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**T H E A T O M B O M B I T S E F F E C T S & H O W T O
M E E T T H E M**

P A R T 5

“EFFECTS ON PERSONNEL”

F I L M S T R I P C . D . 3 5

L E C T U R E N O T E S



L O N D O N : H E R M A J E S T Y ' S S T A T I O N E R Y O F F I C E

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THE UNIVERSITY OF CHICAGO
DEPARTMENT OF CHEMISTRY
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NOTES FOR THE INSTRUCTOR

1. THE INSTRUCTOR

The qualities required in a good instructor are as follows:-

- (i) Must be PURPOSEFUL
- (ii) KNOW the SUBJECT
- (iii) Be PAINSTAKING
- (iv) ENTHUSIASTIC
- (v) Have a DRAMATIC SENSE
- (vi) A PLEASING MANNER
- (vii) Must have the right ATTITUDE towards the class

2. THE STUDENT

The student is largely dependent on his five senses for acquiring knowledge. If the training is to be most effective, therefore, it should be directed more or less simultaneously to as many of these senses as possible.

3. THE LECTURE

The Instructor should use every possible device to maintain the interest of his class, and to prevent boredom. Introduce drama, surprise and variety; encourage questions; etc.

The lecture should be short and, if necessary, broken up into small periods. The breaks may be made by means of visual aids, something dramatic, a few test questions or a summary.

4. THE FILM STRIP

The film strip is merely one of the visual aids to instruction and the lesson should be planned and prepared by previewing the strip in conjunction with the notes, so that the best use may be made of the strip in presenting the lesson.

The film strip should not be used as a substitute for demonstration. It should be followed, whenever possible, by demonstration and practical work. (This obviously will not apply to every film strip).

5. THE INSTRUCTOR'S NOTES

The notes given in this booklet are not as they stand, intended to be read to the class, but are designed to assist in the preparation of the lecture.

HOW TO USE THE FILM STRIP

1. Screening and projection should be prepared and checked before the lecture.
2. The projector is best placed as close to the screen as the size of the class permits, and should be central to the screen to minimise distortion of the picture. It should be set high enough to project the image above the heads of the students. The projected picture can generally be raised or lowered by means of milled screws at the bottom of the projector. Before using the projector, make certain that the electricity supply is of correct voltage.
3. Focus the film strip on the screen at the beginning of the lecture. The "focus frame" included at the beginning of the strip is provided for this purpose. If a proper screen is not available, a clean sheet of white cloth can be used provided it is stretched free from wrinkles. Any white, opaque material or surface (e.g. a white wall) will do in an emergency. Total darkness is not normally necessary.
4. Orderly seating helps to create an attitude of attention vision being obstructed. A rear row of seats should be at a distance from the screen not greater than 8 times the WIDTH of the projected picture. The front row should be at a distance not less than twice the DEPTH of the projected picture. The seats should be situated within an angle of 30° extending outwards from either side of the projected picture.
5. Film strips should be wound with the emulsion (or dull) side outwards, so that, when threaded, this dull side faces the lamp.
6. The projector should be properly maintained if it is to project the pictures as clearly and efficiently as possible. Lenses and glass aperture plates should be cleaned and polished regularly with methylated spirit or other suitable cleaning fluid, and finished off with dry chamois leather. Aperture plates should not normally be removed.

FILM STRIP CD 35

THE ATOM BOMB ITS EFFECTS AND HOW TO MEET THEM

PART V

EFFECT ON PERSONNEL

FRAME

- 1 In applying the effects of an air burst atomic bomb to the population of a British city, it is assumed firstly that there has been no warning prior to the attack, and then that a clear five minutes warning has been given.
- 2 For the first example consider a factory at a point $\frac{1}{2}$ mile from ground zero.
- 3 It is nearly time for the shift to change over and workers are hanging about outside.
- 4 Nearby is the administrative block of modern steel girder construction and at ground floor level one of the secretaries is standing near the window.
- 5 Suddenly, and without any warning, an atomic bomb bursts 1,000 feet in the air and about $\frac{1}{2}$ mile away. The people outside the factory are all killed, in theory they may have died three times.
- 6 First from heat flash their bodies will be charred.
- 7 Secondly they may have received a lethal dose of gamma rays.
- 8 Thirdly they may be crushed under the debris.
- 9 As the secretary is in an office on the far side of the block from the explosion she is shielded from the heat flash.

FRAME

10 There are several floors above her and the thickness of another building at the back; equivalent to say three or four feet of concrete. This will protect her from a lethal dose of gamma rays.

11 She will however, probably be killed by the effects of the blast. At $\frac{1}{4}$ mile from ground zero the steel framed building will be largely destroyed.

12 Now if it is assumed a warning has been sounded, the workers will go to their shelter beneath the factory.

13 The secretary hurries downstairs to the basement.

14 The workers will now be protected. They have two feet of concrete as a roof to their shelter. It is possible, owing to the debris, they may be trapped.

15 The secretary has even better protection than before against heat and radiation. Her chance of survival as a result of the blast will depend how efficiently the basement has been reinforced. She may however be trapped.

16 At a point $\frac{3}{4}$ mile from ground zero there is a street crossing.

17 Mr. Smith is crossing the road, notice he is wearing a hat and coat. The Atom Bomb explodes $\frac{3}{4}$ mile away when he is half way across and is fully exposed.

18 Mr. Smith is in a direct line with the explosion and will receive all three effects of the bomb.

19 The heat flash would normally have killed him at this range, but the industrial haze will lessen its power and Mr. Smith's woollen coat affords him considerable protection.

20 Radiation at this range is still powerful but there is an even chance of his survival.

FRAME

- 21 He may be severely injured or indeed killed by flying glass and masonry.
- 22 People who had turned into the side street will have the protection of the buildings against heat and radiation.
- 23 But part of these same buildings falling on them may severely injure or kill them.
- 24 If a warning had been received all these people would have taken cover. Mr. Smith would look about him for a solidly built building like this store which is a framed building.
- 25 The people in the side street find a surface shelter handy and go into it.
- 26 Mr. Smith is now protected from the effects that might have killed him, namely heat, radiation and blast.
- 27 His greatest danger is however, from secondary blast causing the false ceilings and partition walls to collapse; there will be flying glass from the show cases, etc.
- 28 If Mr. Smith had had time to go to the basement he would almost certainly be unharmed.
- 29 People in the surface shelter are protected from Heat and Radiation and this time will survive the Blast effects. The shelter exits might be blocked. It is important to realise that at this distance rescue operations might be hampered by serious fires.
- 30 Mrs. Brown lives in a semi-detached house at a point $1\frac{1}{2}$ miles from ground zero.
- 31 Whilst Mrs. Brown is collecting the washing off the line the atom bomb explodes $1\frac{1}{2}$ miles away on the other side of the house.

- 32 The house acts as a shield from heat flash and at this range the gamma rays will not cause injury. The effects of blast will be considerable and there is the danger of falling chimney pots and flying glass. Mrs. Brown will be very lucky if she escapes injury. Unless Mrs. Brown had taken the precaution of white washing her windows, there is a chance that the heat flash will have started a fire on the top floor front. Her injuries may prevent her from dealing with the fire quickly and her house might be gutted.
- 33 If Mrs. Brown had received a proper warning she would have gone to her Anderson Shelter, and at this range she would have been safe from all the effects.
- 34 She would have been able to re-enter her house and with assistance deal with any small fires.
- 35 As a final example Mr. Jones lives $\frac{1}{2}$ mile further away a distance of two miles from ground zero.
- 36 Mr. Jones is about to leave home and is standing in the doorway looking at the sky.
- 37 Normally the brilliance of the heat flash would cause temporary blindness and would harm the exposed parts of the skin, but the industrial haze has reduced the brilliance and range of the flash, and he would probably only experience slight reddening of the skin.
- 38 Radiation at this range will be negligible, but there may be a very slight risk from fission products in the "Fall out" if he were down wind of the explosion.
- 39 The blast effect will break the windows of his house, but it is unlikely to cause him any personal injury.
- 40 If there had been a warning and he had taken shelter he would be safe from any risk of injury.

In all the cases considered the people who were not sufficiently protected were killed or injured by one or more of the atomic bomb's three effects. When these same people were assumed to have taken proper cover in shelters or basements, they stood a far better chance of not being killed by the effects of the bomb.

Conclusion As in the last war the immediate post raid problems are going to be those of rescue and fire fighting, only on a very much larger scale. There will be the added problem of access through areas blocked by debris. Although the atomic bomb causes immense damage, there is still a great deal that Civil Defence can do to save and protect life.

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