

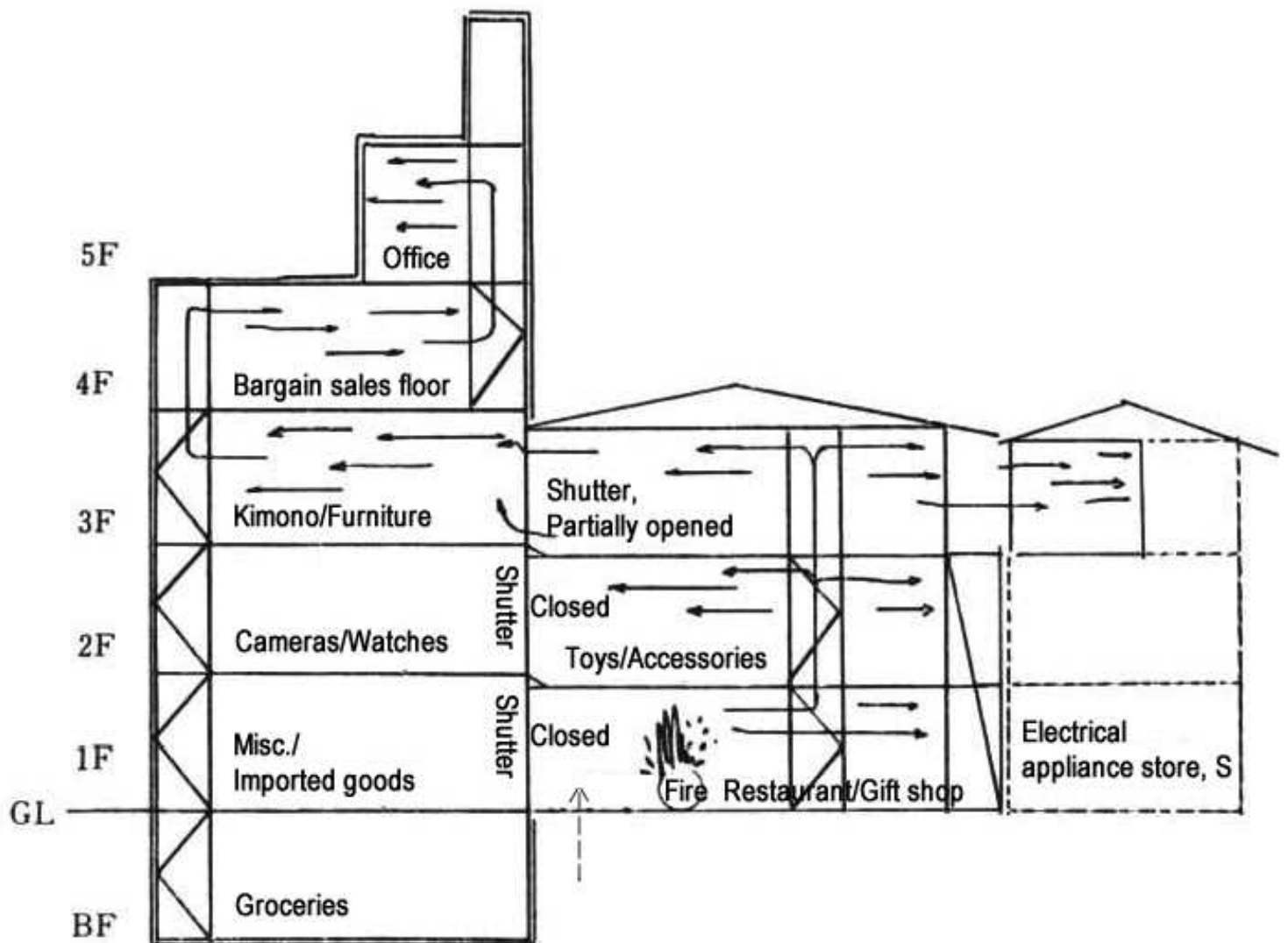
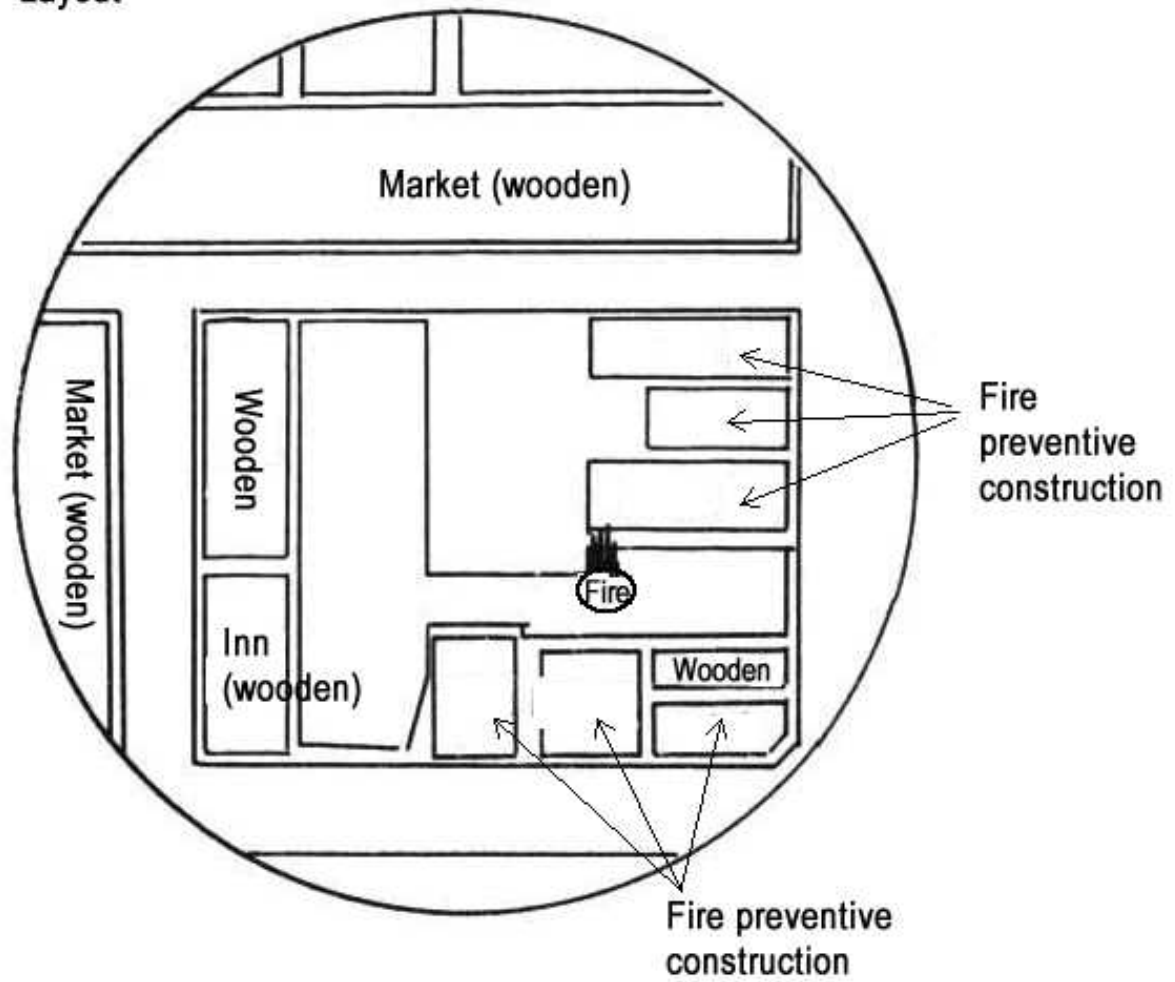
Building Name Address	Use (as per FSA Annexed Table)	Date and Time of Incident	Structure and Stories Area	Extent of Damage (Damaged Area/ Total Area)	No. of Casualties
Sendai Marumitsu Department Store	Department Store (4)	May 5, 1956	Fire resistive 5 stories above ground and 1 below	All, <u>Half</u> , Partial, Small 2,397m ²	Fatalities 0
		Breakout at 17:30 (approx.) Detected at 17:35 Notified by emergency call Extinguished by 20:00	Partially wooden, 3 stories above ground		
5-12 Ura Sendai MIYAGI			Building area 1,210m ² Total floor area 5,141m ²	(47%)	Injured 4 (2)

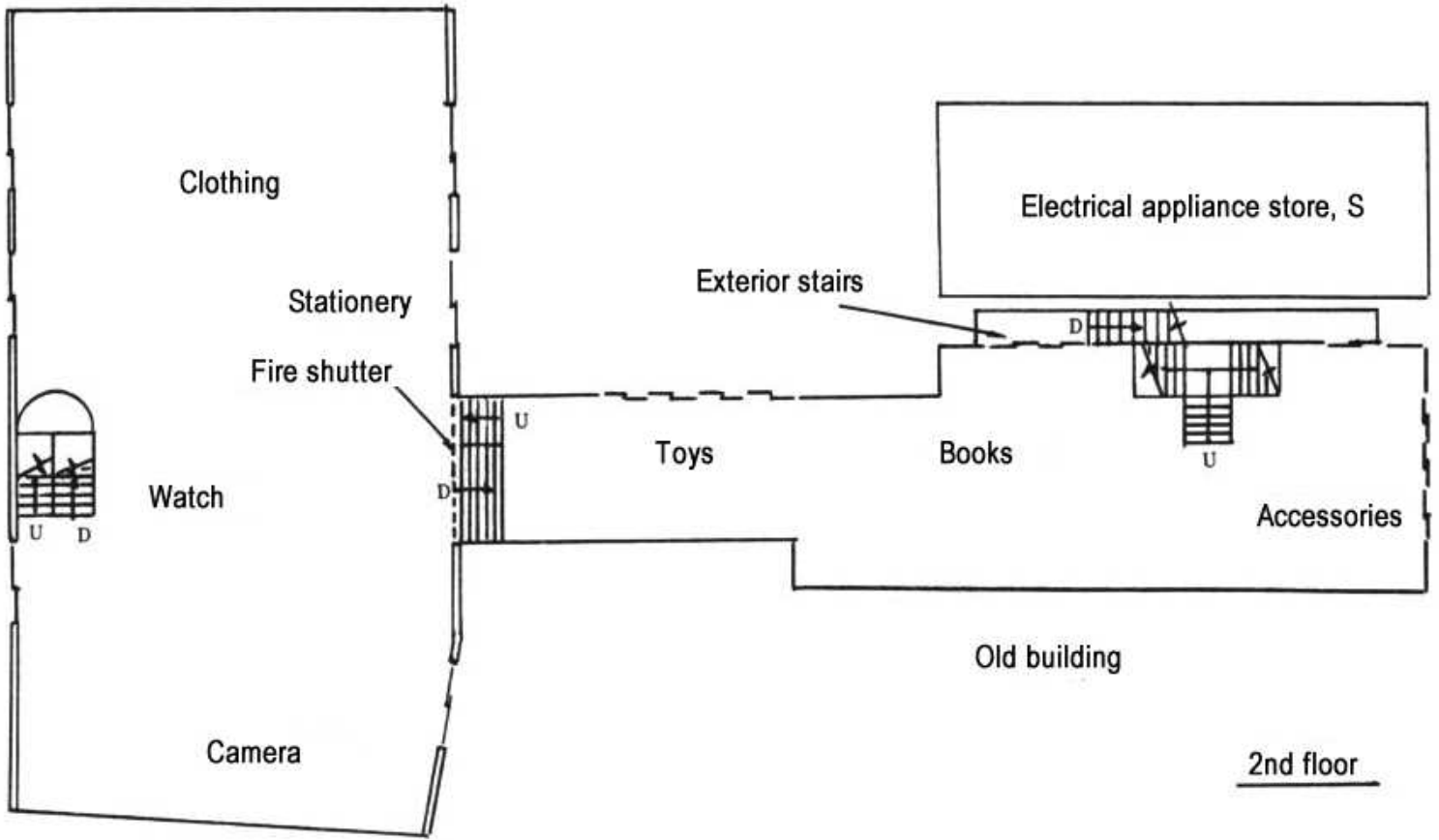
I. Summary of Fire Incident										
(1) Summary	<p>This department store fire was started from the 1st floor of the wooden 3-story building, which was entirely burned down, and then spread to the 3rd to 5th floors of the 5-story fire-resistant building that was connected to the wooden building. The fire emerged during their business hours and there were over 2000 people inside the buildings. With an appropriate evacuation led by the clerks, everybody evacuated safely.</p>									
	(2) Conditions per Floor	Floor	Total area		Damaged area		Use (Purpose)	No. of persons	No. of fatalities	Fire escape equipment
		m ²		m ²					<Old building> Indoor stairs (2 units each on 1st to 3rd floors)	Fire extinguisher s
		Old building (Wooden)	New building (Fire resistant)	Old building	New building		Number inside parentheses is number of store clerks.		<New building> Indoor stairs 1 from 1st to roof floor, and 1 from B1 to 4 th floor	Indoor fire hydrants (1st to 4 th floors of new building)
Roof			21.5							Fire alarm
5			140.3		140.3	Office	0			
4			688.2		688.2	Bargain Sales, Office	57(7)		2 units of rope ladder (4 th and roof floors)	
3		353.1	746.8	353.1	478.5	Sales	307(57)			
2		368.8	793.3	368.8		Sales	624(74)			
1		368.8	841.8	368.8		Sales	641(91)			
B1			819.0				647(47)			
Total	5,141.6		2,397.7			2,276(276)	0			
(3) Origin of Fire	<p>(Floor, Room, Part, Combustibles, <u>Habitable</u>/Non-habitable room, <u>Present</u>/Absent)</p> <p><u>The fire emerged from the coffee stand near the stairwell on the 1st floor of the old building (wooden).</u></p> <p>On the coffee stand, 3 kerosene stoves were being used around combustible materials. The area was under corrective construction for being an illegal structure and was surrounded by temporary panels. There was no exterior wall. The interior walls were covered by the curtains and wallpaper.</p>						(4) Cause of Fire	<p>When the coffee stand staff was pouring kerosene into one of the stoves without turning the stove off, he spilled the kerosene and the kerosene caught fire.</p>		

(5) Fire Propagation Path	火源の位置 (Location of Fire Source) 火源からの伝播 (Propagation from Source) 他階への伝播 (Propagation to Other Floors)	
	Coffee stand on the 1st floor of the old building	Decorative curtains and temporary plywood walls
<p>The fire emerged from the coffee stand on the 1st floor of the old building, alighting the decorative temporary curtain, papers and plywood in the vicinity, and spreading to the wooden walls and ceiling as well as to the 2nd and 3rd floors of the old wooden building. Once the fire reached the 3rd floor of the old building, it ignited the 3rd floor ceiling (new building) near the ventilation duct (fell during the fire) that was installed next to the fire shutter casing. Then, as the flame blazed up toward the north stairwell, it spread to the 4th and 5th floors, destroying them.</p>		
<ul style="list-style-type: none"> ○ Main Reasons for the Propagation of the Fire <ul style="list-style-type: none"> ○ The fire, which started from the 1st floor of the wooden building, was surrounded by a large quantity of combustible materials. ○ Since the fire shutter on the 3rd floor malfunctioned due to the fire, it did not close to keep the fire out and the fire shutter casing became the route of the fire spread to the new building. (The opening beneath the shutter was not the direct cause of the fire spread because they removed all the combustible materials from that area.) ○ Smoke Propagation Path The smoke from the 1st floor of the old wooden building ascended rapidly along the north stairwell and propagated to the entire old building, but it did not penetrate to the new building for a long time because of the closed compartment shutter between the old and new buildings. 		
II. Summary of the Building		
(1) Built	Construction, Completion and Major Renovations (Completion) 1946, (Expansion) March 1956	
Fire Prevention Management	(2) Vertical Shafts	(3) Fire Prevention
	Stairs [X] Duct Spaces [] Elevators [] Pipe Shafts [] Escalators [] Other () []	<ul style="list-style-type: none"> ○ The department store had received appropriate guidance from the fire department on a routine basis, and based on the guidance, the store had formed an in-house firefighting team of 139 members, appointing the general manger as the team leader. In an emergency, the team was supposed to form several groups such as general affairs, security, firefighting and lifesaving; however, things did not proceed as planned. ○ The flammable items were poorly handled.
	<p>Each floor of the south stairwell of the new building was partitioned with a fire shutter; however, on the north stairwell, except for the 2nd floor, there were no fire shutters on any floor (illegal), which became the path of fire spread to the upper floors of the new building.</p>	
	(4) Fire Compartments	(5) Firefighting Equipment
	The connecting portion between the old (wooden) and new (fire resistant) buildings was partitioned by an electrically operated fire shutter (Type-B).	There was no firefighting equipment at all in the old building (illegal).

(5) Evacuation	Means of Escape (No. of Persons)	Obstacles to Evacuation
	<ul style="list-style-type: none"> ◦ Stairs [X] (1400) ◦ Elevators/Escalators [] () ◦ Escape equipment [] () ◦ Directly to ground from windows or openings [] () ◦ Rescued [X] (8) ◦ Other (Climbed down rainwater gutters and lightning rods) [X] (2) 	<ul style="list-style-type: none"> ◦ No windows [] ◦ Barred openings [] ◦ Locked emergency doors (Exits) [] ◦ Alarm system [] (Poorly controlled, Malfunctioned, Not installed) ◦ Power outage [] ◦ Other () []
<ul style="list-style-type: none"> ◦ Since the kerosene combustion yielded remarkable smoke and flames from the onset, the customers who were near the fire source immediately escaped to the east exit or to the new building. The customers on the 2nd and 3rd floors of the old building detected the fire from the smoke coming out of the stairways, floor and walls and started their evacuation at an early stage of the fire. Since the store clerks helped them to evacuate, everybody evacuated from the old building in approx. 3 minutes after onset of the fire. ◦ On the other hand, the customers in the new building did not respond to the store clerks' instructions at first because they believed that the fire resistant building was safe, which caused temporary confusion. However, since the clerks continued to warn them using the PA system and megaphones, everybody evacuated from the building without any casualties. ◦ The store executives who were notified of the fire decided to evacuate the customers first. They placed the male store clerks on each floor to avoid congestion around the stairway and closed the fire shutters after everybody evacuated from the old building, which provided a good amount of time for evacuation. 		
(6) Casualties	Healthy individuals (Drunk persons) Individuals in need of assistance Infants Elderly Disabled Patients/ill persons	Obstacles to Evacuation <ul style="list-style-type: none"> ◦ No windows [] ◦ Barred openings [] ◦ Locked emergency doors (Exits) [] ◦ Alarm system [] (Poorly controlled, Malfunctioned, Not installed) ◦ Power outage [] ◦ Other () []
	None	
IV. Issues and Lessons Learned		
<ol style="list-style-type: none"> 1. The store failed to provide thorough training on how to handle flammables and how to notify about and extinguish fire. 2. The department building was inadequately constructed and therefore, in order to comply with the Building Standards Law, they had built a new building. Since they just had removed the wooden structure (east side of the new building), there was no exterior wall. When the fire broke out, there were only temporary plywood walls that were covered by curtains because they were waiting for the permit for the extension/renovation. Given these conditions, that particular part of the building was a vulnerable space to handle flammables. 3. After the fire shutter was closed in between the old and new buildings, the store clerks removed the display case and other combustible materials, so the goods did not contribute to the spread of fire. 4. Since the department store was able to supply electricity with a private generator until the electrical technician decided to cut it off, they avoided a chaotic condition that could arise from a power outage. 5. The fire broke out in a department store that held an unspecified number of people. Although there were over 2,000 people at that time, no one was hurt and all evacuated safely because the store made appropriate decisions and issued evacuation instructions. 		

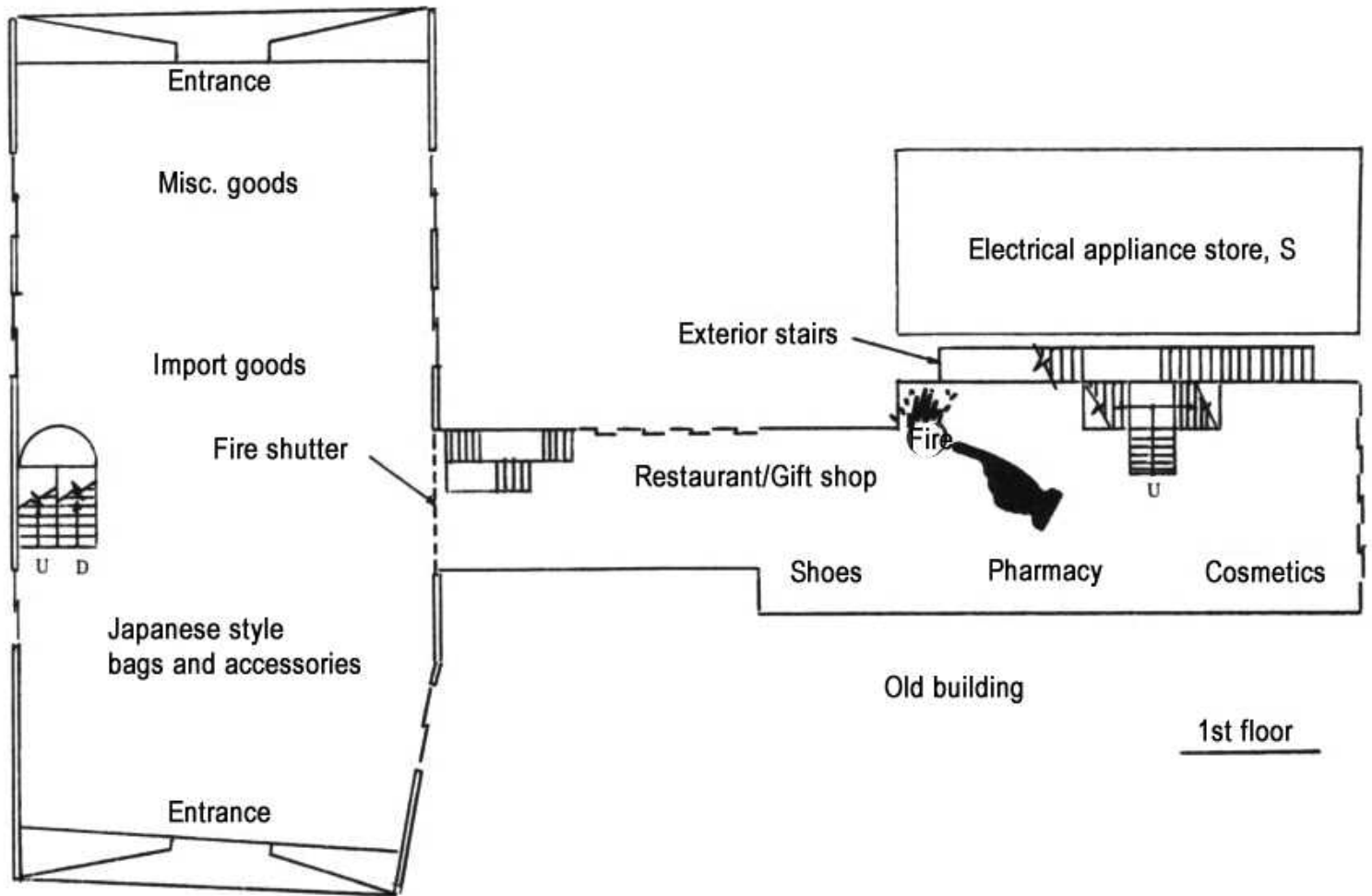
Layout





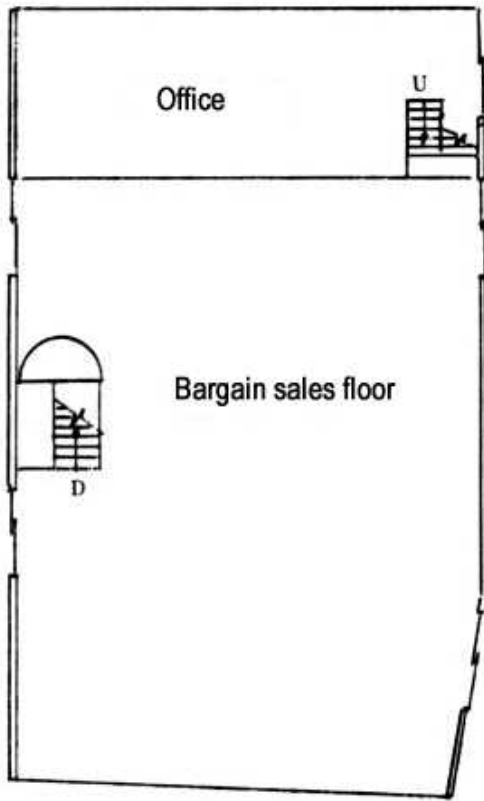
New building

2nd floor



New building

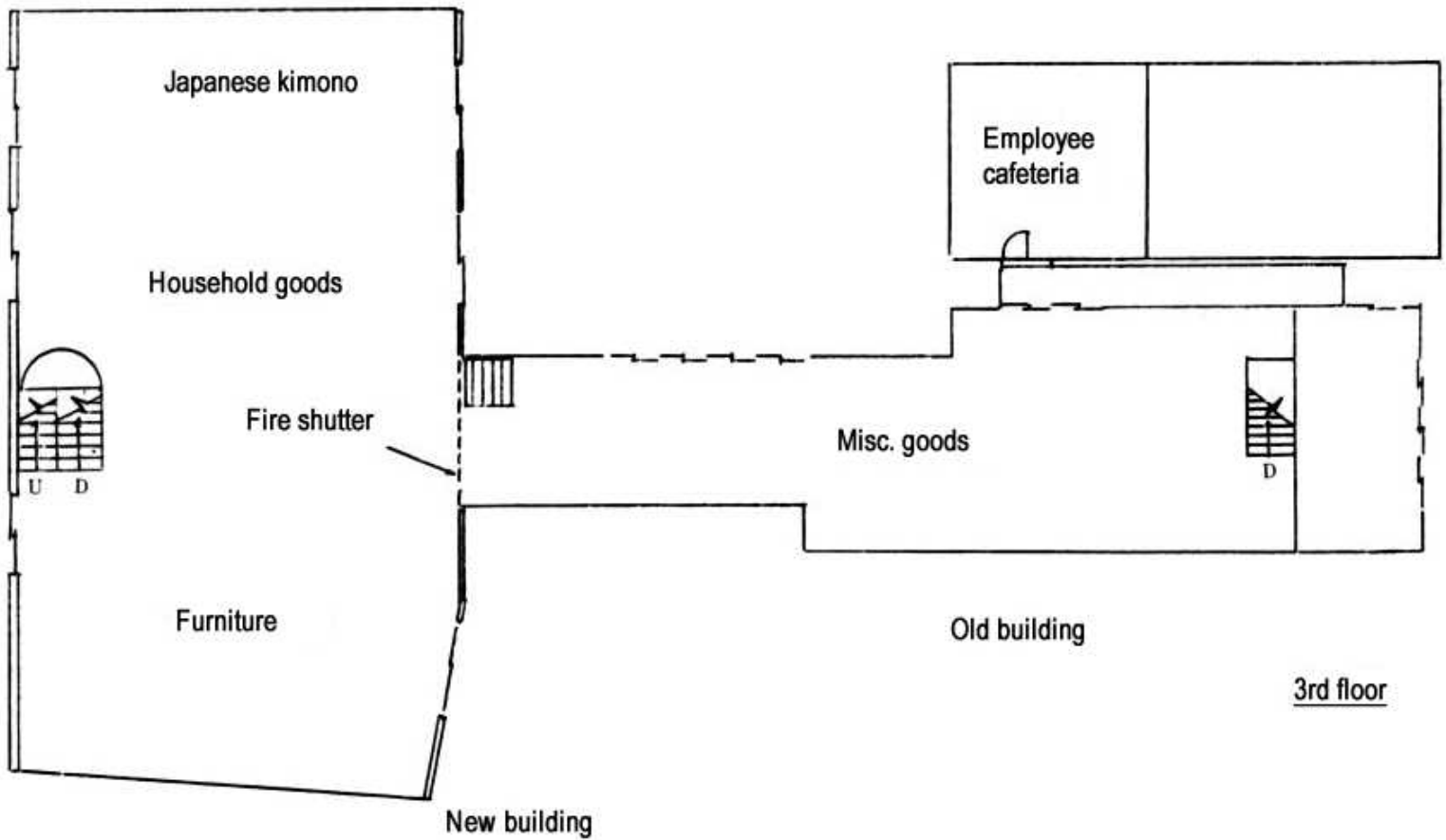
1st floor



4th floor of new building



5th floor of new building



3rd floor

Note: underground floor layout omitted (new building)