalent to that afforded by a basement fallout shelter in a private home will be available to all residents of the City of Kingston.

(B) It is anticipated that the rate of new construction of university, institutional and municipal buildings, together with the current trend towards large

* Assistance in physical measuring (i.e. Contaminated Plane, etc.) given by Co-ordinator.

apartment block construction will mean that the availability of 100+ P.F. Shelter spaces will easily outstrip the growth rate of population within the foreseeable future.

(C) There are at least seven major building projects offering possible 100+ P.F. protection currently under construction or in the design stage within the City of Kingston and this, coupled with the fact that no use has yet been made of middle floors in high rise buildings, indicates that similar protection will be afforded the residents of rural areas of Frontenac County as the second objective of the programme is tackled.

(D) It is realized that the delivery of postal information cards to all residents will provide only an immediate basic means of survival. There must, of

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KINGSTON/FRONTENAC PUBLIC FALLOUT SHELTER PROGRAMME — *Chart 1*

Shelter Area	*Location*	*Capacity*
DEPARTMENT OF NATIONAL DEFENCE		
R.M.C. Library	Pittsburgh	1252
Currie Bldg.	"	502
McKenzie Bldg.	"	624
Stone Frigate	"	1150
Officers Mess	"	1074
Ft. Frederick	"	582
Ft. Haldimand	"	2319
Yeo. Hall	"	3407
Fort LaSalle	"	1146
Old Fort Henry	"	1876
		13932
FEDERAL AND PROVINCIAL		
Federal Building	Sec. 3	1300
Ontario Hospital		
Admin. Bldg. Wing "A"	Sec. 4	690
" " Wing "B"	"	750
Female Inf. Wing "B"	"	416
" " Wing "C"	"	416
Male Inf. Wing "B"	"	416
" " Wing "C"	"	416
Main Female Wing North Old	"	306
" " " South Old	"	266
Main Male Wing North Old	"	306
" " " South Old	"	266
Main Admin. Old	"	344
" Kitchen Area Old Central	"	250
South Cottage North Central	"	120
Kitchen "E"	"	330
		6592
MUNICIPAL AND PRIVATE		
L.C.V.I. South Wing	Sec. 4	1500
Tech. Wing	"	1161
Kingston Public Library Ad.	Sec. 3	112
Police Station	"	170
Rideaucrest 1962 ad.	Sec. 2	355
KINGSTON GENERAL HOSPITAL		
Connel Wing	Sec. 3	619
Dietary Wing	"	146
Victory Wing	"	437
New Children's Wing	"	221
Main and Watkins Bldgs.	"	224
Douglas Wing	"	251
Richardson Wing	"	50
School of Nursing	"	492
School of Nursing Gym.	"	402
Tunnel Bailie to Empire	"	140
1st Floor Connell Wing	"	363

Shelter Area	*Location*	*Capacity*
HOTEL DIEU HOSPITAL		
Old D.V.A. Wing	Sec. 3	26
Tunnel Hosp. to Laundry	"	272
Tunnel Nurses Res. to Main Tunnel		
St. Joseph's Wing	"	90
Fire Station No. 3	Sec. 4	80
County Registry Office Ad.	2	132
Sewage Treatment Cont. Bldg.	Pittsburgh	33
" " Tunnel	"	50
P.U.C. Truck Storage Section	Sec. 2	101
P.U.C. Gas Sales Bldg.	"	68
Water Purification Plant	3	240
Lucerna Motel Hotel	1	133
House of Providence—St. Josephs Res.	2	841
Capri Motel	1	117
Heathfield		
New add. "A" East-West on N.	4	647
" " "A" East-West on S.	4	
" " "A" Conn. Link	4	
1963 Ad. Bedroom Wing	4	216
1953 Addition	4	176
Old Front Hall	4	357
Old Novitiate Wing		
Bowling Green Apts.	Sec. 4	117
Apy. Bldg. Clergy and Johnston	3	154
59 Unit Apt. Avenue Road	4	249
Pascoe Apts. West St.	3	166
LaSalle Hotel—6 Storey Sec.	2	400
Empire Life Building	3	86
Whig Standard Press Bldg.	"	202
Parkdale Apts.	4	330
St. John's Church	2	380
Q.E.C.V.I. New ad. to Shop Wing	1	305
Aluminum Co. of Canada	"	
Shipping Dept.		334
South Plant—Lock. and Wash Rms.		270
North Plant Offices		47
South Plant Offices E. and W. Wing		140
" " " N. and S. Wing		152
Dupont of Canada	Kingston Township	
Office Building		455
Research Building		430
Tire Yarn Plant		171
Spin and Poly Bldg. 4th Fl.		322
MUNICIPAL AND PRIVATE		
Queen's University	Sec. 3	
Leonard Hall		1499
Morris Hall		895
McNeil House, North Wing		639
" " South Wing		
" " North-South Wing		

Shelter Area	*Location*	*Capacity*
McLaughlin Hall, new add.		150
Craine Bldg.		78
Chown Hall, North Wing		709
" " East-West Wing		
Engineering Drawing Bldg.		398
Dunning Hall		1414
Richardson Hall		880
Ellis Hall		2051
Douglas Library New Wing, Bsmt.		1256
" " " " Sub-bsmt.		
Douglas Library New Wing, Sub-Sub-Bsmt.		
Queen's University (cont'd)	Sec. 3	
New Biology Bldg. N.-S. Wing		1992
" " " Lecture Wing		
Gordon Hall		832
Frost Wing Chemistry Bldg.		255
Nicol Hall		627
Ban Righ Hall, East-West Wing		533
" " " South Wing		
Adelaide Hall, Stuart St. Wing		637
" " Univ. Av. Wing		
Miller Hall, West Sect. Union St.		975
" " East Sect. Union St.		
" " Centre Sect. Union St.		
Physiology Bldg.		325
Anatomy Bldg.		212
Fleming Hall, West Sect.		394
" " East Sect.		
" " Centre Sect.		

Shelter Area	*Location*	*Capacity*
Students Union, new add. N-S. Wing		527
Students Union, new add. E-W. Wing		
Clark Hall add.		367
Etherington Hall, South Wing		760
" " North Wing		
Gymnasium, new add.		146
Students Memorial Union, West Wing		851
Students Memorial Union, Centre Wing		
Students Memorial Union, East Wing		
Students Memorial Union, Reading Room		
Fourth Men's Residence, King St.		1800
Clark Hall orig. bldg		209
Gordon Hall Annex		466
Frontenac County Court House		650
Hotel Dieu Hospital, new wing Bsmt.		691
" " " " " Grd. Fl.		820
St. Mary's of the Lake 1954 Wing	Sec. 4	728
" " " " 1928 Wing		
Parkdale Garden Apts. new bldg.	"	330
Confederation Life Bldg.	3	132
Cleland and Flindall Bldg.	1	554
		40714

Grand Total—61,238

E.M.O.

PUBLIC FALLOUT SHELTER

In the event of nuclear attack the public fallout shelter for this residence is located at:

.....

.....

All residents without an approved private shelter should go there as soon as warning of fallout in this area is received over the radio.

EMERGENCY SUPPLIES

Residents should take with them:

1. All available food in the home.
2. A supply of fresh water.
3. A portable battery radio.
4. A supply of blankets.
5. A supply of fresh clothing.
6. A supply of special medicines if needed (insulin, etc.).
7. Such other *essential* items as may be required.

SHELTER PERIOD

Your emergency government, through the RADEF system, will keep a close watch on the rate of decay of fallout in this area.

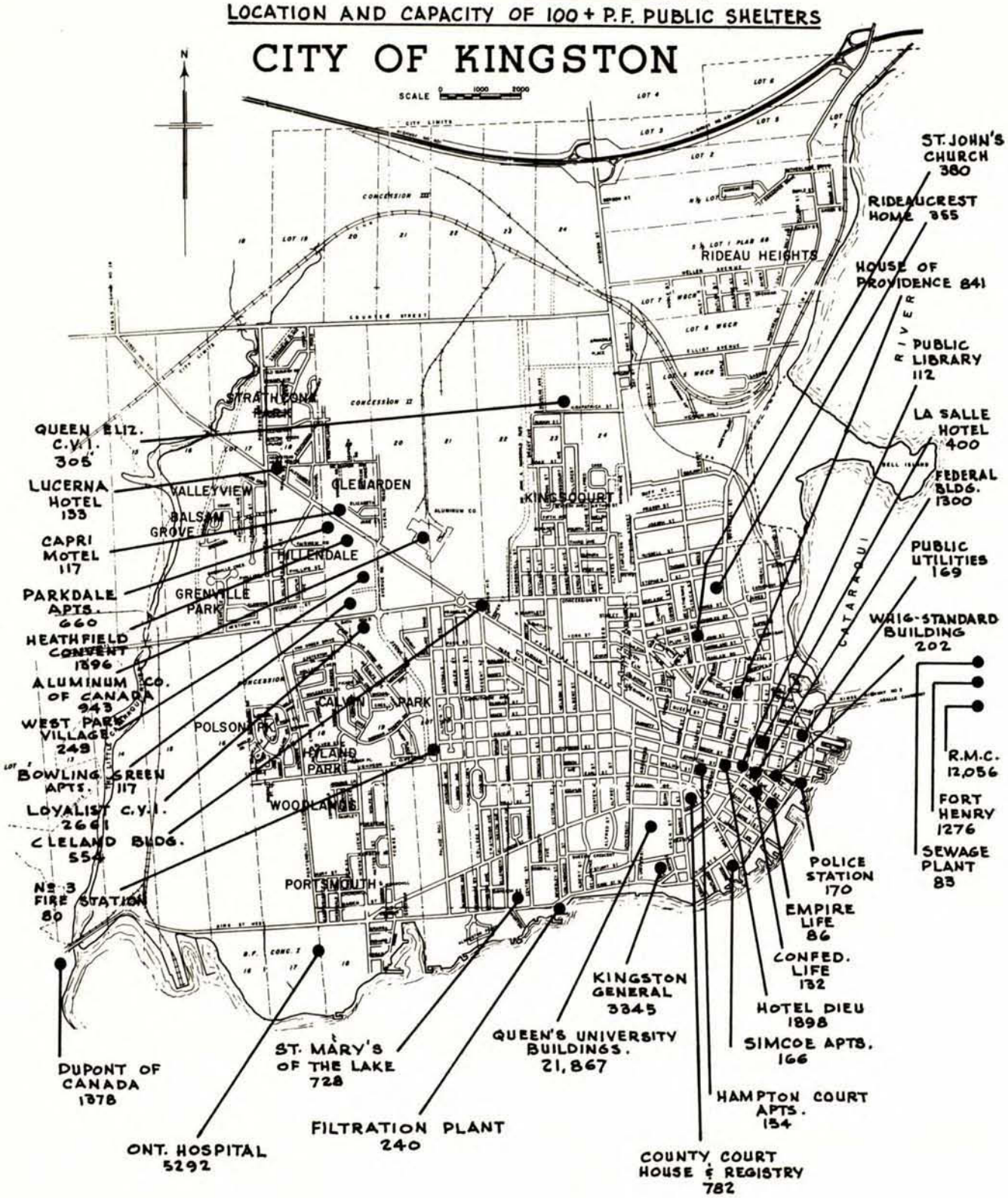
YOUR RADIO WILL TELL YOU WHEN IT IS SAFE TO LEAVE.

CITY OF KINGSTON / COUNTY OF FRONTENAC

JOINT EMERGENCY MEASURES ORGANIZATION

PUBLIC FALLOUT SHELTER PROGRAMME

LOCATION AND CAPACITY OF 100+ P.F. PUBLIC SHELTERS



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THE PROBLEM OF NUCLEAR SHELTERS

By ROBERT L. CORSBIE
WHITE PLAINS, N.Y.

Reprinted from the Archives of Environmental Health, April 1964, Vol. 8, pp. 613-22.

FOREWORD

WE ARE PLEASED to provide this paper for our members and others who are also concerned with preparedness for survival in the event of a thermonuclear attack on this country.

"The Problem of Nuclear Shelters" is an up-to-date examination of a national, local, and an individual problem, by a man with broad knowledge and practical experience in the design, construction, and the testing of shelter systems and their components, and of the effects on occupants of such shelters, under actual atomic test conditions.

NIDM is indebted to Robert L. Corsbie and the Archives of Environmental Health for permission to reprint this paper for limited distribution.

Introduction

Doctors of medicine and architects have in common a responsibility for helping man defend against untoward effects of his environment. This common cause would be aided immeasurably if the professions consulted more frequently than when the doctor needs a house or the architect needs a prescription.

As an architect, it is easy to sum up the normal hazards in the environment which are routinely of concern to the designer of physical structures. These can be lumped in the word "weather," plus fires, floods, and earthquakes. This paper deals with new hazards—those which began when man learned to make an atomic bomb. Some of us, but not nearly enough, have, since 1945, been concerned with the nature and meaning of the physical damage produced by the atomic bursts in Japan. Professional training and prudence dictate that we study and understand the effects of nuclear weapons and feasible countermeasures. We can also call this a matter of good citizenship. Additionally, the taxpayer should be able to appraise the federal, state, and local civil defense budgets and programs and decide whether too much or too little is being done and whether the funds are being wisely spent in a realistic effort to give reasonable assurance of national survival of nuclear attack and postattack recovery.

The Threat and Countermeasures

Much of the nation's confusion in our civil defense posture relates to the miserly support and timid planning to meet the proliferating technologies of weapons development and the possible multiple atomic attack systems of the Soviet Union. In the mid-50's, it was believed that the Soviet Union's stockpile was small and comprised only kiloton atomic weapons with significant damage radii extending only two to four miles. The delivery vehicles of these weapons against this nation were subsonic bombers at speeds of a few hundred miles per hour. Our defenses against the bombers were inadequate, but our warning system was under development and an alert of several hours was predicted within a few years.

This situation changed rapidly. Before 1960 it was generally accepted that Russia had a stockpile of multimegaton nuclear weapons with blast and thermal effects ranging to 20 miles and more. Our 1954 experience in a Pacific nuclear weapons test accident which produced contaminating fallout on natives more than a 100 miles away on coral atoll islands strongly attracted attention to the fallout potential from megaton weapons exploded close to the ground. It was known that Russia had many types of bombers, including supersonic craft capable of delivering a heavy attack on most areas of the United States. The increased effectiveness of our defenses was not good enough to assure that one or more multimegaton bombs might not be delivered on each of our principal military and industrial-civilian targets.

Today, the principal delivery threat is the intercontinental ballistic missile (ICBM), possible submarine-launched nuclear warheads, and second-echelon supersonic manned aircraft. Much has been said in the public media concerning the nature, energy yield, and capacity

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Following World War II, he was a member of the U.S. Strategic Bombing Survey Team which studied the effects of the only two atomic bombs used in war, on Hiroshima and Nagasaki. Mr. Corsbie was responsible for preparation of the official Strategic Bombing Survey Reports on the effects at Hiroshima and Nagasaki. Also, he was the Atomic Energy Commission Co-ordinator in preparation of the 1957 and 1962 editions of the Effects of Thermonuclear Weapons.

He is an internationally recognized authority on the effects of thermonuclear weapons on man and his environment, and countermeasures to such weapons. He has written numerous technical papers, and is widely sought as a lecturer and speaker.

Mr. Corsbie is a long-time member of The International Institute for Disaster Mobilization, and services as a member of its Board of Directors.

of Soviet nuclear warheads and the delivery systems. A short time ago, it was thought that the ICBM's were unreliable in aim and involved such large circular probable errors, together with the small carrying capacity, that the total nuclear threat to the United States from rocket delivery could safely be left to the active military defenses supported by a Civil Defense functioning in the image of armbands and tin hats as in World War II.

Keeping pace with the increasing magnitude of the threat of nuclear attack was the confusion of the citizens on what to do about it. The nation became divided into groups which (1) did not believe that a nuclear war would ever take place; (2) those who did not believe anything could be done about it; (3) those who refused to think about it at all; and (4) a minority which accepted the problems of a nuclear world and believed there were feasible countermeasures that would permit most of the citizens of the nation to survive the impact of the acute phases of nuclear war and the longer, chronic phase, with its complicating effects on man's environs.

The ever-growing threat of multimegaton bombs and shortening warning time of an attack arriving at speeds of 5,000-mph and higher led more to emotional than to logical direction of changes in civil defense planning. The concept of mass evacuation appeared as a cure-all and evaporated slowly. Strategic evacuation was discussed but never realistically worked into a national nuclear countermeasures program.

Before 1960, public interest in the threat of nuclear attack was stimulated by guarded official statements and speculative public media comment on the Gaither Report. The argument seemed to be (1) whether or not there should be a civil defense similar in organization and capacity to the military defense; (2) should a national shelter system be provided to protect the citizenry; and (3) should the shelters protect against the single effect, fallout; or (4) should blast shelters be the countermeasures against all the effects of nuclear reactions in bombs.

The Changing Program

In late 1960 and early 1961, considerable public enthusiasm was observed throughout the nation in support of home fallout shelters. The federal government played the role of guide, developer, and disseminator of do-it-yourself information of some value but mostly impractical in application. This federal view changed by 1962 after the 1961 transfer of most federal Civil Defense responsibilities from the Office of Civil and Defense Mobilization, EO,* to the Office of Civil Defense, DOD. Instead of encouraging joint federal-public action on the part of individuals and industry to build shelters, the emphasis was shifted and the "National Fallout Shelter Program" dragged forth. It was proposed and managed by the new OCD, with the objective of surveying buildings throughout the nation, largely in target areas, to determine which structures met the uncertain but official criteria for fallout shelters. From this program, which is still under way, there has gushed an enormous number of computer cards and a small amount of information relevant to the adequacy of the structures as nuclear shelter.

Despite the increasing range and accuracy of ICBM's, and supersonic speeds of manned bombers, the yields of nuclear bombs in the rocket warheads and bombcases, the probabilities of abort, malfunction, or destruction by our antimissile defenses, this civil defense program seems to have progressed in the belief that although the 20-kiloton 1945 Hiroshima and Nagasaki weapons have increased in yield a thousandfold or more, only fallout has increased proportionally and blast and thermal and initial radiation effects have remained dwarfs of a previous era.

The World War II experience of the United Kingdom in evacuation of selected categories of the population to reduce casualties from conventional bombs provided some basis for our earlier shortsightedness in wasting years talking of mass evacuation of New York City and other areas as a countermeasure against nuclear attack, but no similar experience exists to explain the total national effort to provide shelter against fallout hazards while ignoring the increased range of thermal, blast, and other effects for multimegaton bombs. One must note realistically that both the number of weapons and the yield of weapons are increasing in the stockpiles of the principal nuclear powers. It is difficult not to believe that these powers will be joined by other nations making nuclear bombs in future years. Also, those who have studied the enormous population explosion predicted to add many additional millions of citizens in the next decades know that today's sparsely populated areas can be tomorrow's densely built-up targets.

The objective of the current national civil defense program is to find areas in existing buildings to provide a fallout shelter for every citizen in the United States. If the objective is met, it does not make sense to believe that the enemy would co-operate with ground burst weapons to produce an effect against which exists the maximum defense. Rather, it appears more logical to conclude that a high percentage of the weapons directed would be burst in the air at optimum height to maximize the range of blast and thermal effects, a distance almost double the range of ground burst bombs.

We must not forget that a nuclear weapon was designed to produce principally blast and fire damage. The only nuclear weapons used against human targets were burst at about 2,000 feet above the ground over Hiroshima and Nagasaki in 1945. This height of burst almost maximized the blast and thermal damage and, to a lesser degree, the initial radiation. Of the approximately 80,000 killed and 80,000 hurt in Hiroshima, and 40,000 killed and 40,000 hurt in Nagasaki by the

* Executive office.

effects of these atom bombs, there exists not a single casualty from fallout.

Blast Protection for Priority Civilians

In the hearings on the OCD FY 1963 appropriation in the House of Representatives, we find that OCD will contribute toward the costs of construction of blast-resistant (30 psi) emergency operating centers in states, counties, and cities. The underground federal regional center at Denton, Tex, is of blast-resistant design, and the same is true of the federal center proposed for Harvard, Mass. In the Emergency Operations Center Contributions Program, Class 1, ie, hardened to withstand at least 30 psi, is called for if the center is within five miles of an aiming area containing SAC and ADC operational bases; major airfields with 7,000 foot runways; major military command and control headquarters such as the Pentagon; major harbors, naval bases, and military supply depots; major military installations; metropolitan areas of 150,000 population or more; areas of high concentrations of industry; AEC production facilities; major dams; major power, transportation, communications, and petroleum handling facilities.

Now it could be argued that if the civil defense leadership in these areas requires protection against a minimum of 30 psi, then the public in these areas is entitled to something more than fallout protection. Something is inconsistent. As someone has put it, "What's good enough for a missile and a civil defense director is good enough for a citizen."

From the description of the categories which should have at least 30 psi designed into the emergency control centers we can see that there are major population groups nearby: a city with 150,000 or more people, for example; a major port; major transportation, communications, and petroleum handling facilities; high concentration of industry. All these call for people.

Consistent planning assumptions must be recognized as elements fundamental to plans and the operations which may be based on the plans. Some of us opine that there is one set of assumptions for the highest levels of government, another set for the armed services, another set for civil defense, and still other sets—how many I cannot guess—for the states, counties, and cities, and still others in use by enlightened business and industry groups. Probably all sets have some common factors, and probably each set has unique factors peculiar to it. This condition gives rise to differences in policies and directives and cross-questioning and criticism. I suppose it is also appropriate to recognize that some try to edge forward with no formal assumptions which describe the problem they attack.

There are some incongruent facts which have appeared. In the public statements which have come from civil defense in recent years, there has been a continual restatement of the requirement for protection against fallout radiation. Protection against the initial effects of nuclear weapons has received short shrift. Secretary Pittman's organization has continued this practice. Civil Defense has come to mean predominantly fallout protection, according to public statements. Fallout protection is, of course, essential. It is the minimum. The identification, marking, and stocking of existing shielding locations will be a notable contribution when it is completed. We shall even realize some protection against initial effects in the fallout shelters. Secretary Pittman and his staff are to be complimented for their energetic administration of the shelter surveys. As I have said, OCD has talked about fallout protection to the public. It has said little about the initial effects. However, OCD is thinking about them even though the public statements would not lead one to that conclusion.

I must confess that I cannot understand why the civil defense director of a city of 150,000 should be requested by the government to have a 30 psi control center if he is to help while the government tells the citizens of the city they need only fallout protection. The demands do not mesh.

The Developing Situation

During the 1955 nuclear tests in Nevada we were concerned with the experimental exposure of various items of physical and biological material to the effects of a device having an energy release comparable to 29 kilotons, ie, 29,000 tons of trinitrotoluene (TNT). Today, the advances in weaponry require that we consider defensive measures against explosions in the megaton range, ie, comparable to millions of tons of TNT.

Changes in the delivery system have required that we shift our focus from delivery by the manned bomber to delivery by manned bombers *and* high-velocity missiles. While the yields have been going up, the delivery times—and thus, the warning times—have been contracting.

Fortunately, the picture is not entirely one of foreboding, because the active defenses of the United States have been enhanced. Nevertheless, in the summation, the threat we face today is far more serious than the threat we faced eight years ago.

The prospects of facing this threat are less terrifying if one understands that:

1. All the effects of a nuclear explosion do not occur at the same time;
2. The relative hazards vary with the yields of the weapons;
3. No single condition of burst can maximize all the effects; and
4. Casualty estimates are based largely on free field conditions and will be fewer than predicted.

Since the effects of a nuclear explosion vary with the conditions of burst, it is unrealistic not to talk about all the effects and all the protective measures. There have been times, such as now, when there appears to be an unwise preoccupation with the hazards of fallout. The only nuclear bombs used in war were airburst, and produced combined blast, burn, and radiation in-

juries. Ground burst nuclear weapons sacrifice 40% of burst energy to the ground and maximize only fallout. At optimum height of burst, the ranges of blast and thermal effects of nuclear explosions are significantly increased.

The Effects of Nuclear Weapons

The effects of a nuclear explosion are better understood if divided into two broad categories, namely, immediate and delayed. The immediate effects are those which occur within about a minute after the actual explosion. These include thermal radiation (light and heat), initial nuclear radiation, ground shock, and blast.

The delayed effects are principally fallout and neutron-induced radioactivity. The fallout which comes down within 24 hours is the early fallout. The induced radiation extends only a short distance from the point of burst and decays much more rapidly than fallout.

Surface Burst Weapons Vs Immediate Effects

The immediate effects versus distances and areas for 1, 5, 10, 20, and 50 megaton surface burst weapons are given in Table 1.

Optimum Height of Burst Vs Blast Effects

The bombs exploded over Japan in 1945 were detonated at such heights above the ground as to maximize the blast and thermal effects. Since the fireballs were well above the ground there was no local fallout. This condition of burst minimizes the fallout but appreciably increases the range of blast and thermal as compared with ground surface detonations.

To illustrate the much greater blast hazard, Table 2 shows comparison or ranges of blast parameters from 1, 5, 10, 20, and 50 megaton optimum-height-of-burst explosions with surface burst weapons.

Having a Plan

The consequences of nuclear war are awesome to contemplate but they need not be the end of this country nor the end of the people if we will face up to the problem and make some sensible preparations against enemy attack. The picture is not all black. For example, if we assume the worst, that our whole attack warning system fails to produce any alarm whatsoever and the burning fireball is the *only* warning of attack, people 20 to 30 miles away from a 20-megaton burst

TABLE 1.—*Effects Vs Distances and Areas for Surface Burst Weapons*

Explosive Yield

Range From GZ* for Various Parameters—Mi

Selected parameters, megatons	1		5		10		20		50	
	Dist.	Area	Dist.	Area	Dist.	Area	Dist.	Area	Dist.	Area
First-degree burns	14.5	628	27.0	2,300	38.0	4,550	49.0	7,550	69.0	14,900
Second-degree burns	10.0	314	19.0	1,140	24.0	1,810	32.0	3,220	45.0	6,450
Third-degree burns	7.7	185	15.5	755	21.0	1,390	29.0	2,640	35.0	3,860
1 psi	7.5	178	12.8	490	16.1	820	20.0	1,260	23.0	2,670
2 psi	4.5	64	8.0	200	10.2	325	13.0	530	17.2	920
5 psi	2.8	25	4.65	68	5.9	110	7.5	184	10.5	365
7 psi	2.2	15	3.9	47	4.8	72	6.0	113	9.0	255
10 psi	1.9	11	3.14	35	4.1	53	5.2	85	7.2	162
15 psi	1.5	6.9	2.65	22	3.3	34	4.2	55	5.7	102
30 psi	1.8	4.4	1.9	11	2.4	18	3.0	28	4.1	53
100 rem	1.8	10	2.2	15	2.3	17	2.7	23	3.6	41

* Ground zero.

TABLE 2.—*Comparative Distances and Areas of Surface Burst Vs Optimum Height of Burst*

Range From GZ for Blast Parameters—Mi

Blast Parameters, Megatons		1		5		10		20		50	
		Dist.	Area	Dist.	Area	Dist.	Area	Dist.	Area	Dist.	Area
1 psi	SB*	7.5	178	12.8	490	16.1	820	20.0	1,260	23.0	1,670
	OHB†	13.5	570	23.0	1,660	29.0	2,640	37.0	4,300	49.0	7,550
2 psi	SB	4.5	63	8.0	203	10.2	327	13.0	531	17.2	930
	OHB	8.2	237	14.0	615	17.8	1,000	22.4	1,575	30.0	2,820
5 psi	SB	2.8	25	4.6	68	5.9	110	7.5	184	10.5	362
	OHB	4.3	58	7.4	173	9.4	277	11.8	437	26.0	805
7 psi	SB	2.2	15	3.9	47	4.8	72	6.0	113	9.0	255
	OHB	3.2	32	5.9	109	7.5	178	9.5	282	12.8	513
10 psi	SB	1.9	11	3.14	35	4.1	53	5.2	85	7.2	162
	OHB	2.7	23	4.7	69	5.9	110	7.4	172	10.0	314
15 psi	SB	1.5	6.9	2.65	22	3.3	34	4.2	55	5.7	102
	OHB	2.1	14	3.5	38	4.5	57	5.7	102	7.8	191
30 psi	SB	1.2	4.4	1.9	11	2.4	18	3.0	28	4.1	53
	OHB	1.4	3.4	2.4	18	2.9	26	3.7	43	5.0	79

* SB, surface burst. † OHB, optimum-height-of-burst.

have an excellent chance of saving their lives and avoiding injury if they know what to do and if *they* have a PLAN.

The burst of the bomb will produce the most brillant light ever seen. Although you may have never seen a nuclear explosion, you will recognize it. It is ten times to 100 times brighter than the noon sun on a clear day. The fact that you have lived long enough to recognize the light means that you are a candidate for survival even though you have been exposed to the bomb effects of light and heat radiation.

These effects reach you at the speed of light. The heat radiation lasts for many seconds. In as little as two seconds you can get behind something—seek shade, as from the sun. This may cut the exposure time to one half or less and reduce the injury to something like a bad sunburn. You may save your life in these two seconds by knowing what to do and having a PLAN.

The next thing to know is that the blast wave follows the heat and travels at the speed of sound. At 20 to 30 miles this would give you about two minutes to get away from glass windows and other materials that will break easily into flying debris. You have two minutes to seek cover as if from an approaching hurricane. If you have a PLAN, these two minutes make the blast effect manageable.

After the blast, the next hazard may be fallout. The early fallout comes from the tons of material sucked up into the fireball at the time of the burst. It travels generally downwind subject to wind currents, following a trajectory which cannot be precisely predicted. The fallout does not cover the ground uniformly like a blanket but more like the rain—spotty and uneven.

The early fallout travels at the speed of the upper winds. At 20 to 30 miles it would arrive in about an hour or more if it is going to arrive at all. So, between the blast wave and the fallout, if there is fallout, there is time to initiate action, collect your family, put out some fires, and go to a prepared shelter. The important thing, again, is to have a PLAN—know what you are going to *do* and where you are going to *go*. All the hazards do not confront you at once—they arrive in sequences of milliseconds, seconds, minutes, and hours.

When fallout comes, if it does, it can be as dangerous as the bomb radiation from the fireballs over Hiroshima and Nagasaki. It is the amount rather than the kind of radiation that is important.

Having a PLAN also means having a capability to measure the radiation hazard where you are. Human senses cannot detect radiation—you must measure it to know whether or not you have a fallout problem, particularly in personnel and family-type shelters.

Blast Casualties

The biological effects of blast are usually discussed as:

Primary effects—those caused by increase or decrease in ambient pressures.

Secondary effects—those due to the impact of objects and fragments set in motion by the blast wave.

Tertiary effects—those associated with accelerations and decelerations in the displacement of human targets.

The threshold of primary blast damage to man is about 5 to 6 psi. The former can rupture eardrums while the latter, in a reflective geometry, may produce lung damage.

Secondary effects are anticipated at wind velocities as low as 50 feet per second (about 35 mph), associated with pressures of about 1-2 psi. These missiles produce skin lacerations. Wind velocities of 100 feet per second, associated with pressures of 2-3 psi, propel missiles at velocities to penetrate serious body cavities.

Wind velocities of 400 feet per second, associated with pressures of 7-10 psi, produce serious wounds and fractures.

Tertiary or displacement effects are associated with impact velocities of ten feet per second and above. These are given by over pressures of approximately 5 psi in an ideal pressure region, and lower overpressures in nonideal regions. An impact with a mass of about ten pounds at a velocity of 12-13 feet per second can cause skull fracture.

Burn Casualties

The biological effects of thermal radiation are produced by the release of explosion energy as heat-producing rays.

Flash or flame burns are usually categorized as:

First-degree burns—burns producing redness of skin and generally similar to a moderate sunburn.

Second-degree burns—burns that produce superficial or deep blisters of the skin, and requiring medical care to prevent infection.

Third-degree burns—burns that destroy the full thickness of the skin and require prolonged medical attention.

High yield weapons deliver thermal energy at slower rates than those in the kiloton range, requiring more energy to produce the same effect. A reasonable estimate of the amount of thermal energy (per unit area) from 5-20 megaton detonations to produce skin burns is as follows:

First-degree burns—3-5 calories/sq cm
Second-degree burns—6-8 calories/sq cm
Third-degree burns—9-12 calories/sq cm

Radiation Casualties

In a war situation, neither an acute radiation dose of 200 rad nor a chronic radiation dose of greater than 200 rad will produce significant somatic effects, and healthy individuals will not find the doses operationally incapacitating. Maps and diagrams of fallout pattern show dose rates at various times and we often see 1,000 r/hr and other high levels indicated. After a couple of weeks, the 1,000 r/hr at H+1 hour will have fallen to 1 r/hr or something in that neighborhood. This level of exposure may be genetically important, but genetic effects are not our problem in a national conflict.

Physical Damage by Blast

Incident overpressures of about 5 psi can destroy most brick and wood buildings. Fifty per cent structural damage to similar buildings is anticipated at about 2 psi. Incident overpressures of 10-30 psi produce destruction of all except very heavy construction. Interior masonry partitions are generally severely damaged at low over pressures, more than exterior walls of the same materials, because of perturbed blast environments in reflective geometries.

Overpressures of about 1 psi and lower produce superficial damage to light elements of buildings, break glass and other thin frangible materials. Considerable glass breakage in residences, automobiles, and busses may be expected at 0.1 psi. Damage to large glazed areas has been experienced at 0.02 psi.

Fire Damage by Thermal Radiation

The threshold for ignition to occur in papers and household materials is about 4 calories/sq cm for weapons of 5-20 megaton yield, and about 8 calories/sq cm for dry rotted wood, leaves, and other forest fuels.

Radiological Warfare

Radiological warfare agents can be classed as (1) radioactive isotopes from controlled nuclear reactions and (2) fallout from nuclear weapons. It is possible to produce isotopes of special characteristics to fit tactical or strategic requirements. Stored radioisotopes and by-products of nuclear explosions may well be considered as possible components of the radiological agents weapons arsenal of one or more of the world's nuclear powers.

Shielding is the only method which protects personnel against external radiation, such as fallout. A suitable protective mask will provide respiratory protection against the inhalation of fission products.

Low Overpressure Shelters

Too little attention has been given in new construction and maintenance of existing buildings to design, materials, construction, shelter, and decontamination as bearing on self-protection. Protection against one to ten pounds per square inch overpressure can usually be gained at little additional cost. Clearly indicated is the use of materials more easily decontaminated, more resistant to overpressures, less susceptible to damaging fragmentation and missile production and sufficiently thermal resistant. Such materials are available and competitive in cost with traditional ones.

The impressive benefits from protection against low overpressures is illustrated in a single example. Let us make two assumptions. First, a fallout shelter of the type advocated for use generally as a public shelter will be adequate against blast that does not exceed $2\frac{1}{2}$ psi.

Second, a 10 psi blast shelter may be defined as one that will resist undamaged a pressure of 10 psi but will collapse at 20 psi.

If exposed to the pressures of a 1-megaton bomb—the size is taken arbitrarily—the fallout shelter will collapse in a region with a radius of 7.10 miles and an area of 159 square miles; the 10 psi shelter, in a region with a radius of 1.31 miles and area of five square miles. That is, comparing two areas in each of which one of these types has been used, the blast shelter will protect persons within an additional area of 154 square miles.

If a shelter is at 25 or 30 miles from a major target, a 2 to 5 psi shelter is adequate. If it is close to a major target, anyone who is putting his money into a shelter should know the facts and be able to make for himself the decision as to how much blast resistance he wants to add to his fallout protection.

What is a Shelter

A nuclear bomb shelter for a family, several families, or a larger group is in simplest terms an emergency home for an estimated period of stay. Its minimal functions are:

To provide a specified degree of protection against the assumed environment.

To meet habitation standards for the estimated period of occupancy, and gradually lowered standards for longer periods, or under more severe conditions than assumed in basic design.

The basic necessities for realistic austere living in an emergency situation fall into four categories and priorities:

1. Sufficient air and water to somewhat more than barely sustain life for 14 days.
2. Food, sanitation, medical supplies, light, and radiation measuring instruments.
3. Shelter operations plan, describing procedures for entering, closing, operating, leaving, decontaminating and re-entering the shelter.
4. (*a*) Sleeping accommodations; (*b*) food preparation facilities; (*c*) radiation measuring and monitoring capability; (*d*) first aid; (*e*) standard broadcast receiving radio; (*f*) tools; (*g*) recreation aids (games, books, and gadgets); (*h*) a means of viewing outside (periscope); (*i*) two-way communication (radio, telephone).

Protective Criteria

Desirable minimal criteria for shelter against the effects of war are:

1. *Protection Factor.*—A protection factor at least 100 against fallout and protection against initial radiation to stay within permissible dose.
2. *Construction.*—Construction hardening against at least 2 psi and associated missile and displacement effects.
3. *Thermal Protection.*—Protection against a thermal flux of at least 15 calories/sq cm and associated effects.
4. *Air and Weather.*—Protection against weather, air contaminants, and air exhaustion.
5. *CO_2 Build-Up.*—Carbon dioxide build-up is usually limited to 3.0% by volume for short intervals. It should be less for longer periods.
6. *Carbon Monoxide.*—A small quantity such as 0.5% of carbon monoxide (CO) by volume, permitted in a closed space can be lethal after one hour. As little as 0.1% can produce well-defined symptoms.

7. *Humidity, Temperature, and Air Movement.*—The conventional summer range for comfort varies from 69 to 73 ET.† At 85 ET efficient work is impossible but this may be an acceptable maximum for the expected level of activity in shelters.

8. *Odor.*—A fresh air supply of 25 cu ft/min or more per smoker is recommended.

9. *Sound.*—In experimental programs which identified 17 objectionable items, noise was considered fourth in discomfort, exceeded only by seating discomfort, lack of space, and restriction of water uses.

10. *Light.*—A nuclear bomb shelter functions best when it provides the minimum disruption in normal living. Therefore, the occupants will profit from a cyclic control of light to provide a daily life cycle. Also, light is needed for shelter management, circulation, recreation, and personal hygiene.

† Effective temperature.

The Risk of Exposure

One approach to the shelter problem is to think in terms of the risks which one takes every day and plans to survive. There is risk in walking across streets, or driving a car, or riding in a taxicab or bus, a plane, a small boat, or a ship. So one takes risks every day to live on the ground, under the ground, and in the air. There is a risk in hurricanes, tornados, floods, and other natural disasters. In my assessment of the risks associated with enemy applications of nuclear energy. I conclude that 1 psi is no greater risk than driving an automobile. A small amount of preparation goes a long way to assure, but not guarantee, survival at an overpressure of 1 psi.

I suggest that you accept the 1 psi risk concept and equate it with a 2-4 calories/sq cm thermal effect, which gives a red sunburn. This happens to most of us several times a year—uncomfortable, but not disabling. Then, equate 2-4 calories/sq cm with a radiation dose of, say 100 rem bomb radiation, and 200 rem fallout radiation. The first would be an acute dose and the second a fallout dose, taken over a longer period of time.

In the light of a war situation, these are acceptable risks because they are comparable to everyday risks. So I would take all these effects and equate them with the hazard of going swimming, or fishing in a small boat, or going to a party on Saturday night. With such a rationale, there is established a direction in which to go—for an individual, a corporation, a state, a nation. Whatever is done improves one's chances.

Professional Guidance

But if we have decided on the protection we need at a given location, and we have the funds, are we at last out of the woods? Not quite. We must get someone to design the system. Architectural engineering firms in the United States can handle conventional power plants, telephone centers, office buildings, churches, bridges, hospitals, restaurants, supermarkets, and so on, without too much difficulty. But when it comes to a structure and the supporting utilities and services which can survive and protect people in a hostile, nuclear environment, we are not very well off.

First of all, there hasn't been much protective construction, so the professionals haven't had much experience. Second, the people in the drafting room are not equipped with the reference materials they need to do the job quickly and accurately. We don't have the handbooks, and thus every job is a special job, requiring more study, more calculations, and more time.

The medical, architectural, and other professions must remedy this. The nation can benefit enormously by our attention to design and details while the plans are appearing on paper on the drafting board.

If we are to be a protected people, we shall first require an informed people. This country's total defense is incomplete and meaningless without qualified and responsible organizations of professional leaders to guide and direct our civil system of defense. A capability for reprisal alone cannot guarantee survival. Of equal importance is our ability to recover over the days, months, and years following nuclear war. This is too important to play by ear. We must marshal our professions and combine our talents to assist in this gigantic task. ▲

Kingston-Frontenac Fallout Shelter Programme—Concluded

necessity, be a follow-up in the development of a force of shelter wardens, adequately trained in the management of people under confined conditions, together with suitable welfare and first aid facilities. It is estimated that at least 600 trained wardens will be required to adequately maintain this programme under fallout conditions.

(E) In order that the programme might fulfill its second aim as Part II of the Kingston/Frontenac Radiological Defence Plan it is essential that all shelter wardens are provided with standard operating procedures and adequate means of communication with the Radef Control Centre at the M.E.G.H.Q. In this way under fallout conditions totals of the persons occupying the shelter areas can be provided to the Radef Control Centre where knowledge of the actual shelter protection factors and the existing radiation levels will permit detailed population dose rates to be calculated for emergency government use.

(F) A high degree of co-operation was shown by owners of buildings and architects in the first instance, in their assistance in the conduct of the municipal surveys and later in the granting of permission to plan for, and publicly designate the various shelter areas. This was particularly evident in the case of Queen's University, the Department of National Defence, the Kingston Board of Education, the Aluminum Company of Canada Ltd. and Dupont of Canada Ltd. ▲

EXERCISE "TAKE-OFF"

Prepared for the EMO NATIONAL DIGEST
By Dr. S. H. Kryszek, Director, Emergency Health Services
Department of Public Health, Halifax, N.S.

A CRISP and sunny day dawned on Nova Scotia's South Shore on Saturday, Sept. 26, 1964.

The residents of Hubbards, a summer resort 30 miles from Halifax, arose with anticipation of a pleasant fall weekend before them.

However, there were unusual signs of activity in the grounds of Shatford Memorial School. One could see at a glance that many men and women were in the process of arranging tables, cooking stoves, pots, together with a large fire extinguisher. Already the preparation of food had begun.

What was all this activity? What induced so many people to forego their weekend rest and instead of usual home activities busy themselves with cooking?

It was exercise "Take-Off", the result of prolonged negotiations between the Provincial and Federal governments and years of planning for Emergency Health Services in Nova Scotia.

In June, 1964, agreement was reached between the two governments for the release of Advanced Treatment Centres for pre-positioning in the province. Two problems faced the Provincial Emergency Health Services.

First, where the Advanced Treatment Centres could be stored and secondly, the training of ATC personnel.

Through assistance received from the Director of the Regional Emergency Measures Organization, space for storage was located in two federal buildings.

The second problem was solved by demonstrating equipment to key personnel of each ATC unit and subsequently exercising the ATC's together with all supporting services, indoctrination taking place during planning meetings.

The training Advanced Treatment Centre with a casualty collecting unit was the first to be released. The unit contained all operational equipment packed in wooden cases in order that it could be handled for training purposes. This is not the case with operational units. The equipment was placed in Liverpool on Nova Scotia's South Shore.

Liverpool has had a well-organized Emergency Measures Organization for many years. All services including Health are well trained and well equipped. Queen Memorial Hospital in Liverpool was exercised twice, in the fall of 1962 and the fall of 1963. Dr. Borden Bird is Director of Emergency Health Services for Liverpool and Queens County with Dr. Lloyd MacLeod as his Deputy.

Two meetings were held with the Medical Officer-in-Charge of the ATC and the local EMO Director with regard to organization and administration of the ATC. Subsequently, a demonstration of equipment by functional areas was held for all key personnel. The key personnel consisted of two doctors, one dentist, a registered nurse-in-charge, a transport officer, an administrative officer-in-charge and a registered pharmacist as a Health Supplies Officer.

The first discussion on holding an exercise took place in mid-July, 1964. The initial thought was to exercise the ATC only, possibly moving the unit some distance. However, it soon became apparent that a real benefit from the exercise would be derived only from exercising the ATC in its real operational location.

That location was Hubbards, approximately seventy miles from Liverpool.

It was obvious that organizing full ATC personnel in Liverpool and transporting them to Hubbards would be unrealistic under operational conditions although possible under exercise conditions. The initial phase had to include organization of all auxiliary workers in the vicinity of the operational location in Hubbards.

It became obvious that it would be unrealistic to exercise the ATC without any supporting services. A list of services necessary to mobilize, open, and maintain an ATC was therefore drawn up. The type and scope of casualty simulation was decided upon.

Saturday, Sept. 26, was set as the date for the one-day exercise. At this time of the year in Nova Scotia the weather is reasonably mild, the length of the night and day are approximately equal and the traffic conditions on a Saturday, while not approaching the rush hour, are not particularly easy.

Dr. S. H. Kryszek

The following services in addition to Health were required for the exercise:

1. Emergency Welfare Services (feeding).
2. Communications.
3. Transportation.
4. Police.
5. Fire.
6. Higher Control.
7. Casualty Simulation.

Personnel and equipment for all these services had to be secured. The municipal organizations in the area had to be invited to participate and to mobilize such services as they could provide.

A meeting was called in Halifax of representatives of EMO's of the City of Halifax, Halifax County and the Provincial Offices concerned. A list of responsibities was drawn up and allocation of those responsibilities to various municipalities involved was agreed upon. The EMO Director of the City of Dartmouth was also invited to participate.

Shatford Memorial School in Hubbards. which was both the operational location of the ATC and the site of the exercise, is located close to the border of Halifax and Lunenburg Counties, with only Halifax County organization being active. Halifax County had to produce auxiliary health workers, stretcher-bearers, welfare services, part of the transportation, secure use of the building both for the exercise and for casualty simulation, supply volunteer casualties and RCMP assistance.

The City of Halifax provided communications.

The City of Dartmouth assisted with transportation while the Town of Liverpool was responsible for transportation of the ATC with Liverpool personnel and for auxiliary police service.

Miss Elelyn Negus, R.N., Camp Hill Hospital, Halifax, N.S., simulating eye injury on Stephen Killam, High School student of Black Point, N.S.

Provincial Headquarters took on the responsibility for overall co-ordination, for casualty simulation, for equipment which was not in possession of the municipalities, for purchase of expendable supplies required for the exercise and for technical advice and assistance in all matters.

Following the meeting an operational instruction was issued. In that instruction, all the decisions taken at the regional meetings in Liverpool and Halifax were compiled so that each municipality knew the extent of their responsibilities.

Two more regional meetings were held in Liverpool and Halifax. Various details were ironed out and administrative information supplied.

Finally a full-dress meeting of all municipal organizations taking part in the exercise, the Provincial Headquarters and the Provincial Co-ordinator was called on Sept. 2.

At this meeting all the municipal organizations reported on the progress in their planning and preparations necessary. A co-ordinating discussion was held and the outline of the exercise settled. The fact that all four municipalities involved were capable of producing all the services required was encouraging.

Provincial Headquarters provided cooking equipment and arranged for purchases of food supplies and eating utensils. These purchases were basically made in the area of the exercise at Provincial Headquarters' request.

Following the final conference, an operation order was issued. The exercise, being the first of its kind, was given the code name "Take-Off."

The order included all routine parts: mission, execution, administration and co-ordinating instruction. Detailed timings were given, although it was realized that under actual field conditions the timings may not be quite realistic.

The operation order was distributed to all officers responsible for any field or administrative functions. No complications arose during the last three weeks prior to the exercise, during that time all previously made arrangements were confirmed. Invitations were sent to a number of officials, to Emergency Health Services in Ottawa, and to central zone ATC key personnel.

Press coverage was assured, with all media in the province well-informed by means of press releases issued by the regional EMO office and the Provincial Health Department. Television coverage of the actual event was scheduled with the local CTV station, CJCH.

An interview the evening preceding the exercise on the CJCH-TV news program "Dateline" informed the public as to the type and scope of the operation. Well-known news editor, Joe King, asked the Director of Emergency Health Services for the Province pertinent questions about the exercise.

The final meeting on Friday evening, Sept. 25, was held in Liverpool in which the senior ATC personnel, the Liverpool EMO Director, the Director of Emergency Health Services and the Emergency Health Supplies Officer participated. Discussion centered mostly on technical details with the problem of concentrating on the exercise as an end in itself instead of the actual operating conditions the main highlight.

Exercise "Take-Off" commenced Saturday morning, Sept 26, bright and early.

At 6:30 a.m. in Liverpool, Dr. Bird, the Medical Officer-in-Charge was alerted and the personnel fan-out began.

At 8:00 a.m. in Hubbards, welfare workers reported to the school yard and began their preparations for a mid-day meal for 100 persons.

Higher control was set up in a radio van at Black Point, approximately four miles from Hubbards near the Black Point Fire Hall, where casualty simulation was to take place. Two other radio cars proceeded to the ATC convoy staging areas to await the arrival of the convoy.

D. C. Johnson (L) of Maritime tel. & tel., communications officer, City of Halifax, and W. S. Curran, (r) assistant director, City of Halifax E.M.O., in the higher control radio van.

Loading of the ATC equipment began at the federal building in Liverpool at 8:10. It is estimated that a complete ATC could be loaded in 55 minutes. The ATC convoy left Liverpool at 9:15.

The convoy reached the first staging area in Bridgewater at 10:25 and was met by a radio car. From then on radio communications were maintained throughout. The second staging area in Chester was reached by 11:20 and a second radio car joined the convoy.

The ATC arrived in Hubbards at 12:00 noon, approximately 30 minutes earlier than expected. By then the higher control was in operation. The emergency meal consisting of stew, doughtnuts and coffee was served at 12:30 p.m.

Following the meal, the ATC personnel and auxiliary workers began setting up the ATC. At that time RCMP and auxiliary police were on the job.

Mrs. Marjorie Maynard, R.N., attending a "casualty" with the assistance of voluntary workers.

Casualty simulation began at the Fire Hall in Black Point at 1:50. The ATC was set up by 3:00.

The first load of casualties left Black Point at 3:50 and processing of the 50 casualties was completed at 5:25.

The evening meal was served for approximately 200 personnel at 5:40. Equipment was packed and loaded by 6:30. The personnel, except senior key personnel, and equipment left for Liverpool at 7:00.

Debriefing and critique began at 7:05. All senior ATC personnel, municipal directors involved and provincial EHS representatives took part in this final meeting, which was completed at 8:10.

This exercise can be termed a success not because of its relatively smooth progress and operation but because we have learned some important lessons.

The first of those lessons—and perhaps the most important one—was that we cannot count on improvisation. Detailed planning must be applied to actual operations just as much as to an exercise. With the exception of casualty simulation, it would be difficult, if not impossible, to operate an ATC without the same supporting services which took part in this exercise.

Feeding is very important—how important we can see from the exercise itself. Police service is essential—if order is somewhat difficult to maintain on a nice day under peacetime conditions—it would be much more difficult in the event of a nuclear explosion.

Auxiliary workers must come from the vicinity of the operational site of the ATC. Mobilizing and transporting a staff of 150 under emergency conditions would be next to impossible.

One item which was frequently discussed, communications for the Advanced Treatment Centre, received a good try out. It is our considered opinion that Advanced Treatment Centres should be on the communications net. Even in the limited exercise when the number of casualties was known, the timings preset and there was no real urgency, the radio communications were a very important factor in the operation of the unit. Without them the ATC would have been blind and deaf, not knowing what to expect.

Next it must be emphasized that if more than one municipality is involved in operating an Emergency Health Unit, the municipal directors must get together and divide the responsibilities and planning for supporting services. This was necessary for this exercise and it will be even more essential for the operational purposes. The exercise showed that it can be done very efficiently. Moreover, this joint planning for health units may be extended into other areas with wider co-operation between municipalities.

W. S. Crowell, St. John instructor and casualty simulator from Liverpool, N.S., putting finishing touches to a "knee injury" On Ruth Publicover, High School Student, Hubbards, N.S.

We were very pleased with the performance of first-aiders and home nursing graduates. They were largely untried as far as major exercises were concerned, they appeared quite efficient and enthusiastic and it is considered that they can do a good job in an actual emergency.

Professional services functioned faultlessly during the exercise. As far as preparing the exercise itself is concerned, we were very well satisfied with performance of such services as casualty simulation, recruiting of stretcher-bearers and other auxiliary workers. All it requires is an interested EMO Director or good service chief, whom we were fortunate to have in this case.

One side benefit obtained from this exercise was production of a draft ATC Operational Manual. The ATC personnel requested some printed material in the form of a manual for use in preparing the exercise. As such a manual was not available at the time, one was prepared by the Director of Emergency Health Services with the assistance of G. A. Reno, Ph.C., Provincial Emergency Health Supplies Officer and F. Lorraine Cluett, R. N., Provincial Emergency Health Services Nursing Officer. The exercise has pointed out certain weaknesses in the manual which will be amended in the next draft.

The Provincial Health Department intends to exercise each prepositioned Advanced Treatment Centre in a similar manner as soon as it is placed in the field. This will provide a good idea of the operational ability of these units and will no doubt increase their operational potential.

Appreciation is expressed to G. A. Reno and Lorraine Cluett for their assistance in preparing this article, and to Ann O'Neil for help in editing. ▲

ISSUES IN PUBLIC ACCEPTANCE OF CIVIL DEFENSE

EDITOR'S NOTE: The following address was presented to the United States Civil Defence Council Annual Conference in 1964. It was prepared by JIRI NEHNEVAJSA of the University of Pittsburgh.

MY TIME with you is too limited to permit me to cover all the pertinent issues that might be on your mind, or those which I would like to share with you. Thus I must be highly selective.

I need not emphasize that your task has been an unenviable one and will probably continue to be extremely difficult. I need not stress that your task is also a vital one, a job essential in the interest of national security in days in which hopes and fears intermingle to produce the intellectual and emotional frustrations which mark our times.

I stand before you as a behavioral scientist. In this sense, I come from the soft sciences, as they are sometimes referred to. Often, you may raise an eyebrow and ponder what it is that we can offer you. On the other hand, you may often expect more from us than our state of knowledge, or our competence, can reasonably deliver.

My objective is not to defend the rationale for social-psychological research into problems which relate civil defense to our society, or that deal with attitudes regarding civil defense and bear upon its adoption, or that deal with the dissemination of messages whereby you would seek to educate our public to the needs of the times.

Let me make a somewhat unorthodox statement instead: I suggest that you hear too often from scientists about data, for instance those which deal with weapons effects, or anticipated casualty rates, or recovery requirements, as being potentially accurate within a factor of five, or ten, or twenty, or even more. As a behavioral scientist, nothing that I will say today will be less accurate than within a factor of .05, and usually, within a factor of .03 or less—and the odds that I am right are about 95 in 100.

Nonetheless, do not underestimate nor overestimate the importance of what I am about to say. First of all, I will consider a few major arguments that bear upon civil defense programs, and suggest the kind of evidence that seems available about them. Secondly, I will pay some attention to the kinds of civil defense systems which have been studied and about which our fellow citizens have various opinions. Thirdly, I will attempt to draw a few conclusions which may have some practical implications.

But before I delve into these specific issues, I would like to mention the kind of program which we have been engaged in at the University of Pittsburgh. As of now, we are beginning a second year of evaluating the nature of interactions between civil defense measures and our society. To date, we have scrutinized the available literature to identify the kinds of arguments which have been made about civil defense. In particular, we have been interested in them as a short of series of propositions which state that *if* we adopt various kinds of civil defense measures, certain social, psychological, economic, and poltical consequences might follow.

We have also assembled materials which provide much of the available evidence which has to do with these arguments. That is to say, we have been building up a capability to ascertain whether the arguments, no matter how well intended or how vocal or what not, are also valid, and the conditions under which they may be valid. This effort is continuing and we are expecting to be able to evaluate systematically the impact of various civil defense systems upon our society under alternative conditions of the international environment.

We have also been responsible for the conduct of the 1963 national survey on attitudes and beliefs about the cold war and civil defense. In this study, completed in that fall of 1963 and now in the final reporting stage, a probability sample of 1,500 Americans was studied with the field work accomplished on our behalf by the National Opinion Research Center of the University of Chicago.

In conjunction with this task, we have developed a major data bank bearing upon all the relevant problems; that is, problems of civil defense, peace and war in general, arms control and disarmament. At this time, we have accumulated data from some 300 studies, local, regional, and national from 1945 on with special emphasis on research pertaining to civil defense problems. These are studies conducted by other contractors of the Office of Civil Defense and its ancestral organizations, as well as by other researchers and

research organizations for reasons other than those chiefly pertinent to civil defense.

This data bank is now being so organized that we will be in a position to answer systematically any inquiry on which knowledge is available, and we ought to be able to do this with increasing accuracy and speed. Furthermore, it is a data bank into which feed materials from current contractors of the Office of Civil Defense in the social-psychological area, and also one which, in turn, provides relevant data to the major OCD contractors in this domain of emphasis, such as the Iowa research of Beal and Bolen, the Michigan State research of Berlo and associates, the Cambridge effort of Ithiel de Sola Pool, the Columbia University work of Gene Levine.

Last but not least, we are now in the final stages of generating an instrument to be used in a nationwide 1964 study which, in addition to traditional peace and war and civil defense probes, attempts to consider the complex interactions of active and passive defense measures.

Let me not pursue this too far. Perhaps I should add that we have completed a study of the public acceptance of the NEAR receiver and the NEAR warning system. I am sure that you will see copies of our final report soon, and I will not elaborate on this any further.

It has been asserted frequently that Americans believe that there is no need for civil defense measures. As best as I can tell, perhaps about 1 in 25 Americans subscribe to this general belief although the last specific data on the subject come from the mid-fifties in the University of Michigan studies. In our 1963-1964 NEAR system study, we probed into projected needs. The respondents were asked what the likelihood was that the nation might not need civil defense because arms control or disarmament measures will make the use of thermonuclear weapons impossible. With respect to a five-year time frame into the future, some 24.7 percent of the respondents consider this more likely than not; but, in fact, only some 6 percent think this alternative very likely or almost certain.

We know of no evidence at this time which would indicate a widespread or even a large minority-related view to substantiate the position that civil defense measures do not seem needed by our population.

Nor is there evidence that Americans believe that civil defense programs would be ineffective. The late 1961 study of Dr. Berlo and associates shows that 43 percent of the eight-city respondents thought that even fallout shelters gave them a very good chance to survive if their city were not directly hit in an attack, and an additional 33 percent believed that they had "some chance" with fallout shelters to survive the holocaust. Steve Whitey's late 1961 study shows that 37 percent of the respondents cited *shelters* as a way to protect themselves in the event of an attack and these were answers to an open-ended probe at that. An additional 24 percent answered to a subsequent probe that shelters would help to make an attack on the United States less damaging. In a similar vein, 66 percent cited the life-saving potential of shelters as their major advantage.

In our 1963 national study, 20.6 percent of Americans believed strongly that shelters provided some chance of survival, and another 69.9 percent agreed with the statement, although not strongly. Asked whether they agreed strongly, agreed, or disagreed with the proposition that people would have a very good chance of surviving if a fallout shelter were far enough from the blast to avoid primary weapons effects, 94.3 percent of our respondents agreed strongly or agreed (although by far, most were not strongly convinced of this: 21.2 percent strongly agreeing, and 73.1 percent agreeing but not strongly).

Whatever shelter systems can or cannot do, it seems extremely obvious that it is not possible to conclude that the available evidence supports the notion that Americans believe civil defense measures ineffective. We are not here to evaluate whether our fellow citizens are right or wrong in their opinions in terms of the technical facts of thermonuclear warfare and protection against it. But one thing is certain indeed: Americans are convinced, to the extent of two out of every three or even more, that shelters would help if we were attacked. One in ten may not share these views.

It has often been asserted that civil defense programs induce, or heighten, anxiety levels and, in particular, among chldren. In an earlier national survey of the University of Michigan, 91 percent of the respondents believed that children ought to be taught in school what to do in the event of a nuclear attack (most of these respondents, 67 percent, answered that this "probably" ought to be taught). Probed further whether children ought to be taught about these things even though this might frighten them, 67 percent of the respondents argued that they should; and an additional 13 percent responded in the affirmative with qualifications. Furthermore, 21 percent of the interviewees thought that teaching children about civil defense might actually or probably scare them; and 58 percent did not think so.

From the New Mexico Abo Project come new data of 1963. Frank Lutz has reported that anxiety levels at the underground elementary school actually tended to be lower than those in the other two schools studied for control purposes. In any event, the data could not

possibly support the conclusion that anxiety associated with going to school in an underground facility, which also is known to be a shelter, was greater than in other school buildings, or that it was increasing.

In the late 1961 research of Professor Withey, the respondents were asked both whether shelter programs would make war more likely or less likely. Nineteen percent of the respondents in the national sample thought that war would become *less* likely, whereas 5 percent thought that it might become *more* likely. But particularly important are answers of those interviewees who responded to both the war-more-likely and war-less-likely probes by saying that shelter programs are irrelevant from the vantage point of war probabilities. Almost two out of three Americans argued this case; only 1 percent believed that shelters would be provocative to the Soviets, and 8 percent thought that shelter programs would contribute to deterrence in a positive manner.

Professor Berlo reported that 75 percent of the eight-city respondents disagreed with the proposition that shelters would make war more likely, and 16 percent agreed with it. This result, too, runs counter to the stereotype often found in lay literature as a major argument against civil defense measures.

In our own 1963 national studies, we find a similar picture. We did not ask whether war would become more or less likely. But we did ask how likely international violence was; and also how likely and desirable various shelter programs would be. The correlations tend to be all positive; that is, there is a slight tendency for people who think war more likely to consider various civil defense protection systems more desirable. But the coefficients are very small and the war likelihood accounts for only a few percent of the variation in desirability of alternative shelter systems.

In the late 1963 and early 1964 NEAR system study also based on national data, we find the same response pattern. Regardless of war expectations, desirabilities of various shelter systems are about the same. The correlation coefficients, too, are of the same order of magnitude as they are from our mid-1963 survey.

Be that as it may, the case that civil defense measures would increase the likelihood of war would be extremely difficult to substantiate from the available evidence. Similarly, even the case that expectations of war and desirabilities of protective systems correlate would be very difficult to support with hard data. On the other hand, over 43 percent of the 1961 respondents from the Michigan University study stated that war would have to seem just about unavoidable if they were to go into shelter construction. This might mean indeed that a rapidly stepped-up program of national civil defense may make war appear more likely, and that quite a few people would be inclined to believe that the Government's move to rapid civil defense preparedness reflects some war probability on which information is unavailable to the public.

I will pursue one more line of thinking. It has been frequently stated in the lay press that civil defense measures conflict with our national peace objectives.

Some 25 percent of our fellow citizens expect that the cold war will end in disarmament. Some 44 percent of our respondents also believe this to be the most desirable ending of the cold war, and about as many interviewees think that disarmament is the primary objective of the United States. About 9 percent of the Americans consider disarmament to be, also, a primary Soviet objective.

Is there a conflict between beliefs regarding disarmament and the desirability of civil defense systems? There is *no* evidence of such conflict which seems available at this time.

Our own studies strongly suggest that regardless of disarmament expectations, or even regardless of disarmament desires on the part of the respondent or as he projects them to the United States, the pattern of desirabilities associated with civil defense alternatives remains unaltered. That is to say, that whether people expect or even desire disarmament to end the cold war, their responses regarding civil defense measures are just about the same.

Furthermore, comparing our results of mid-1963 before, during and after the test ban treaty agreement does not lead to different conclusions about civil defense at all. Before July 21 which marks the announcement of impending treaty negotiations, between July 21 and 25 when Mr. Harriman was negotiating in Moscow, and after July 25 when a successful atmospheric test ban treaty was announced, the data on desirabilities of alternative civil defense systems simply do not differ from each other.

The data that we know of at this time do not lead to the interpretation that a conflict exists between the nation's efforts to reduce effects of nuclear weapons by making their use unlikely if not impossible, and between efforts to reduce the effects of such weapons by providing reasonable protection of our citizenry against them.

In other words, there is nothing that points to a contradiction between our objective to save Americans in the event of a nuclear attack, and our goals to attain viable agreements along the arms control and disarmament spectrum.

Of course, there are many arguments that bear on the civil defense issue. I will cite one more example,

not for the sake of exhaustiveness, but because it may be an important one.

Two in three Americans, as our mid-1963 study reveals, claim that people would help each other in the event of nuclear attack and one in three think that our people would be primarily concerned about themselves.

This means, of course, that some 33 percent of our fellow citizens believe that other Americans are rather selfish: they would chiefly cater to their own needs. We know from other research that these so-called projective questions reflect the personal opinion of the respondent rather well. Hence, we can say that about one in three Americans might display behaviour leading to attempts at self-preservation, possibly family-preservation, but not much more. On the other hand, two out of three of our compatriots volunteer the information that Americans would help one another.

No matter how pessimistic a picture you may wish to adopt, it would be hardly justifiable to conclude that in the event of a thermonuclear war upon our country, we are likely to turn into barbarians. You may wish to suggest many other alternative interpretations; but the image of the savage man-to-man struggle simply does not make much sense in the light of the available data.

One more topic should be explored. It has been stated repeatedly that our public is actually apathetic about civil defense. This seems to be both valid and invalid. But the problem relates more to particular civil defense systems than to civil defense in general.

It is valid in the sense that the nation has experienced a major drift from concern, and usually lack of it, with private shelters to a concern with public facilities, and that the private shelter program would be difficult to evaluate as a success.

Yet, we find that about 2 percent of Americans have shelters in their homes. This figure is identical with the Columbia University results of Professor Levine. Professor Berlo speaks of 1.4 percent of people who have some type of shelter in the eight cities sampled.

An additional 20 or so percent of the respondents are claiming that they have made some quasi-shelter arrangements; these are either in their homes, or else in the neighborhood.

No matter how one looks at the nationwide distribution of shelters resulting from private initiative, one conclusion seems inescapable; it is not at all clear how many of such shelters are effective by technical standards of protection requirements. Probably, most are not.

Yet, this is not the point at issue. Rather, we are speaking about the evidence of popular apathy, and we find such evidence fairly contradictory. The 1963 Columbia University study, or the 1961 research of Stephen Withey, indicate that civil defense issues lack urgency and saliency. They are not among the most prominent problems of the day that our populace worries about. They are, in fact, among the least interesting issues which call for public attention.

I consider Dr. Levine's tentative explanation of this particularly relevant. Dr. Levine suggests that the issues which are most salient for our population are those problems for which no visible or clear solution is available. In civil defense, the solutions are as obvious as they are publicly accepted; hence, the public does not worry about civil defense because basically all problems seem to have been solved, and all that is needed is to implement the solutions.

But again, whatever position you take, the data on public apathy are ambiguous. By some measures, such as the willingness to volunteer for civil defense work, our public is anything but apathetic.

By other measures, such as performance and even attitudes regarding private shelters, our public is anything but enthusiastic. The nature of the measure, in this respect, greatly influences the result we get.

I would like to discuss each of these issues, and many others, with you at great length. But I cannot do this in my brief presentation.

Let me, therefore, summarize our results about the kinds of civil defense systems our fellow citizens would like to see.

First of all, there is no doubt about the fact that Americans would like to protect schools, or if you wish, children in schools. School shelter systems get a strong endorsement which must not be neglected.

Secondly, our citizens express strong beliefs that the surveying, marking and stocking program has worked. They like the program perhaps without realizing its ramifications. We know, for instance, from Withey's research that above-ground facilities are considered a poor risk even if some such buildings survive the initial onslaught. People simply do not know enough about the behavior of fallout to be adequate, or even reasonable, judges of where and when they might find adequate protection.

Thirdly, our citizens distinctly prefer public over private facilities. However, this does not mean that national state or community programs of shelter identification, improvement, or construction would not trigger off a wave of interest in private shelters. There are enough Americans who would rather be in private than public shelters if they had to go anywhere—perhaps some 40 percent of them or even more as of the middle of 1963.

Fourthly, our citizens prefer Federal responsibility. They distinctly prefer Federal funding, and there is no evidence that they might shy away from the kind of Federal control this could entail. In our own studies, this comes clearly in the forefront of the basic belief systems. In Withey's research of late 1961, there are

more people who feel that the responsibility ought to be Federal than there are respondents who single out any other alternative.

If anything, on top of Federal leadership, our respondents, as well as those of Withey in his national survey of 1961, are arguing about their own *involvement*. Few are interested in state or community dominated programs. The bulk falls between Federal and personal orientations.

Fifth, our fellow Americans are least receptive to private shelter programs financed by themselves; nor are they enthusiastic about private shelters which might be built with some form of Federal financial aid, direct or indirect.

Sixth, our studies show that people already think that we are spending more money on civil defense measures than we actually are. Our median comes to about $4.40 per man, woman and child, and this is well above the total of annual Federal, state, and local expenses all combined. What is even more important: our population expresses the view that we ought to be spending actually much more than they think we are spending. The median desired expenditure comes close to $21 per person, and this, of course, matches the requirements of only the most ambitious programs seriously contemplated by our Government for the future. That is, the $4 billion program per annum which provides full fallout protection along with adequate blast protection around military installations and potential target cities. It also comes close to an estimate which involves a full fallout protection system coupled with anti-ballistic missile defense around the nation's military installations and potential target cities.

These are the most demanding options which Secretary Pittman suggested in his analysis of national need before the Armed Services Subcommittee last summer.

Let me conclude with a few implications which I think the research findings have up to date:

1. I think that our studies, along with the Michigan research of past years, the current Columbia University, Michigan State University, and Iowa efforts, substantiate the conclusion that civil defense is quite popular at the attitudinal level. You need not fight existing public resentment, even though you may be faced with opposing, small, but at the same time very vocal minorities.

2. I must add that because people desire various civil defense measures, you should not assume that this makes anything you try to do justifiable. Rather, in addition to the public pulse which is in favor of civil defense in at least two out of three, or even three out of four cases, you must continue questioning the technical value of any program, and you must continue probing how we can best improve our capability so that the nation is not eventually frustrated and disappointed.

3. I think there is overwhelming evidence that you can stress the importance of protective measures in schools. There is enough reasonably good evidence, with nothing to the contrary, that you can say that anxiety levels of children will simply not be affected in some intolerable manner.

4. I know that you share with all of us the aspirations for a better world, a world without the threat of war. It is important that you not be in conflict with, or appear to be in conflict with, those measures that lead to the relaxation of tensions, particularly those which our Government through the Arms Control and Disarmament agency considers both desirable and feasible. I think that you wish to keep instilling in our population the conviction that you and the Office of Civil Defense are not competitors of ACDA, and also, that you can offer a significant contribution to arms control. Professor Eugene Wigner, one of our nation's most distinguished physicists and this year's Nobel prize winner, under whose leadership I was privileged to serve in the National Academy of Science civil defense study of the summer 1963, is entirely correct in suggesting that the kind of weapons effects reduction due to civil defense measures is permanent in nature, whereas even good measures of political control that are negotiated depend on the whim of the enemy to abide by the respective treaty agreements.

5. I think that you have a major educational job facing you. Our people expect their towns to be targets of an enemy attack in the event of war. Perhaps this is the kind of pride that cannot admit that one's town may not be that terribly important from the vantage point of the Universe, or even cold war strategy. Our people are misinformed, although their intuitive judgments about the likely world, the desirable one, about what can be done and ought to be done are exceptionally sound. The public tends to grossly exaggerate, or shockingly underestimate, the behaviour of nuclear weapons. Our public is entirely unsure as to what a nuclear war might mean—a year after its termination, a few years thereafter, or a decade or more following it. I think therefore that yours is the awesome burden to lead our public, neither to an easy optimism, nor to undue pessimism, but to the realities of the troublesome, and perhaps frightening, years to come.

6. I think that you have a vital job in the domain of our nation's security and survival. My colleagues and I share this task with you. We hope to help prevent a holocaust which none of us desires; but should it be imposed upon us, whether we survive as persons or not, we all wish our nation to survive, recover, and prosper. ▲

EMO NATIONAL DIGEST

MASTER INDEX

1961

1962

1963

1964

If undelivered return to:
EMERGENCY MEASURES ORGANIZATION
Daly Building,
Ottawa, Canada

CANADA
POSTAGE PAID
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