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AMMUNITION FOR LAW ENFORCEMENT. PART III. PHOTOGRAPHS OF BULLET--ETC(U)
SEP 76 W J BRUCHEY, B IZDEBSKI, H OFFNEY
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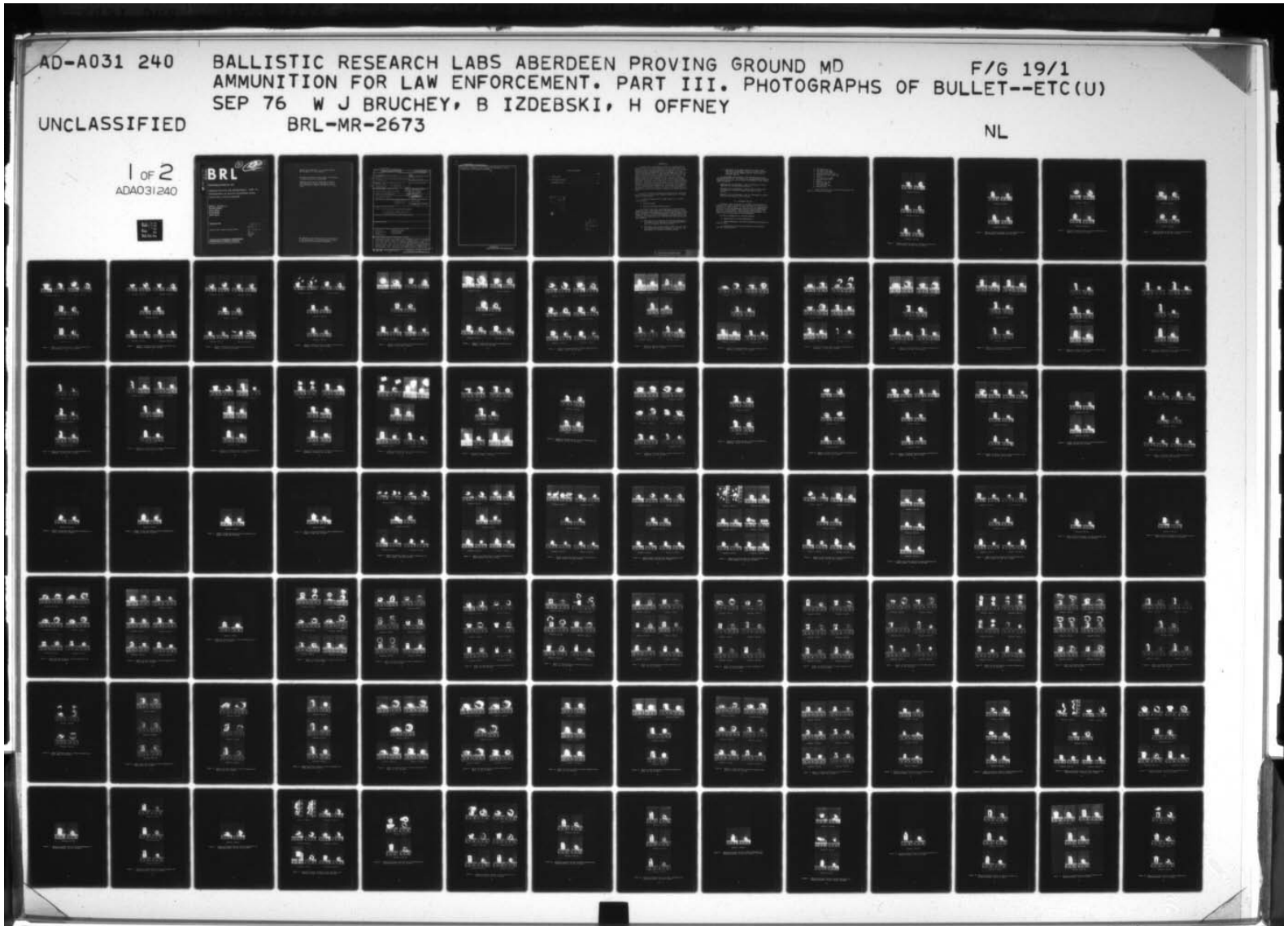

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MEMORANDUM REPORT NO. 2673

AMMUNITION FOR LAW ENFORCEMENT: PART III, PHOTOGRAPHS OF BULLETS RECOVERED AFTER IMPACTING TISSUE SIMULANT

William J. Bruchey, Jr.
Bernard Izdebski
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Bruce Rickter
James Haynie

September 1976

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USA BALLISTIC RESEARCH LABORATORIES
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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

A comprehensive study was conducted for the Department of Justice to determine what factors influence human incapacitation by handgun bullets. An evaluation of the effectiveness of nearly all commercial handgun bullets was made. As part of the study, each bullet was recovered after impacting and penetrating a tissue simulant target. This report is a supplement to the overall program methodology and results presented in a BRL Report entitled, "Ammunition for Law Enforcement: Part I, Methodology for Evaluating Relative Stopping Power

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and Results." Presented in this report are the photographs of bullets recovered after firing during this program.

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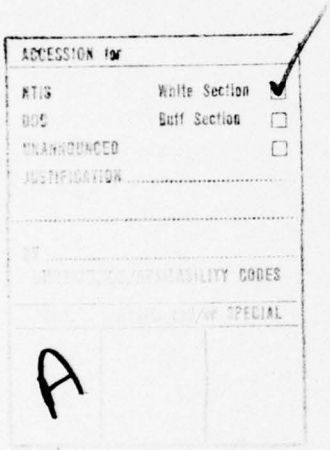
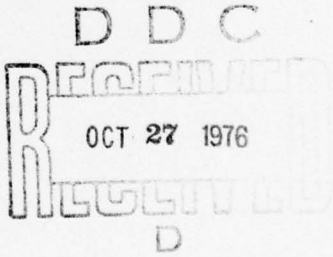




I. INTRODUCTION

In December 1972, the National Institute of Law Enforcement and Criminal Justice of the Law Enforcement Assistance Administration approved and funded a project, submitted by the Law Enforcement Standards Laboratory (LESL) of the National Bureau of Standards, to conduct a study of the terminal effects of police handgun ammunition. LESL late in 1973 contracted with the U.S. Army Ballistic Research Laboratories (BRL) to conduct the study and prepare a report of its findings. The purpose of the study was to provide federal, state and local law enforcement agencies with a criterion for use in selection of handgun ammunition; a criterion which considers not only the offensive capabilities of the ammunition, but also the safety factors concerning innocent bystanders. The purpose was not specifically to show that studies by previous investigators were invalid, but to bring the salient features of these previous studies together with a more detailed and updated description of the entire scenario to produce a unified approach to the problem which would allow an objective evaluation of handgun effectiveness.

To place the question of handgun effectiveness on the level of an objective approach, three primary terminal characteristics of handgun ammunition were studied:

1. Relative Incapacitation of Human Targets (i.e., relative stopping power).

2. Ricochet Hazards.

3. Material Penetration Characteristics.

As the focus of the study was on commercially available handgun ammunition in the caliber range from 0.355 (9mm) through 0.45, an extensive laboratory investigation of all significantly different handgun bullets available to law enforcement agencies in the United States was conducted. This report deals with experiments performed for the relative incapacitation portion of the study from which the following data were extracted:

1A. Measurement of the formation and subsequent development of the temporary cavity produced in tissue simulant by each bullet as a function of striking velocity.

1B. Measurement of the general dynamic behavior of each bullet as it penetrated the tissue simulant, its stability, and deformation, as a function of striking velocity.

1C. Measurement of the impact velocity by factory loaded ammunition corresponding to each bullet under study when fired from various handguns currently used by law enforcement agencies.

The photographic data presented in the following section were gathered during Part 1B. The volume of the data generated for relative incapacitation requires that the results be presented in three separate reports as follows:

Ammunition for Law Enforcement: Part I, Methodology for Evaluating Relative Stopping Power and Results.

Ammunition for Law Enforcement: Part II, Data on Cavity Formation and Bullet Deformation During Penetration of Tissue Simulant.

Ammunition for Law Enforcement: Part III, Photographs of Bullets Recovered After Impacting Tissue Simulant.

II. PHOTOGRAPHIC RESULTS

During the conduct of the tests to evaluate the effectiveness of handgun bullets against personnel, each bullet was fired into a 30 cm long block of tissue simulant. For each test shot, the penetration of the bullet was recorded dynamically by both high-speed cinematography and flash x-ray photography. After each shot (when possible), the bullet was recovered from the tissue simulant and photographed. Presented on the following pages are these photographs.

The data are arranged in the following sequence:

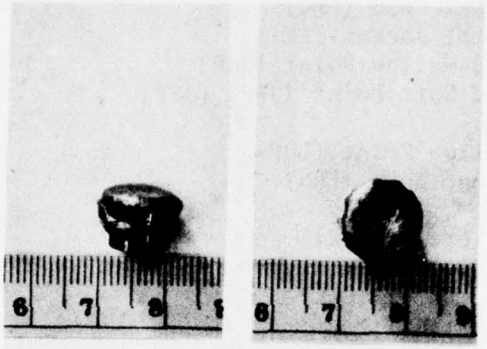
1. Manufacturers are listed alphabetically.

2. Within manufacturer, the data are presented from smallest to largest caliber.

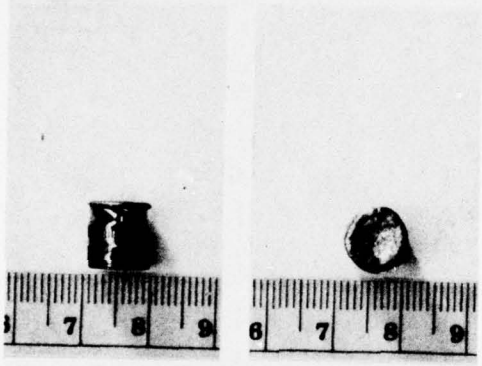
3. Within caliber, the data are presented in the following order for construction type:

a. Full Jacket (FJ)
b. Full Metal Case (FMC)
c. Full Metal Jacket (FMJ)
d. Jacketed Hollow Point (JHP)
e. Jacketed Soft Point (JFP) (JSP)
f. Lead (L)
g. Lead Hollow Point (LHP)
h. Lead Round Nose (LRN)
i. Lubaloy
j. Metal Piercing (MP)
k. Round Nose (RN)
l. Semi-Wadcutter (SWC)
m. Wadcutter (WC)

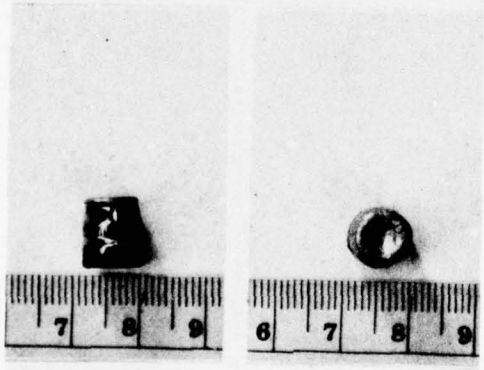
4. Within construction type, the data are presented from smallest to largest mass in grains.



Velocity = 409 m/s

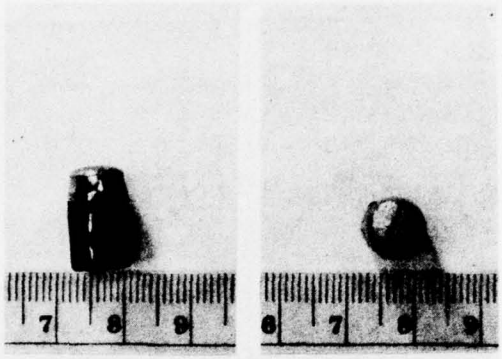


Velocity = 356 m/s

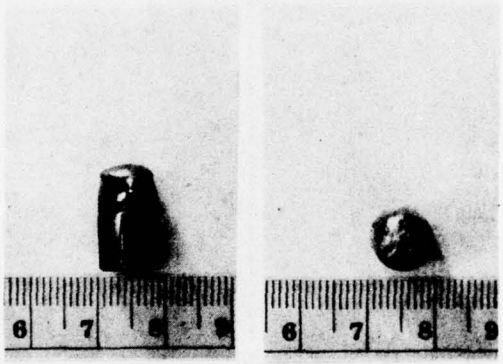


Velocity = 312 m/s

Figure 1 Effects of Striking Velocity on Bullet Deformation for HIGH PRECISION, .357 MAG, JHP, 110 GRAIN

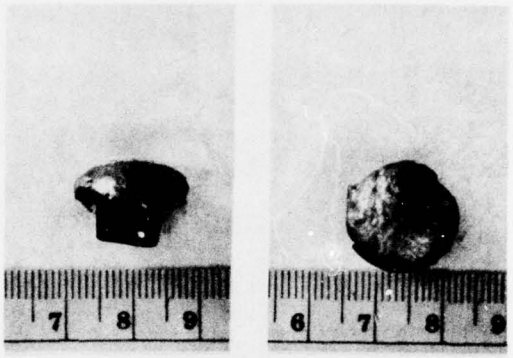


Velocity = 387 m/s

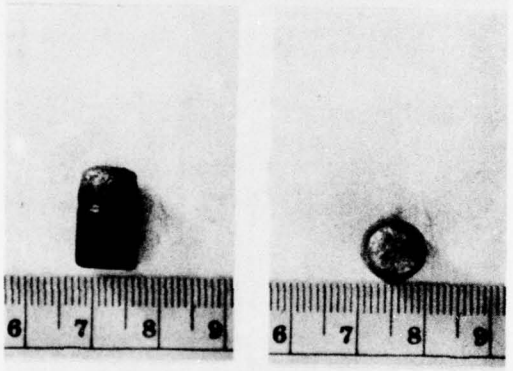


Velocity = 343 m/s

Figure 2 Effects of Striking Velocity on Bullet Deformation for HIGH PRECISION, .38 SPECIAL, JHP, 158 GRAIN

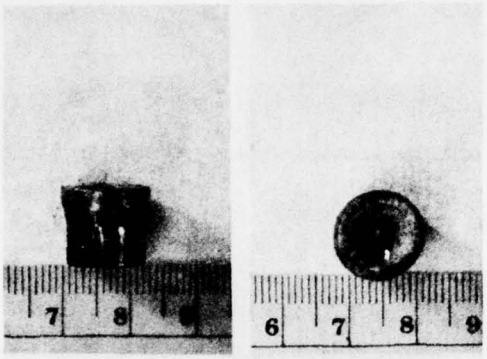


Velocity = 481 m/s

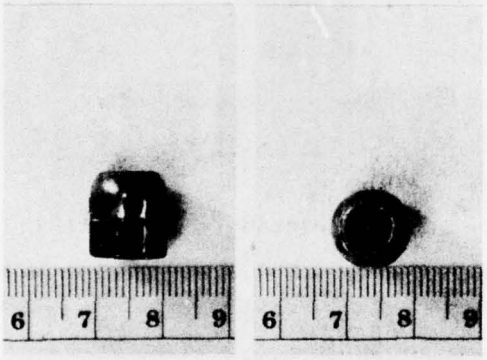


Velocity = 349 m/s

Figure 3 Effects of Striking Velocity on Bullet Deformation for HORNADY, .357 MAG, JFP, 158 GRAIN

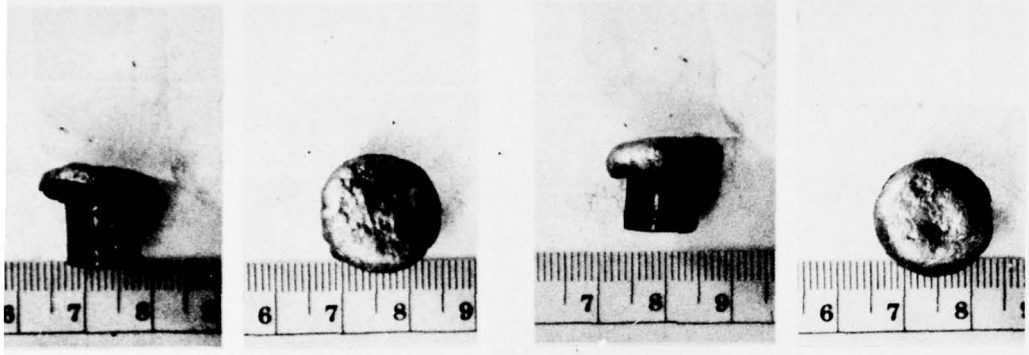


Velocity = 342 m/s



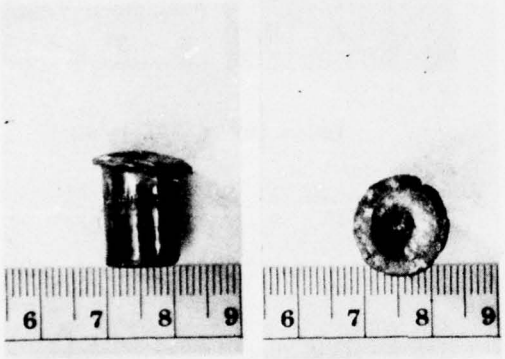
Velocity = 290 m/s

Figure 4 Effects of Striking Velocity on Bullet Deformation for HIGH PRECISION, .45 ACP, JHP, 170 GRAIN

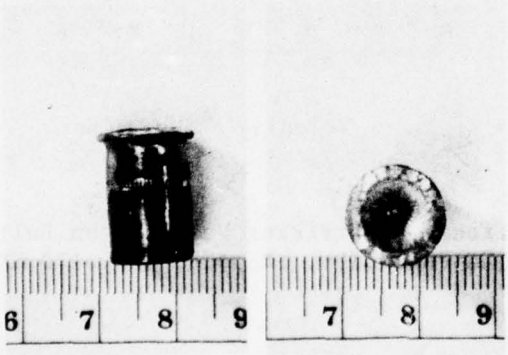


Velocity = 355 m/s

Velocity = 348 m/s

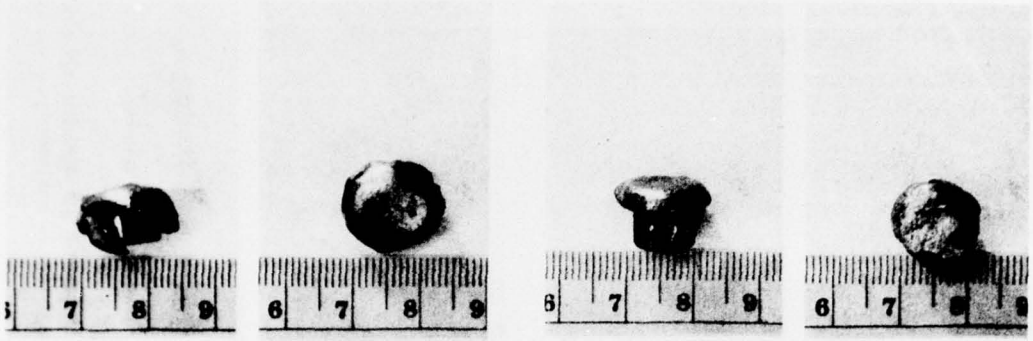


Velocity = 303 m/s



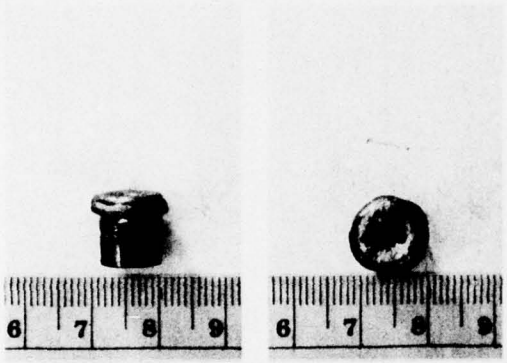
Velocity = 271 m/s

Figure 5 Effects of Striking Velocity on Bullet Deformation for HIGH PRECISION, .44 MAG, JHP, 240 GRAIN

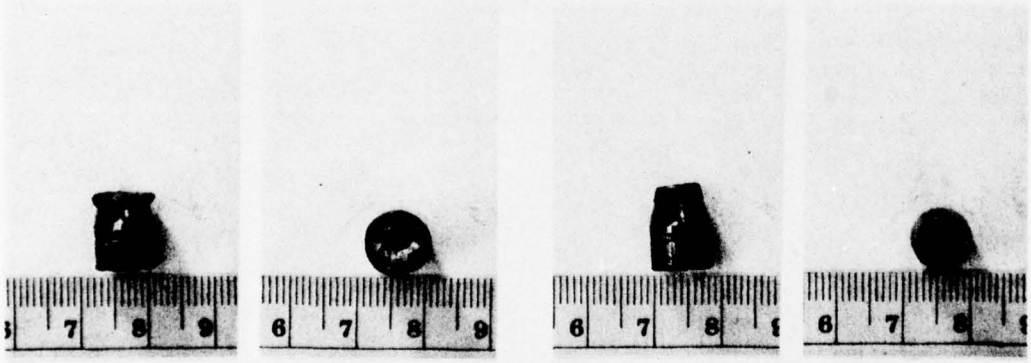


Velocity = 405 m/s

Velocity = 336 m/s



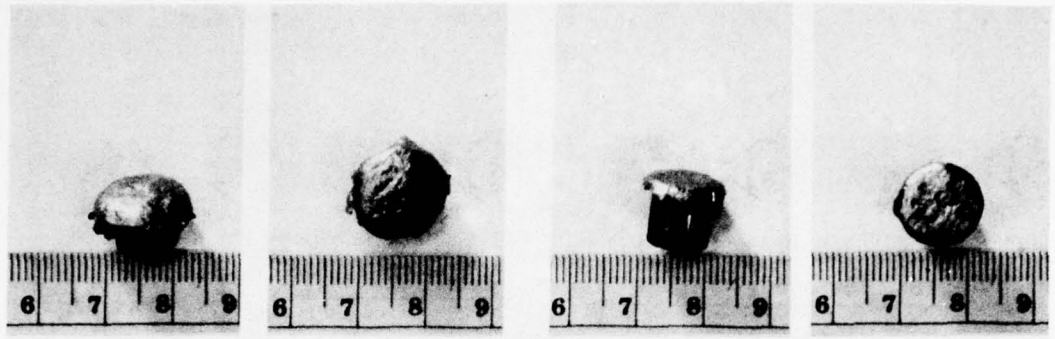
Velocity = 293 m/s



Velocity = 224 m/s

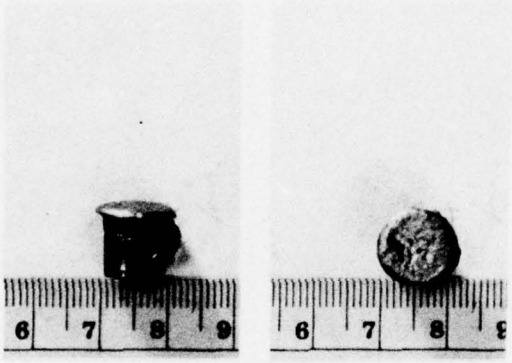
Velocity = 144 m/s

Figure 6 Effects of Striking Velocity on Bullet Deformation for HORNADY, .38 SPECIAL, JHP, 110 GRAIN

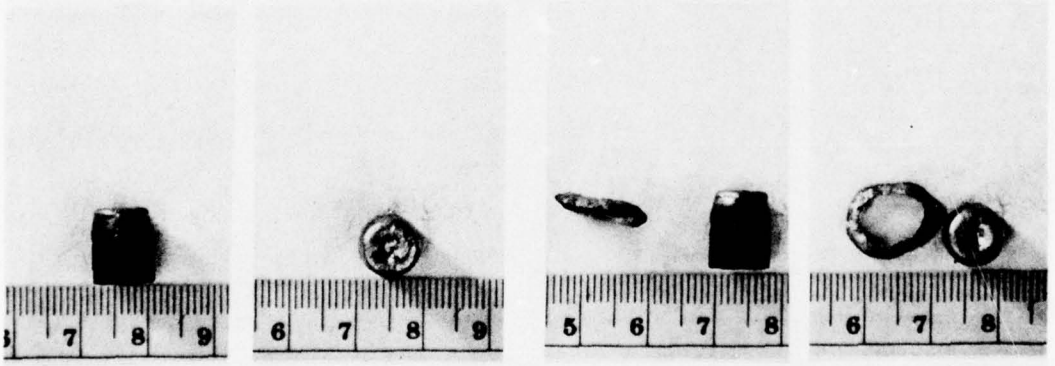


Velocity = 426 m/s

Velocity = 376 m/s



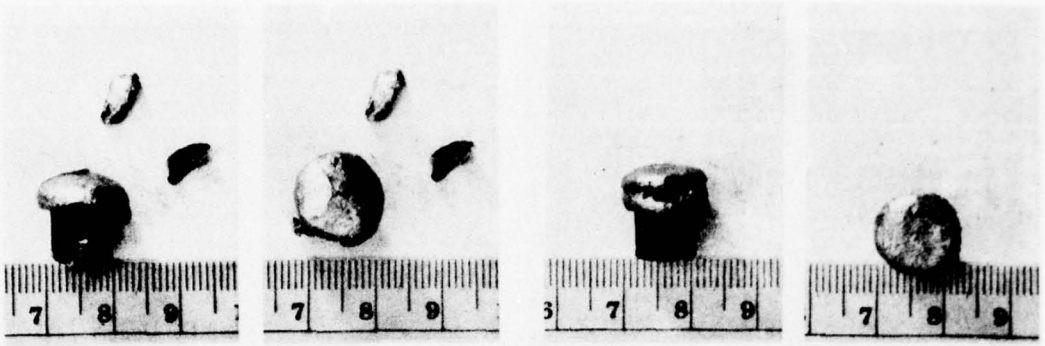
Velocity = 356 m/s



Velocity = 294 m/s

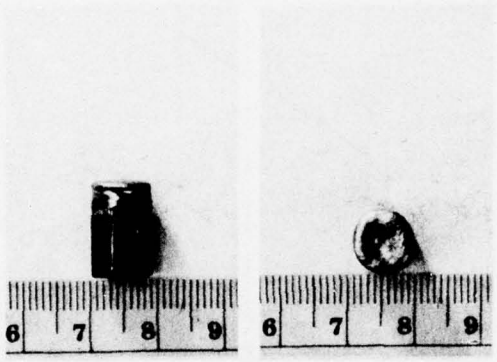
Velocity = 247 m/s

Figure 7 Effects of Striking Velocity on Bullet Deformation for HORNADY, .357 MAG, JHP, 125 GRAIN

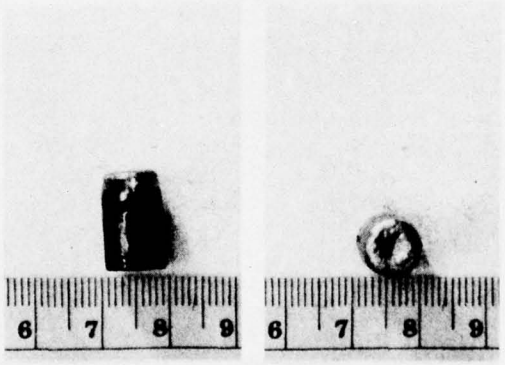


Velocity = 395 m/s

Velocity = 348 m/s

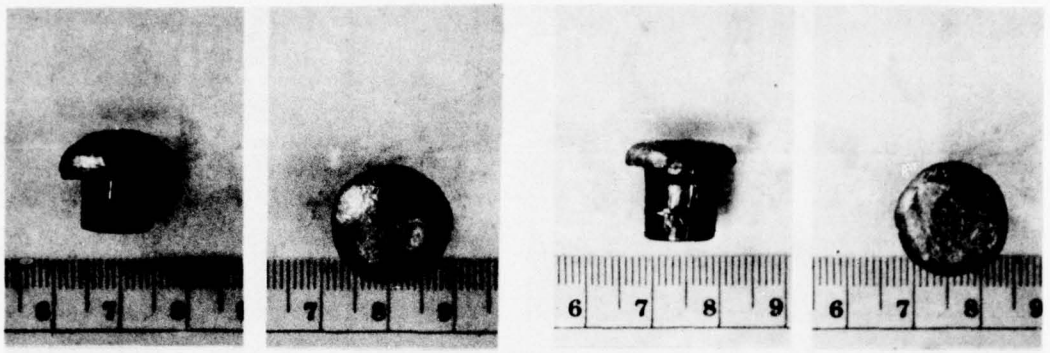


Velocity = 303 m/s



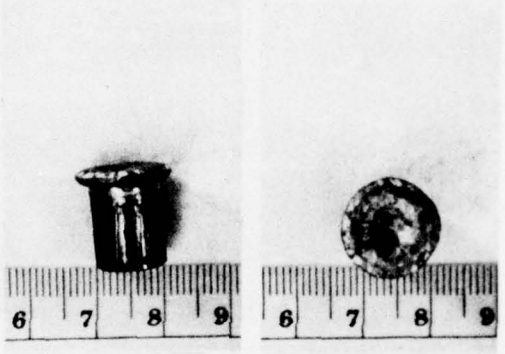
Velocity = 259 m/s

Figure 8 Effects of Striking Velocity on Bullet Deformation for HORNADY, .38 SPECIAL, JHP, 158 GRAIN

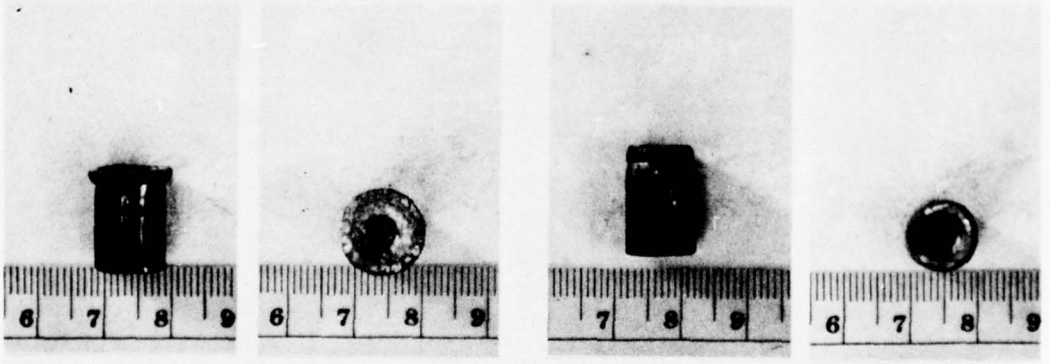


Velocity = 355 m/s

Velocity = 314 m/s



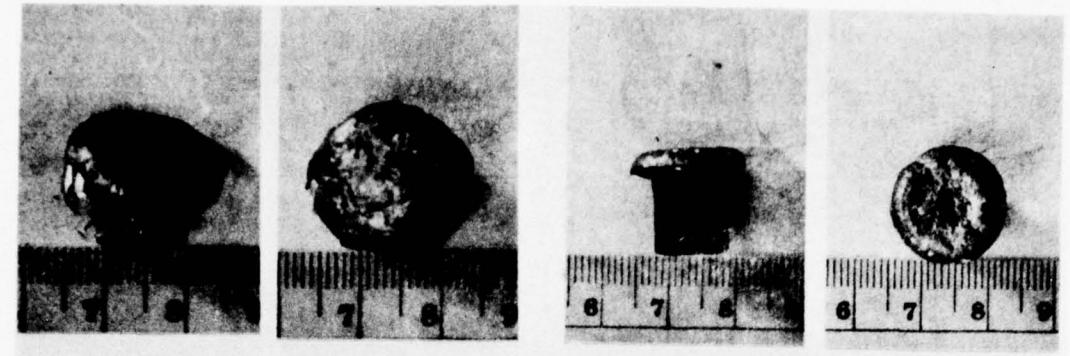
Velocity = 279 m/s



Velocity = 261 m/s

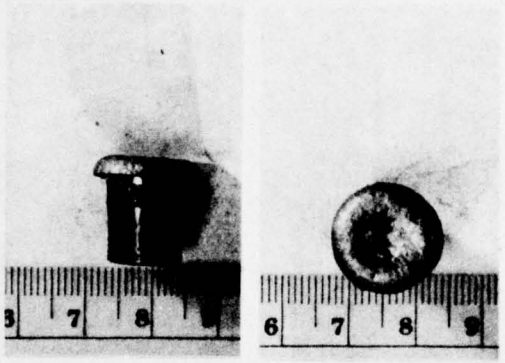
Velocity = 221 m/s

Figure 9 Effects of Striking Velocity on Bullet Deformation for HORNADY, .41 MAG, JHP, 210 GRAIN

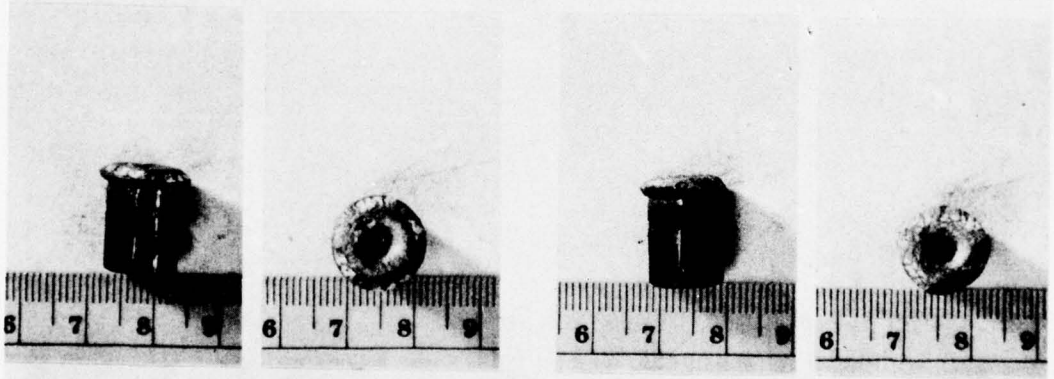


Velocity = 341 m/s

Velocity = 316 m/s



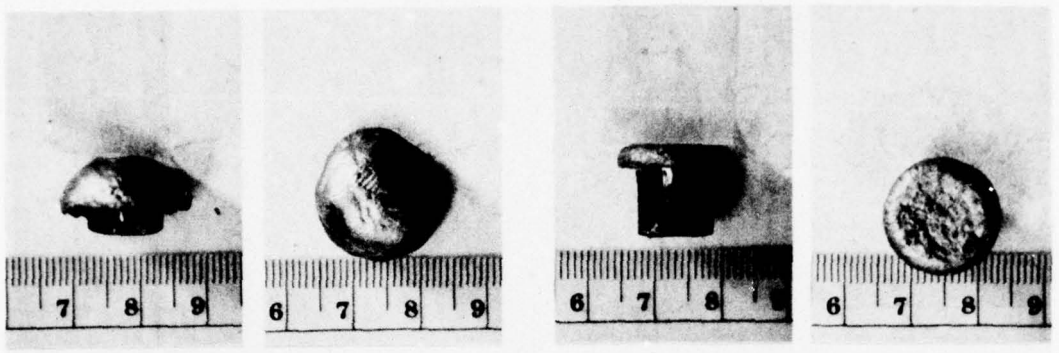
Velocity = 303 m/s



Velocity = 262 m/s

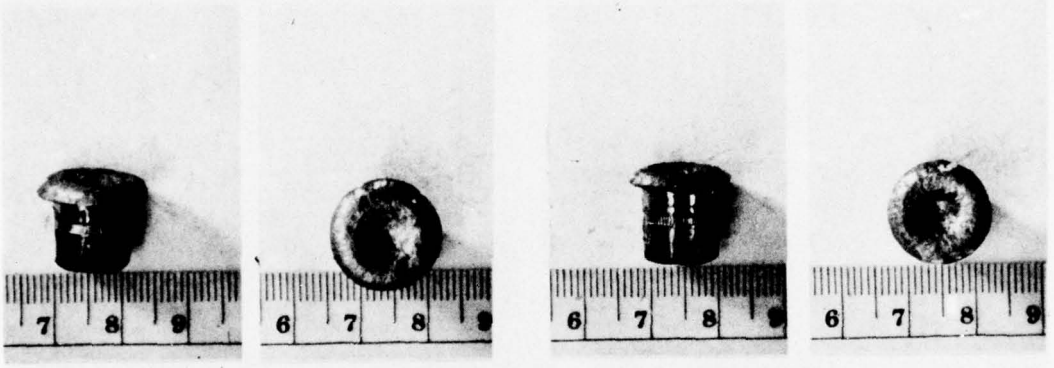
Velocity = 236 m/s

Figure 10 Effects of Striking Velocity on Bullet Deformation for HORNADY, .44 MAG, JHP, 240 GRAIN



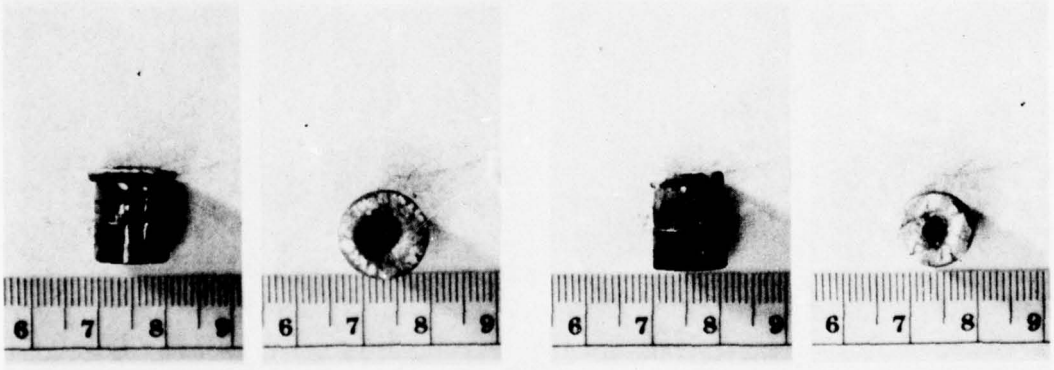
Velocity = 374 m/s

Velocity = 338 m/s



Velocity = 317 m/s

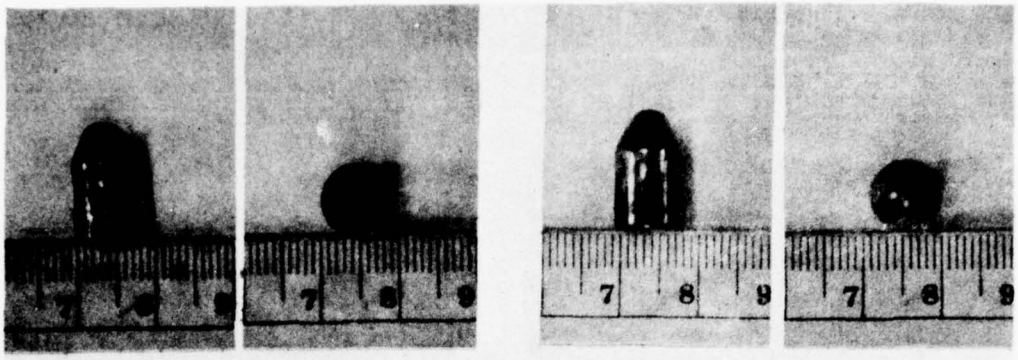
Velocity = 296 m/s



Velocity = 266 m/s

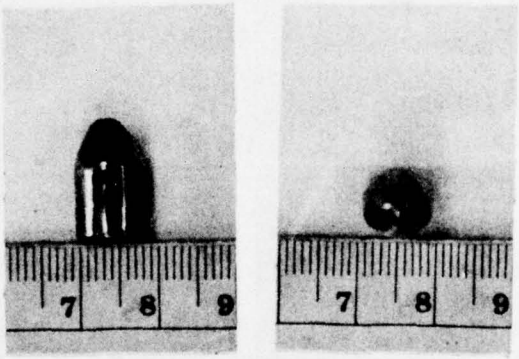
Velocity = 231 m/s

Figure 11 Effects of Striking Velocity on Bullet Deformation for HORNADY, .44 MAG, JHP, 200 GRAIN

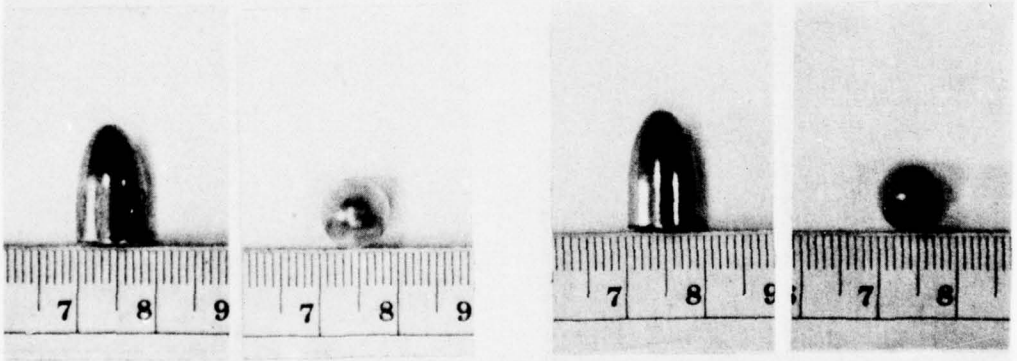


Velocity = 425 m/s

Velocity = 407 m/s



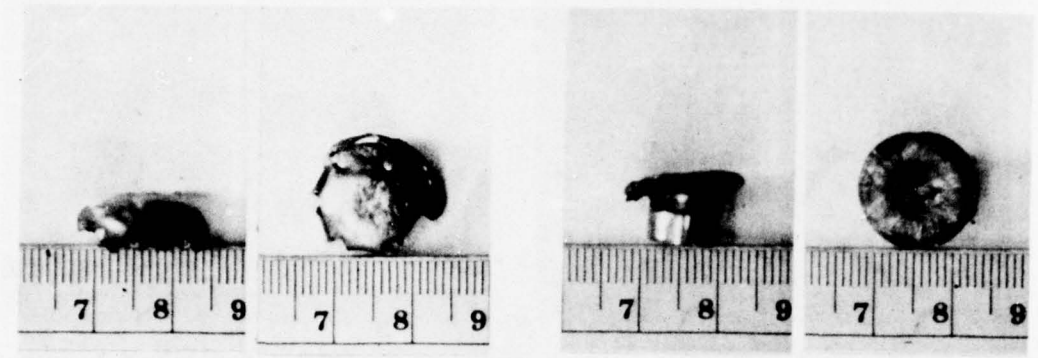
Velocity = 371 m/s



Velocity = 354 m/s

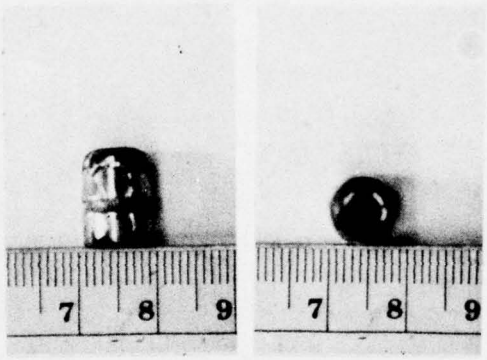
Velocity = 0 m/s

Figure 12 Effects of Striking Velocity on Bullet Deformation for REMINGTON, 9MM, FJ, 124 GRAIN

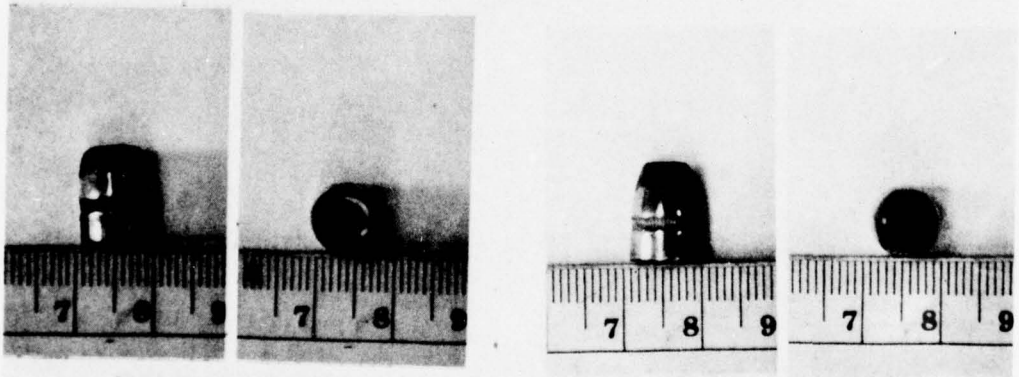


Velocity = 425 m/s

Velocity = 298 m/s



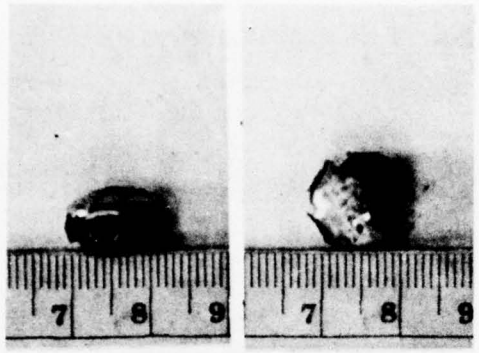
Velocity = 260 m/s



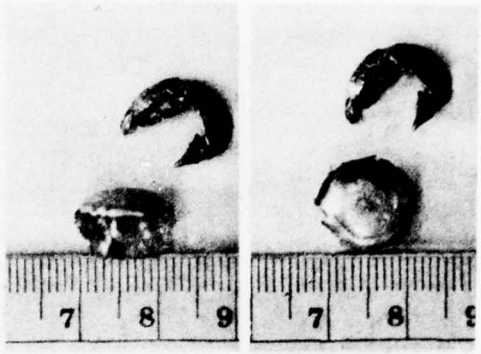
Velocity = 244 m/s

Velocity = 0 m/s

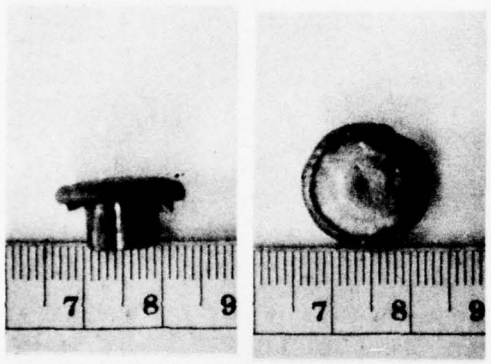
Figure 13 Effects of Striking Velocity on Bullet Deformation for REMINGTON, .38 SPECIAL, JHP, 96 GRAIN



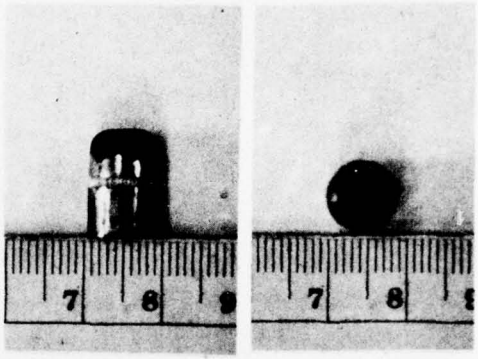
Velocity = 430 m/s



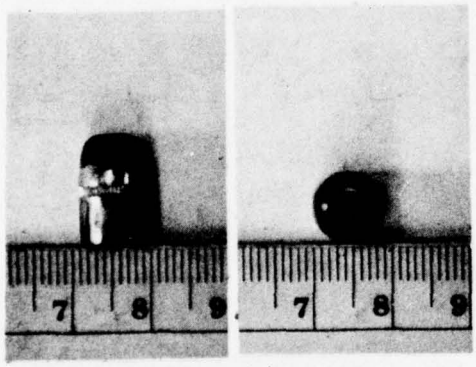
Velocity = 383 m/s



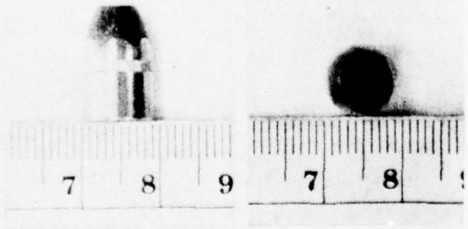
Velocity = 346 m/s



Velocity = 290 m/s

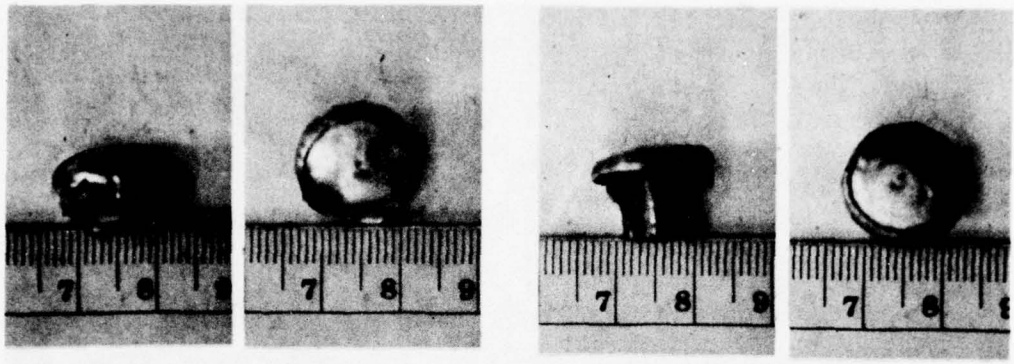


Velocity = 230 m/s



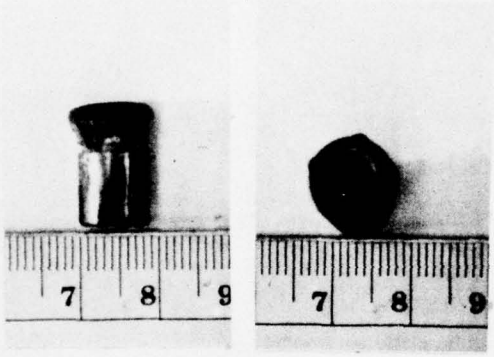
Velocity = 0 m/s

Figure 14 Effects of Striking Velocity on Bullet Deformation for REMINGTON, .357 MAG, JHP, 125 GRAIN

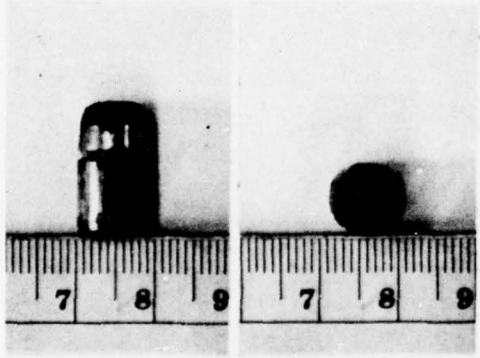


Velocity = 393 m/s

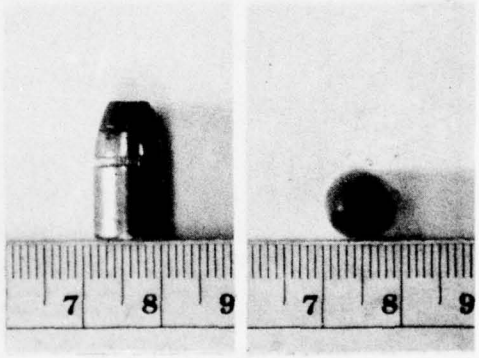
Velocity = 354 m/s



Velocity = 321 m/s

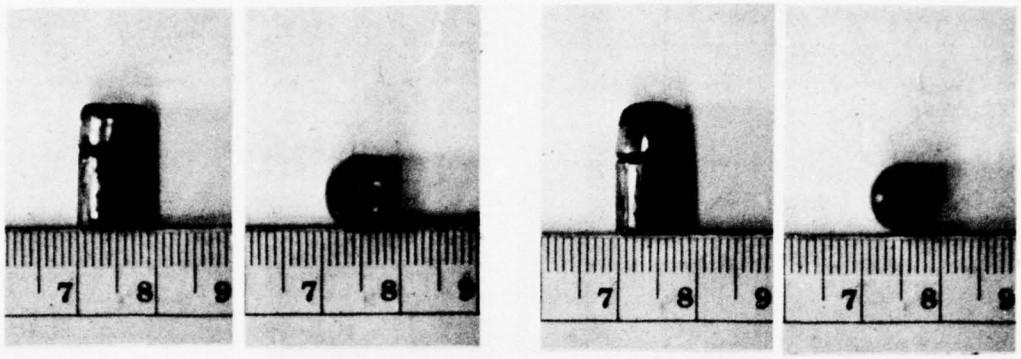


Velocity = 269 m/s



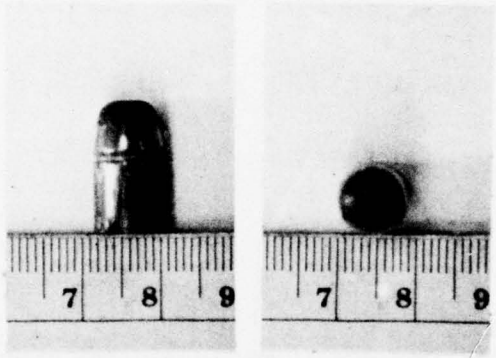
Velocity = 0 m/s

Figure 15 Effects of Striking Velocity on Bullet Deformation for REMINGTON, .357 MAG, JHP, 158 GRAIN

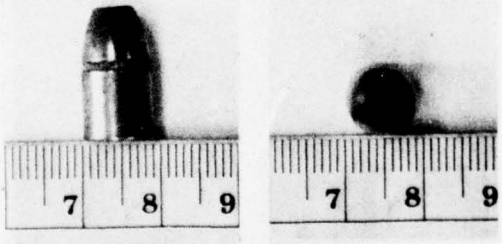


Velocity = 394 m/s

Velocity = 356 m/s

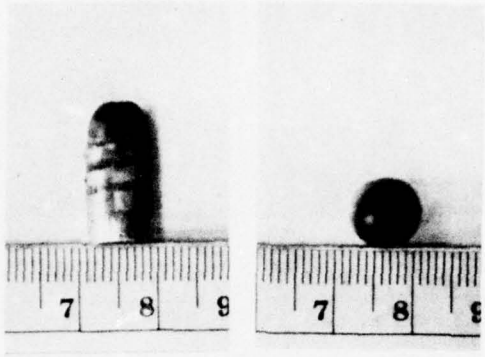


Velocity = 321 m/s

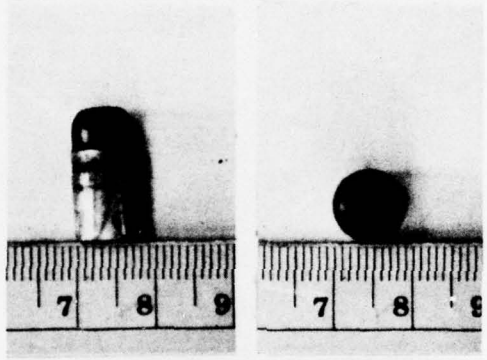


Velocity = 0 m/s

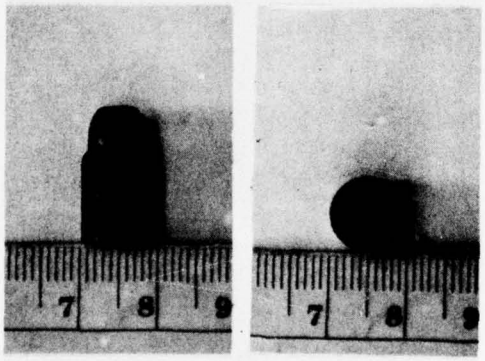
Figure 16 Effects of Striking Velocity on Bullet Deformation for REMINGTON, .357 MAG, JSP, 158 GRAIN



Velocity = 381 m/s

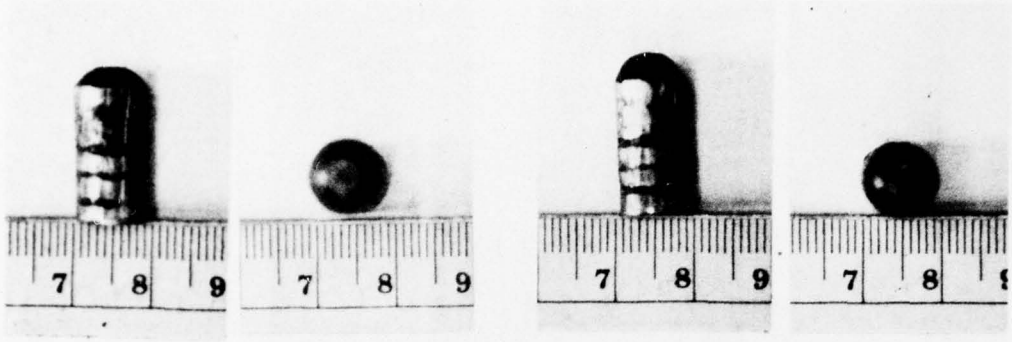


Velocity = 360 m/s



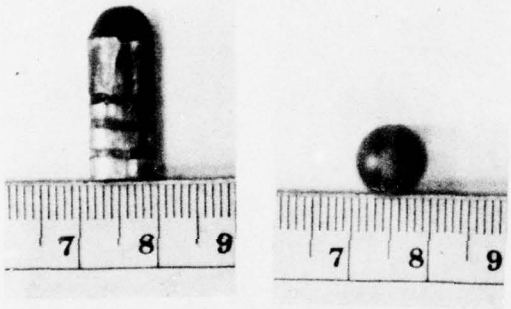
Velocity = 0 m/s

Figure 17 Effects of Striking Velocity on Bullet Deformation for REMINGTON, .357-MAG, L, 158 GRAIN

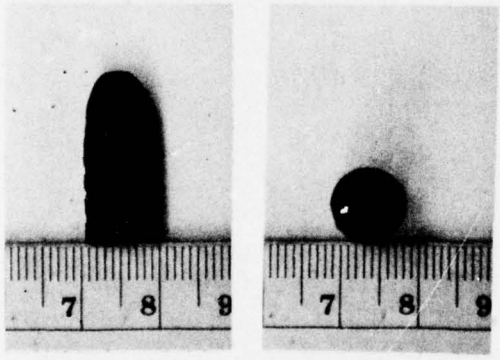


Velocity = 397 m/s

Velocity = 368 m/s

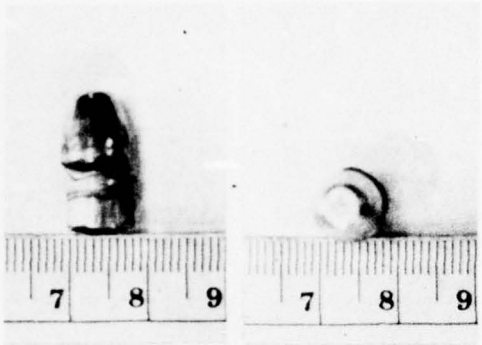


Velocity = 326 m/s

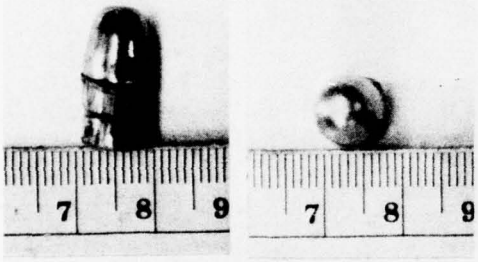


Velocity = 0 m/s

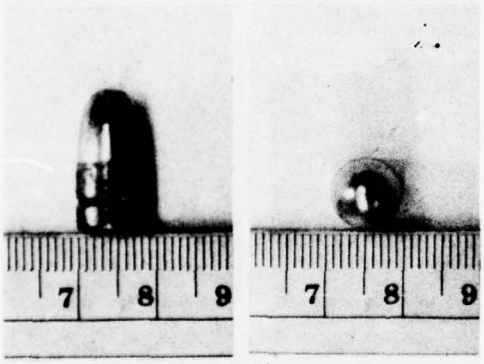
Figure 18 Effects of Striking Velocity on Bullet Deformation for REMINGTON, .38 SPECIAL, L, 200 GRAIN



Velocity = 410 m/s

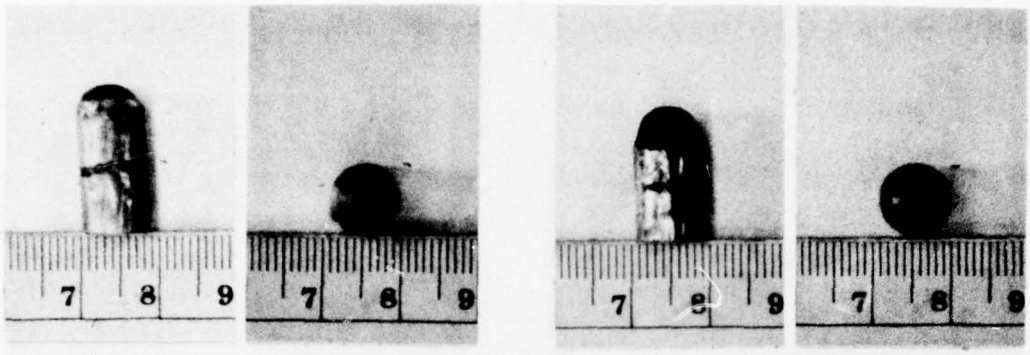


Velocity = 375 m/s



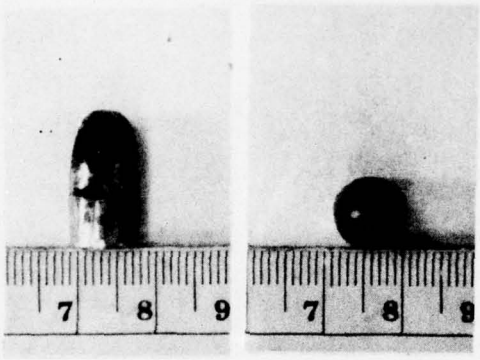
Velocity = 0 m/s

Figure 19 Effects of Striking Velocity on Bullet Deformation for REMINGTON, .38 SPECIAL, MP, 158 GRAIN

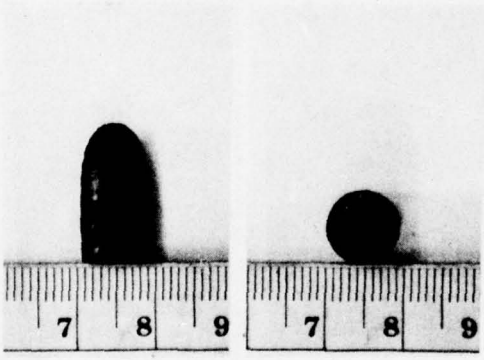


Velocity = 386 m/s

Velocity = 376 m/s

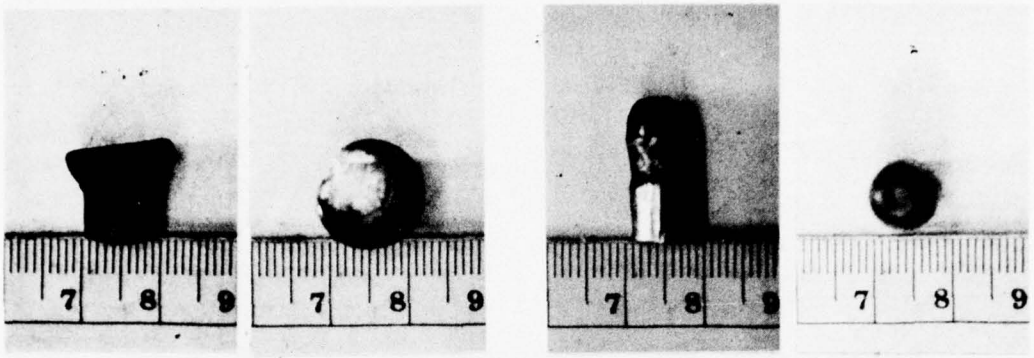


Velocity = 329 m/s



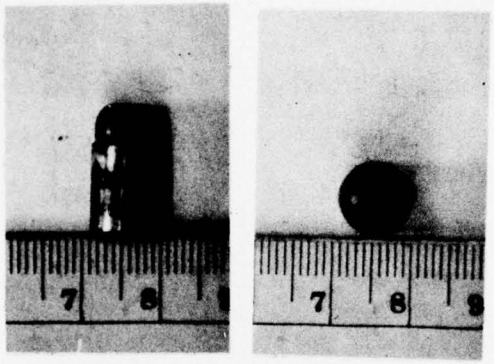
Velocity = 0 m/s

Figure 20 Effects of Striking Velocity on Bullet Deformation for REMINGTON, .38 SPECIAL, RN, 158 GRAIN

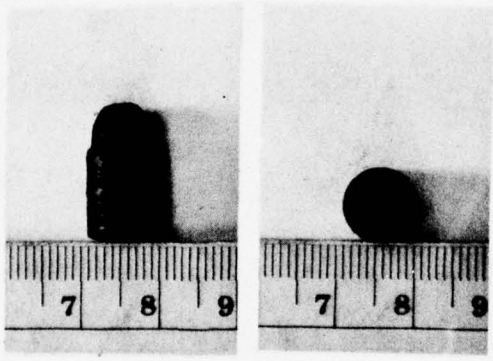


Velocity = 416 m/s

Velocity = 349 m/s

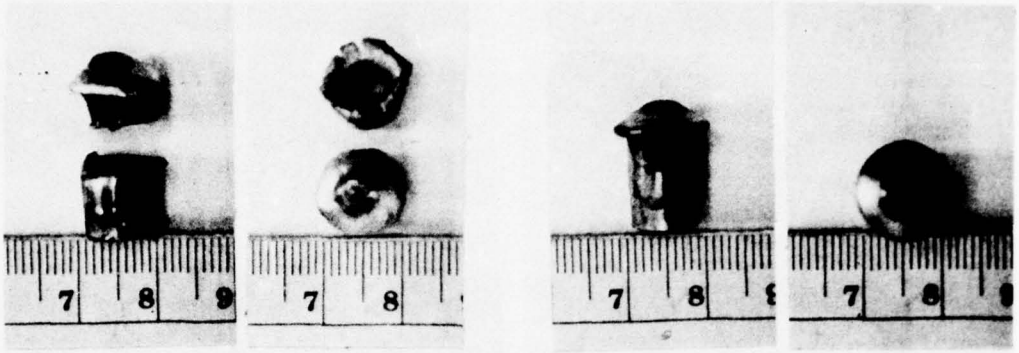


Velocity = 330 m/s



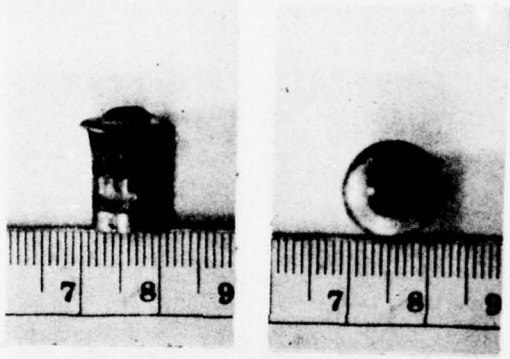
Velocity = 0 m/s

Figure 21 Effects of Striking Velocity on Bullet Deformation for REMINGTON, .38 SPECIAL, SWC, 158 GRAIN

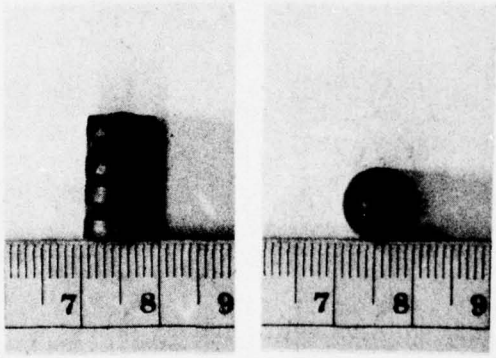


Velocity = 437 m/s

Velocity = 293 m/s

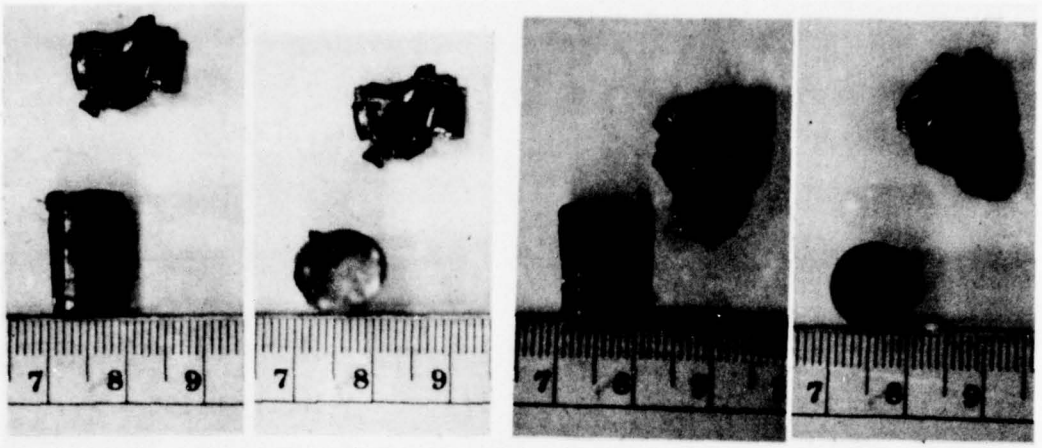


Velocity = 265 m/s



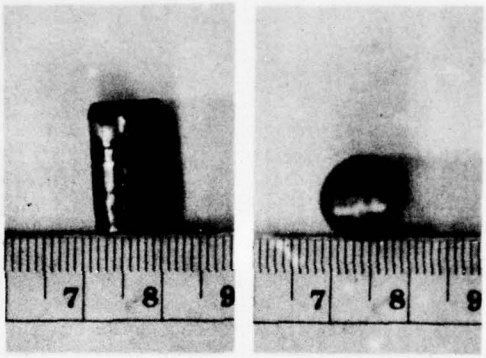
Velocity = 0 m/s

Figure 22 *Effects of Striking Velocity on Bullet Deformation for* REMINGTON, .38 SPECIAL, WC, 148 GRAIN

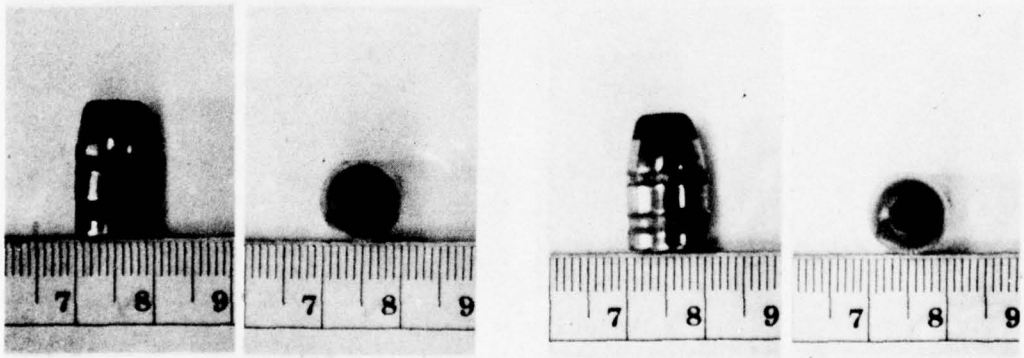


Velocity = 389 m/s

Velocity = 369 m/s



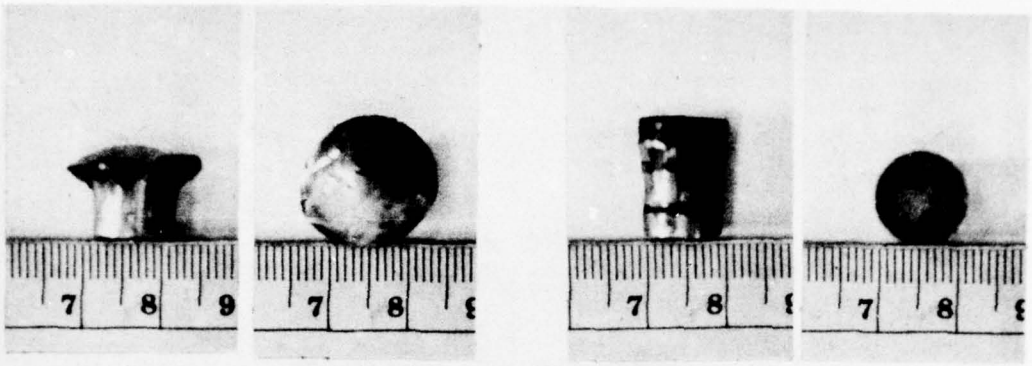
Velocity = 348 m/s



Velocity = 297 m/s

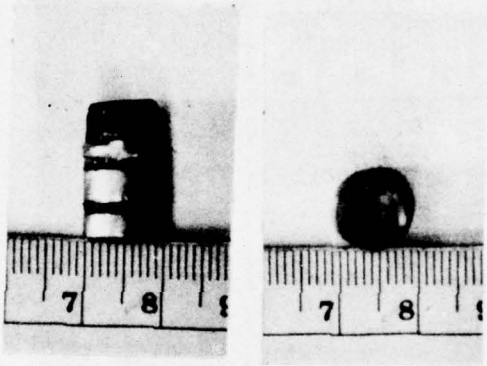
Velocity = 0 m/s

Figure 23 Effects of Striking Velocity on Bullet Deformation for REMINGTON, .41 MAG, JSP, 210 GRAIN

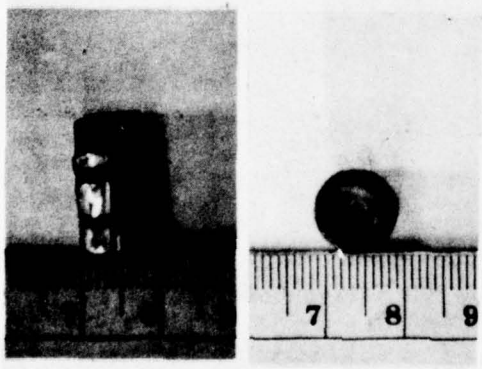


Velocity = 436 m/s

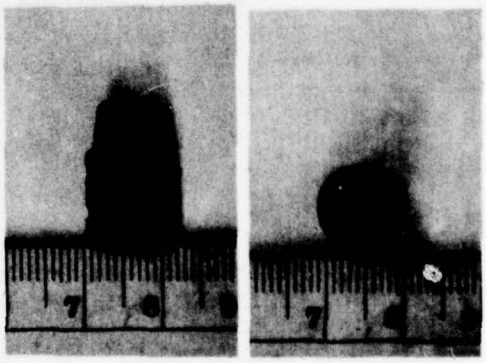
Velocity = 385 m/s



Velocity = 353 m/s

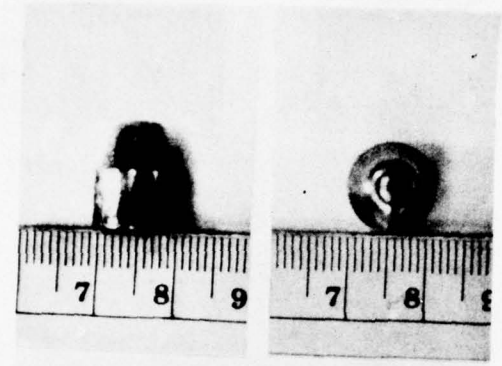


Velocity = 332 m/s

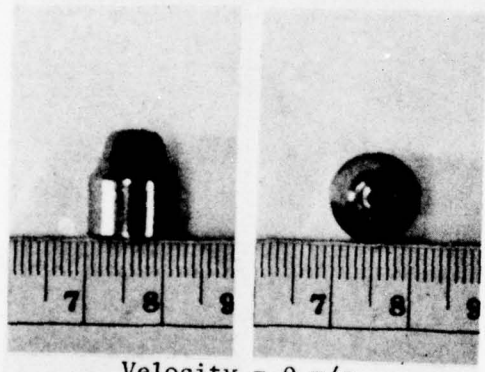


Velocity = 0 m/s

Figure 24 Effects of Striking Velocity on Bullet Deformation for REMINGTON, .41MAG, L, 210 GRAIN



Velocity = 375 m/s



Velocity = 0 m/s

Figure 25 Effects of Striking Velocity on Bullet Deformation for REMINGTON, .45 ACP, WC, 185 GRAIN

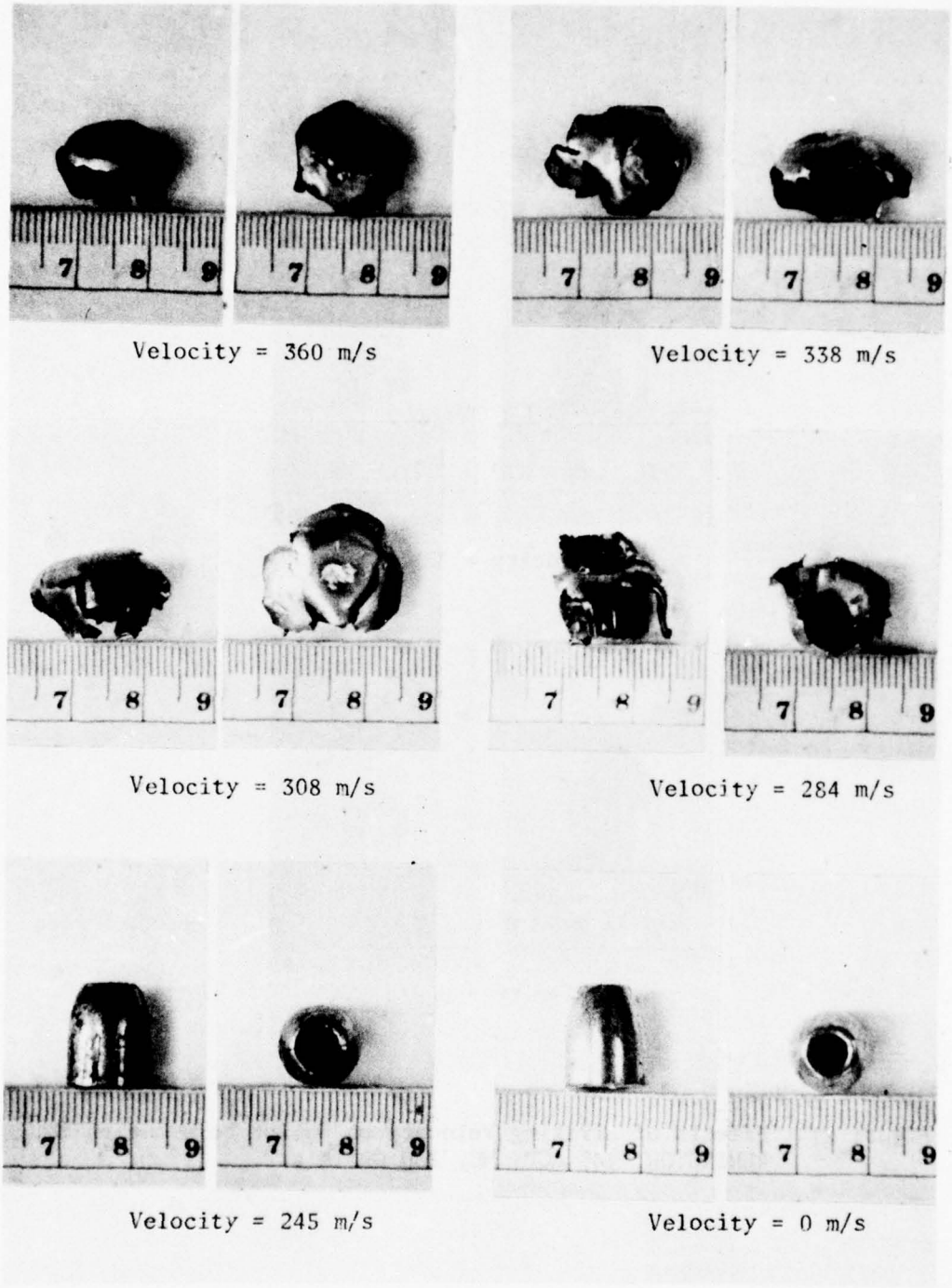
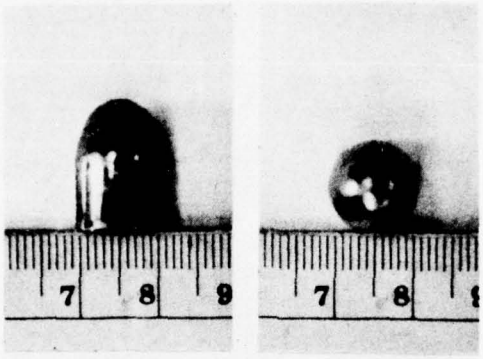
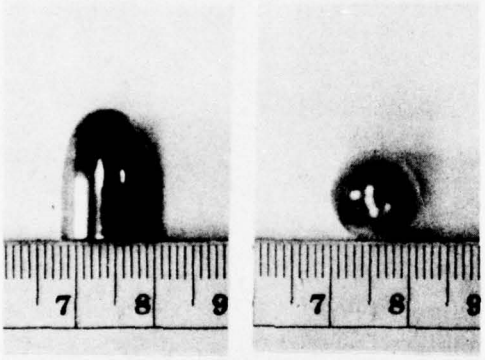


Figure 26 Effects of Striking Velocity on Bullet Deformation for REMINGTON, .45, JHP, 185 GRAIN

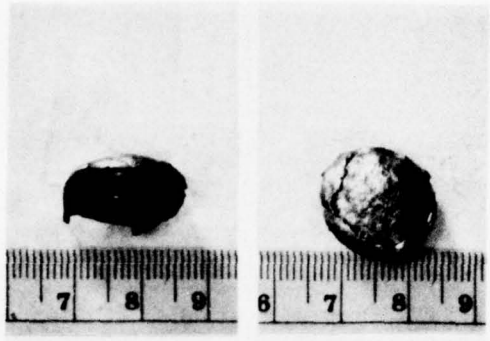


Velocity = 379 m/s

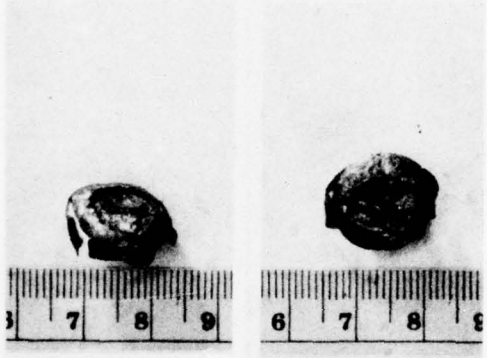


Velocity = 0 m/s

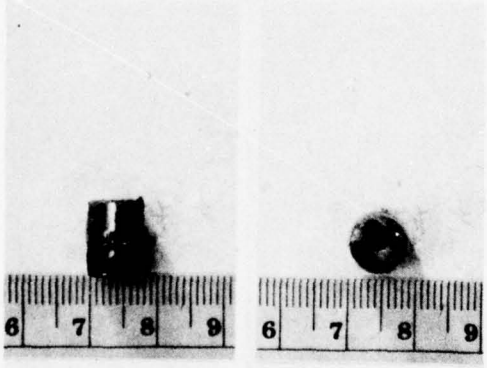
Figure 27 Effects of Striking Velocity on Bullet Deformation for REMINGTON, .45 ACP, MC, 230 GRAIN



Velocity = 440 m/s

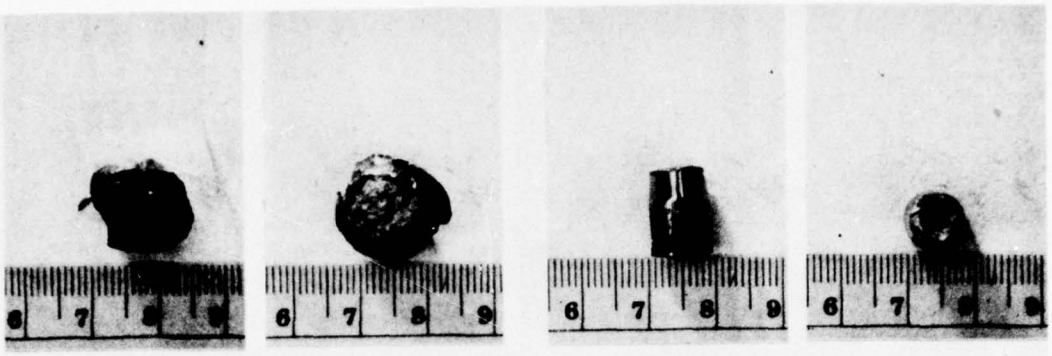


Velocity = 393 m/s



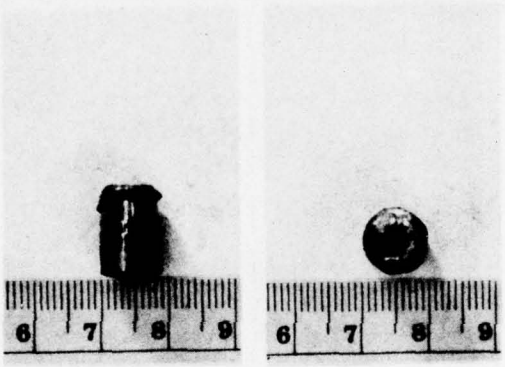
Velocity = 342 m/s

Figure 28 Effects of Striking Velocity on Bullet Deformation for SIERRA, .357 MAG, JHP, 110 GRAIN

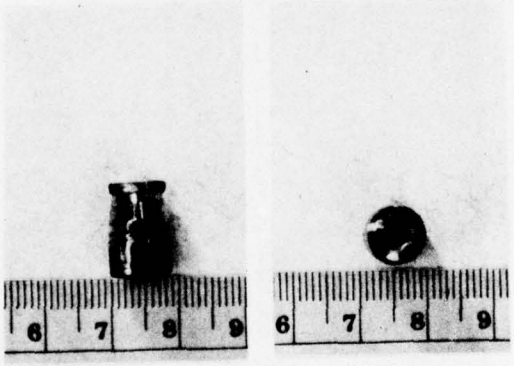


Velocity = 387 m/s

Velocity = 329 m/s

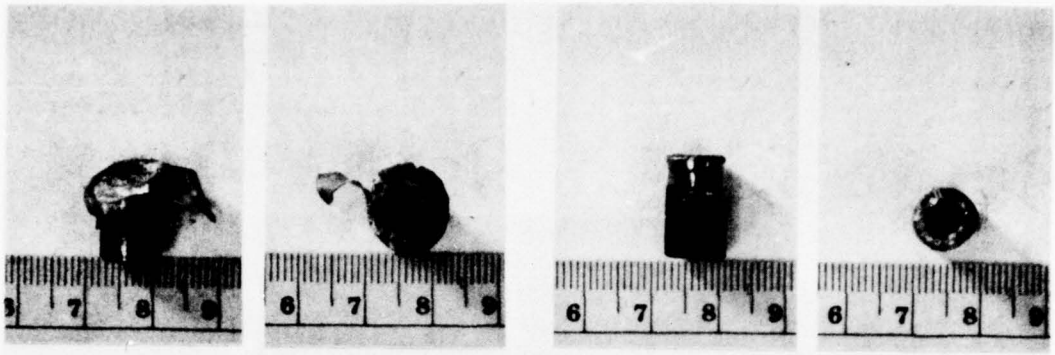


Velocity = 274 m/s



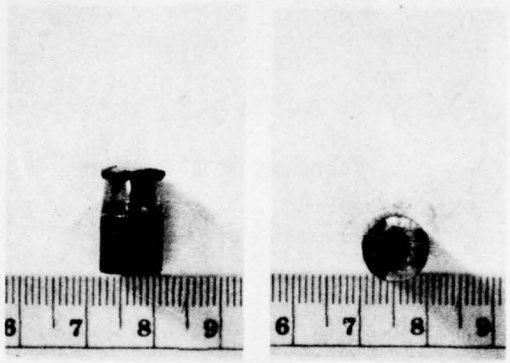
Velocity = 230 m/s

Figure 29 Effects of Striking Velocity on Bullet Deformation for SIERRA, .38 SPECIAL, JHP, 125 GRAIN

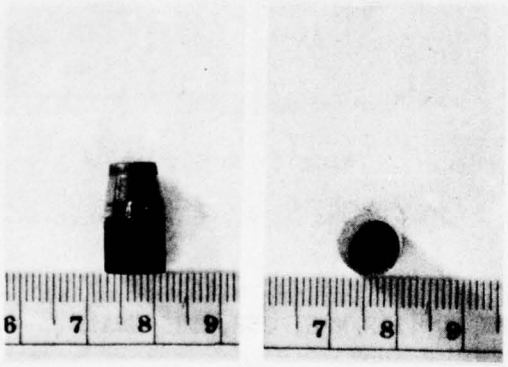


Velocity = 350 m/s

Velocity = 292 m/s



Velocity = 245 m/s



Velocity = 152 m/s

Figure 30 Effects of Striking Velocity on Bullet Deformation for SIERRA, .38 SPECIAL, JHP, 150 GRAIN

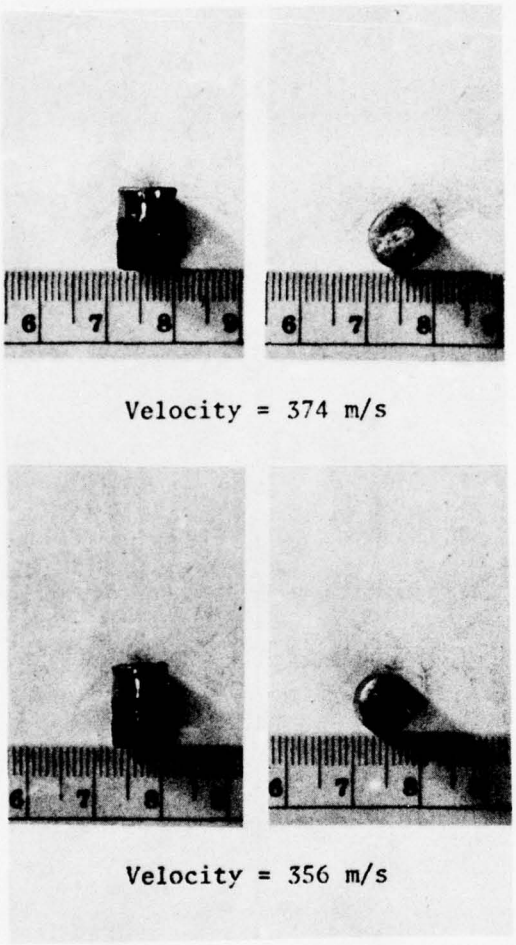
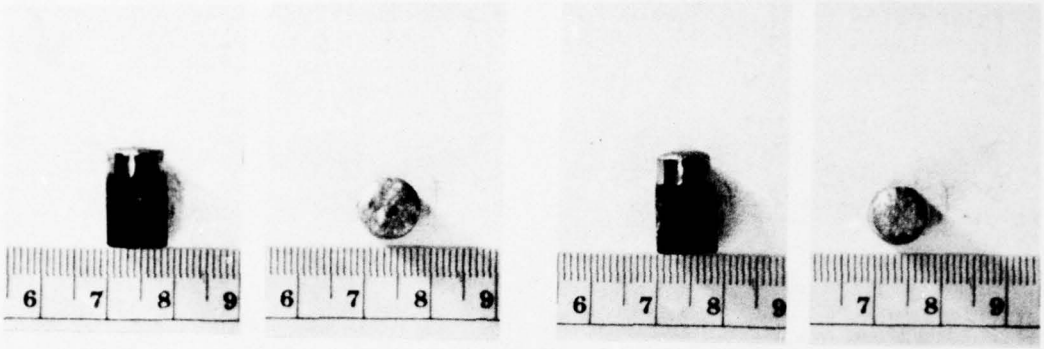
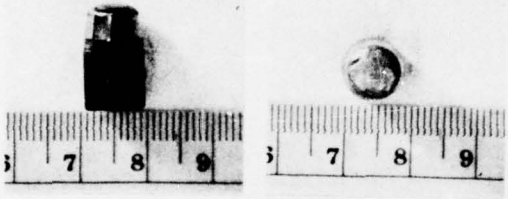


Figure 31 Effects of Striking Velocity on Bullet Deformation for SIERRA, .357 MAG, JSP, 125 GRAIN

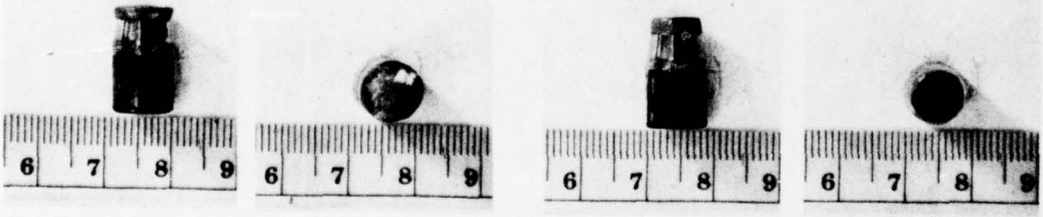


Velocity = 385 m/s

Velocity = 345 m/s



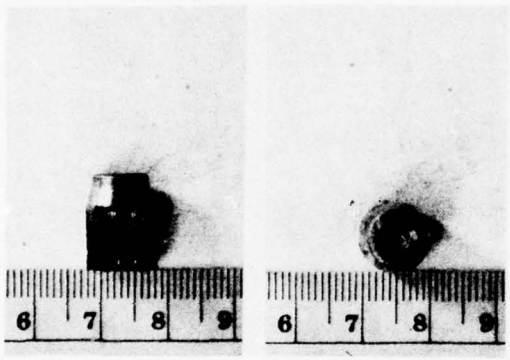
Velocity = 295 m/s



Velocity = 260 m/s

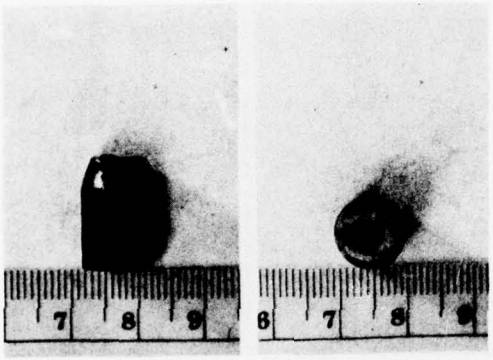
Velocity = 180 m/s

Figure 32 Effects of Striking Velocity on Bullet Deformation for SIERRA, .38 SPECIAL, JSP, 158 GRAIN



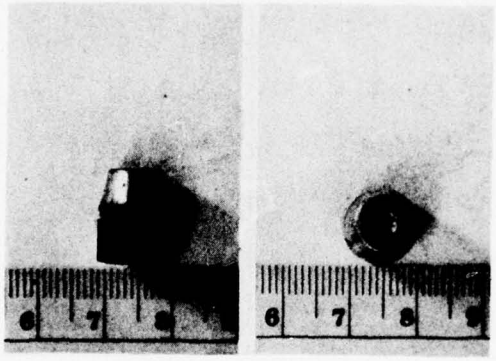
Velocity = 355 m/s

Figure 33 Effects of Striking Velocity on Bullet Deformation for SIERRA, .41 MAG, JHP, 170 GRAIN



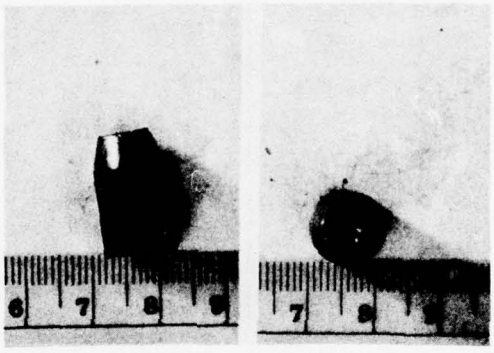
Velocity = 353 m/s

Figure 34 Effects of Striking Velocity on Bullet Deformation for SIERRA, .41 MAG, JHP, 210 GRAIN



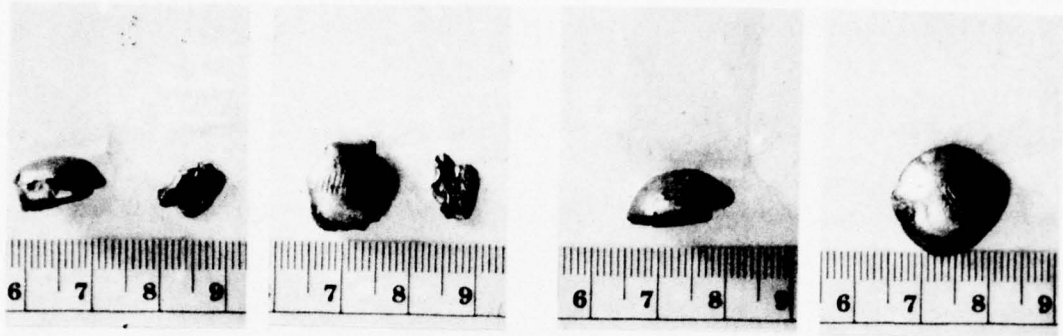
Velocity = 371 m/s

Figure 35 Effects of Striking Velocity on Bullet Deformation for SIERRA, .44 MAG, JHP, 180 GRAIN



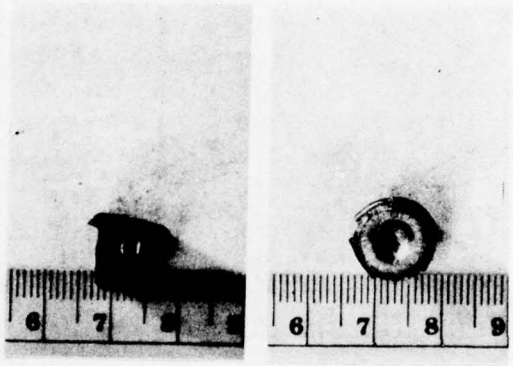
Velocity = 369 m/s

Figure 36 Effects of Striking Velocity on Bullet Deformation for SIERRA, .44 MAG, JHP, 240 GRAIN

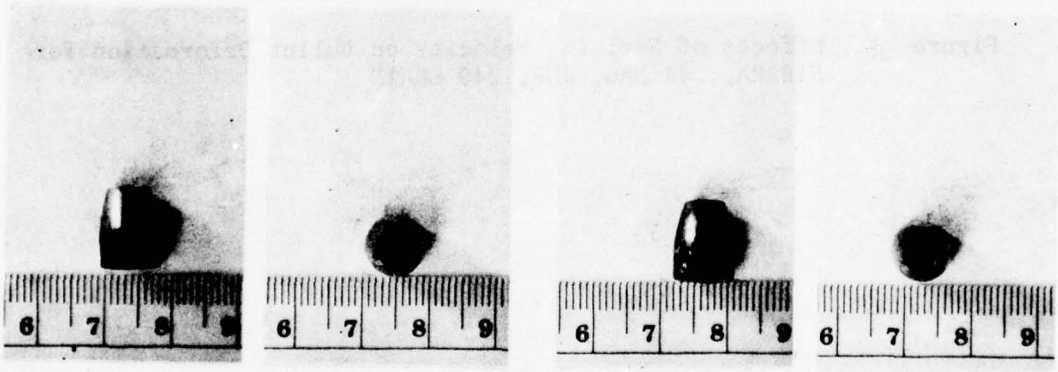


Velocity = 461 m/s

Velocity = 420 m/s



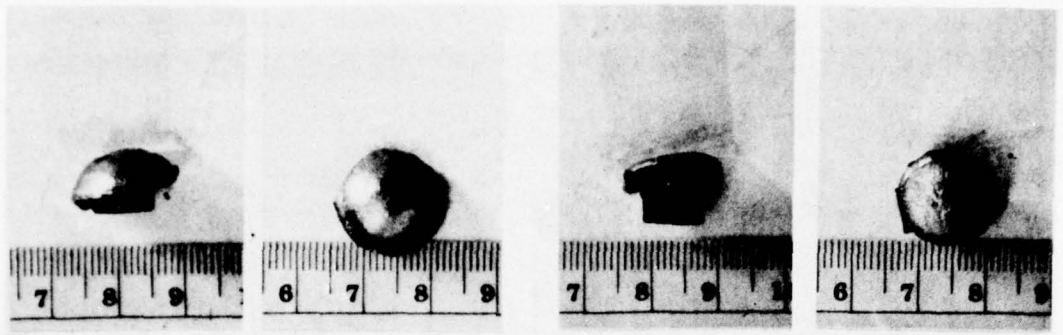
Velocity = 335 m/s



Velocity = 255 m/s

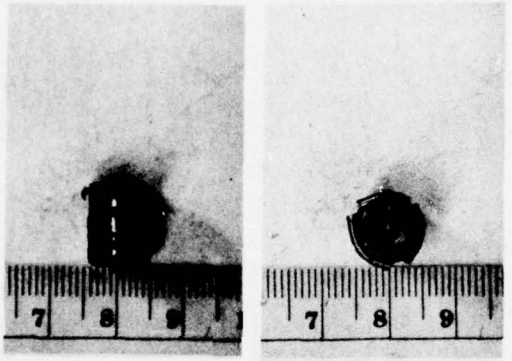
Velocity = 183 m/s

Figure 37 Effects of Striking Velocity on Bullet Deformation for SMITH & WESSON, 9 MM, JHP, 100 GRAIN

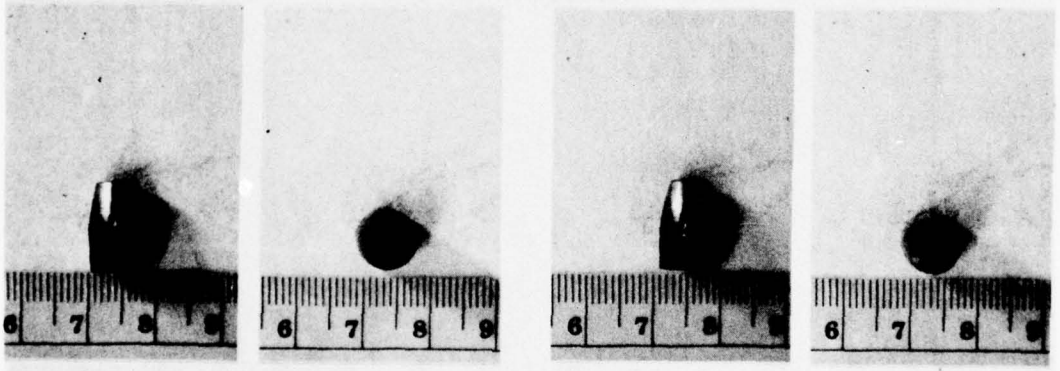


Velocity = 427 m/s

Velocity = 382 m/s



Velocity = 366 m/s



Velocity = 263 m/s

Velocity = 156 m/s

Figure 38 Effects of Striking Velocity on Bullet Deformation for SMITH & WESSON, 9 MM, JHP, 115 GRAIN

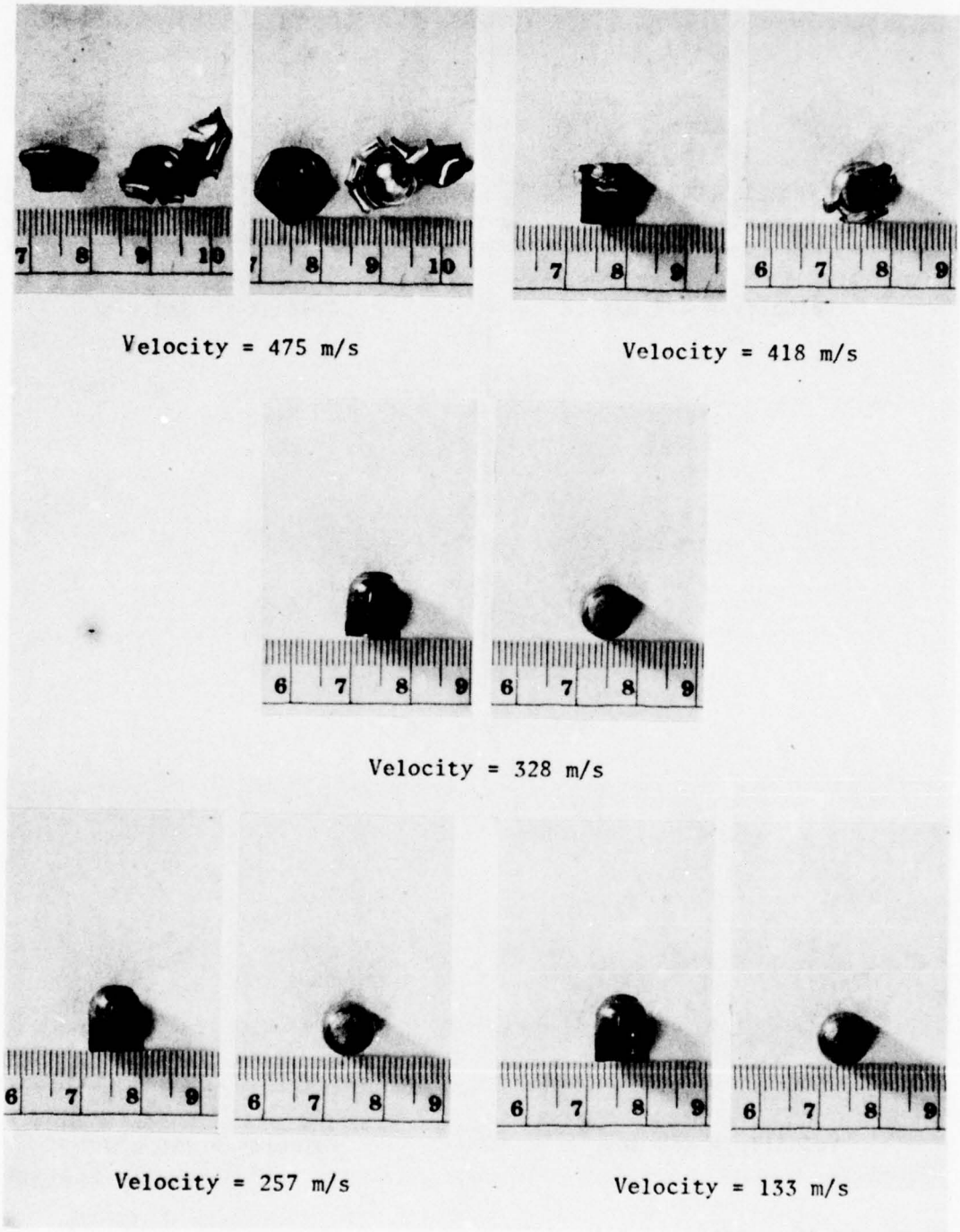
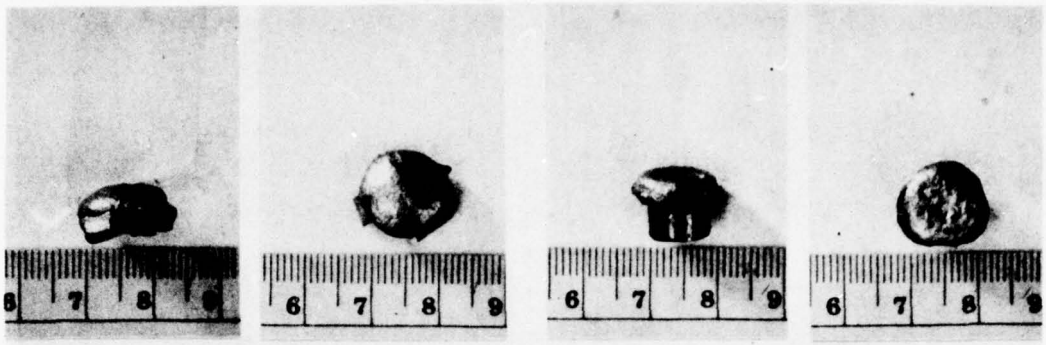
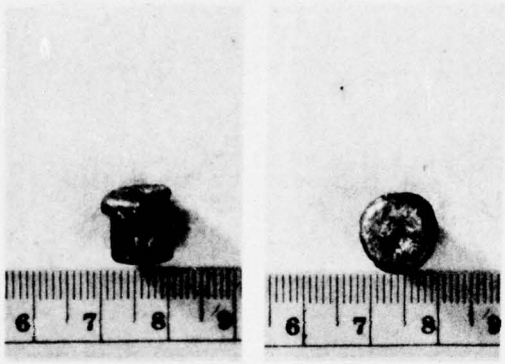


Figure 39 Effects of Striking Velocity on Bullet Deformation for SMITH & WESSON, 9 MM, JSP, 90 GRAIN

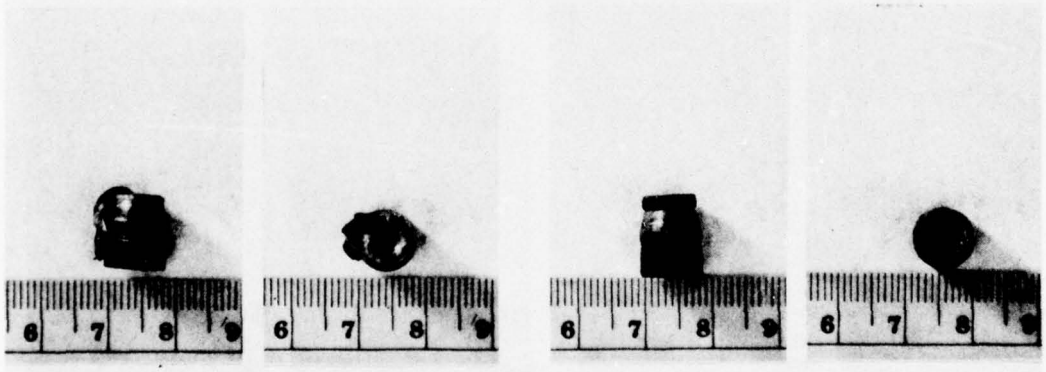


Velocity = 526 m/s

Velocity = 342 m/s



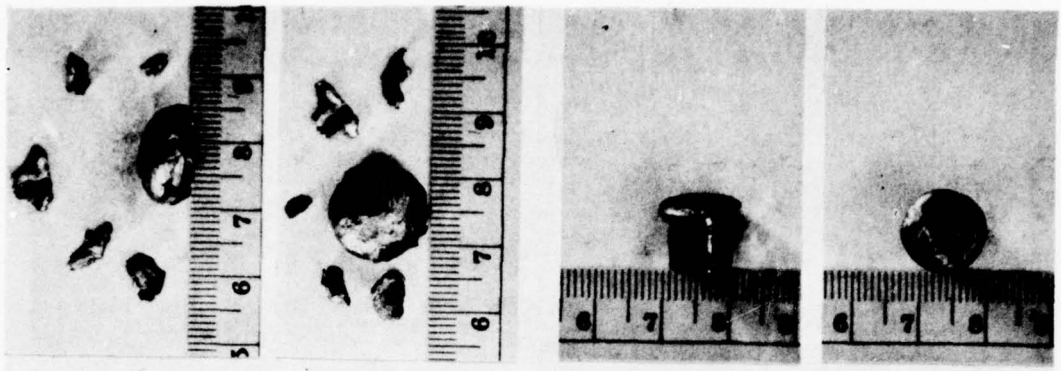
Velocity = 311 m/s



Velocity = 236 m/s

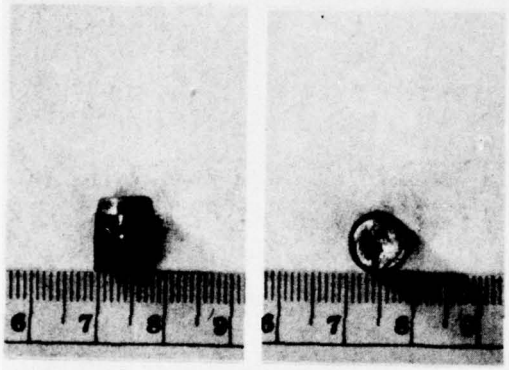
Velocity = 190 m/s

Figure 40 Effects of Striking Velocity on Bullet Deformation for SMITH & WESSON, .357 MAG, JHP, 110 GRAIN

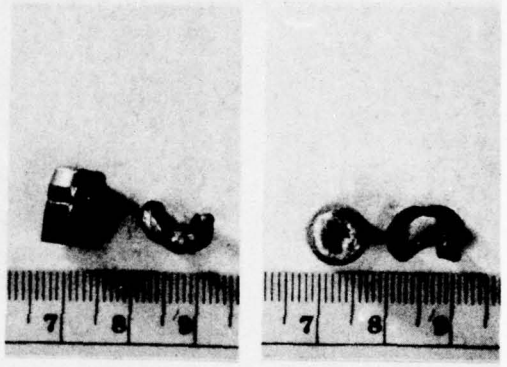


Velocity = 544 m/s

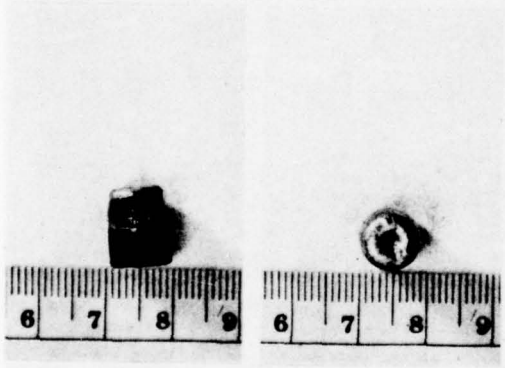
Velocity = 387 m/s



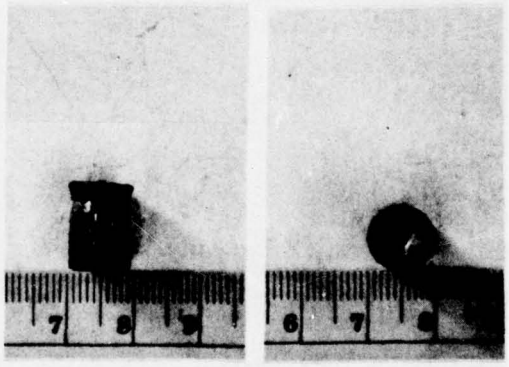
Velocity = 307 m/s



Velocity = 279 m/s

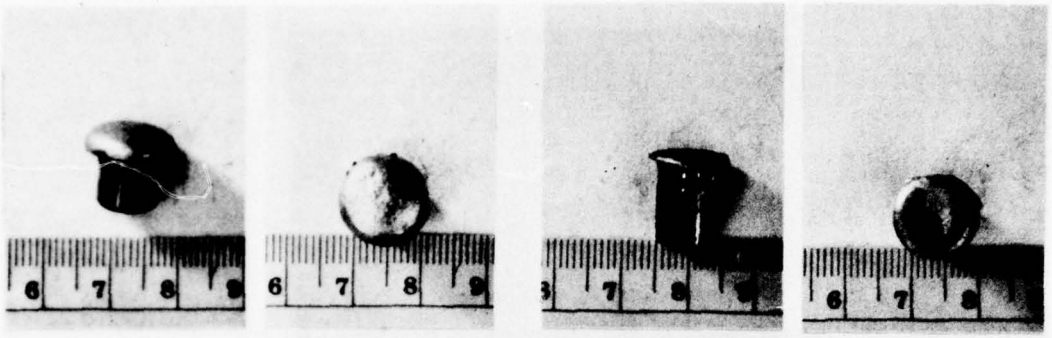


Velocity = 250 m/s



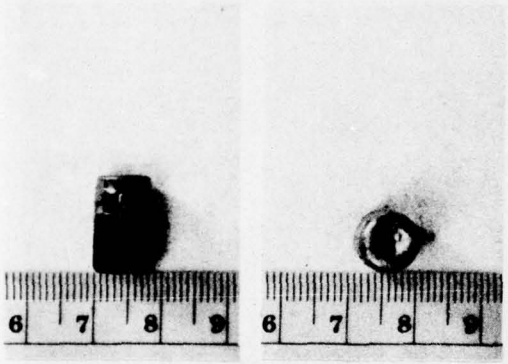
Velocity = 209 m/s

Figure 41 Effects of Striking Velocity on Bullet Deformation for SMITH & WESSON, .357 MAG, JHP, 125 GRAIN

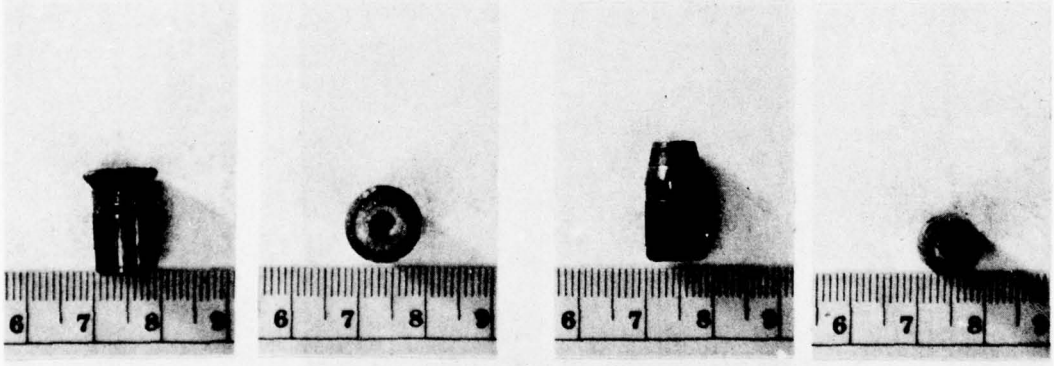


Velocity = 448 m/s

Velocity = 371 m/s



Velocity = 346 m/s



Velocity = 240 m/s

Velocity = 154 m/s

Figure 42 Effects of Striking Velocity on Bullet Deformation for SMITH & WESSON, .357 MAG, JHP, 158 GRAIN

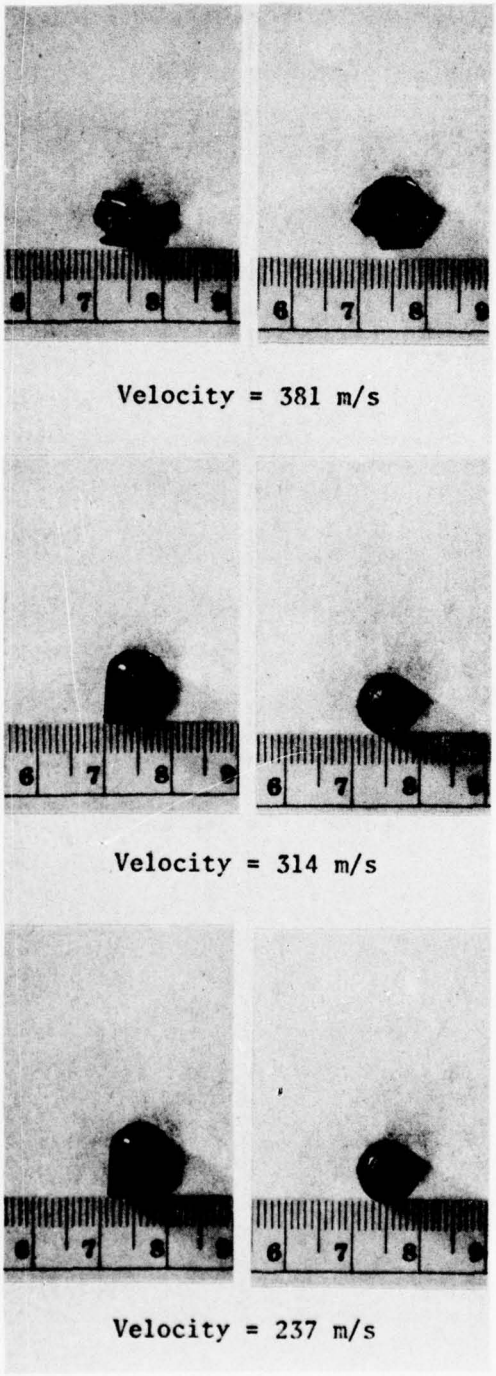
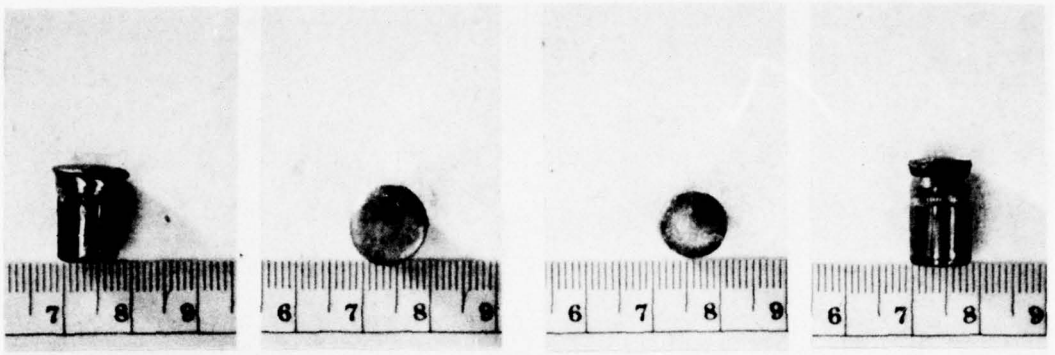
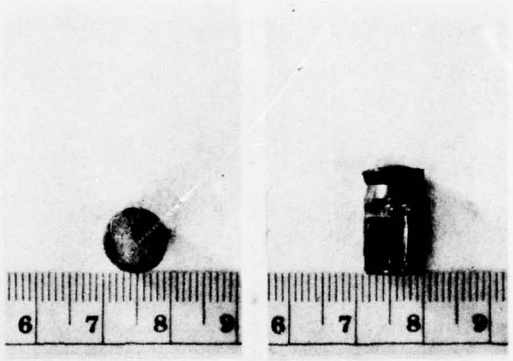


Figure 43 Effects of Striking Velocity on Bullet Deformation for SMITH & WESSON, .38 SPECIAL, JSP, 90 GRAIN

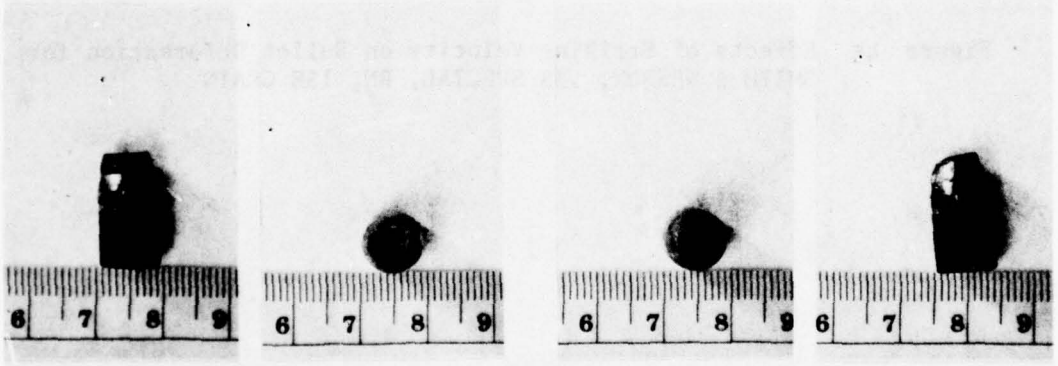


Velocity = 476 m/s

Velocity = 328 m/s



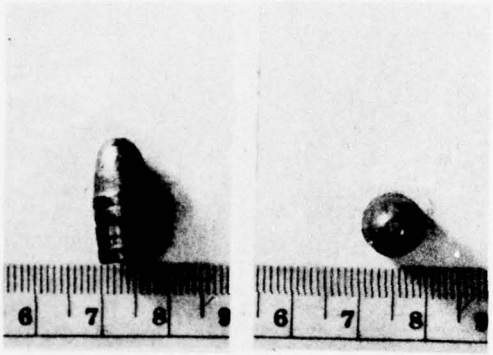
Velocity = 317 m/s



Velocity = 291 m/s

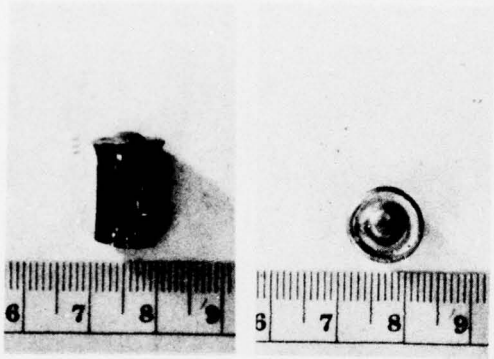
Velocity = 230 m/s

Figure 44 Effects of Striking Velocity on Bullet Deformation for SMITH & WESSON, .357 MAG, JSP, 158 GRAIN



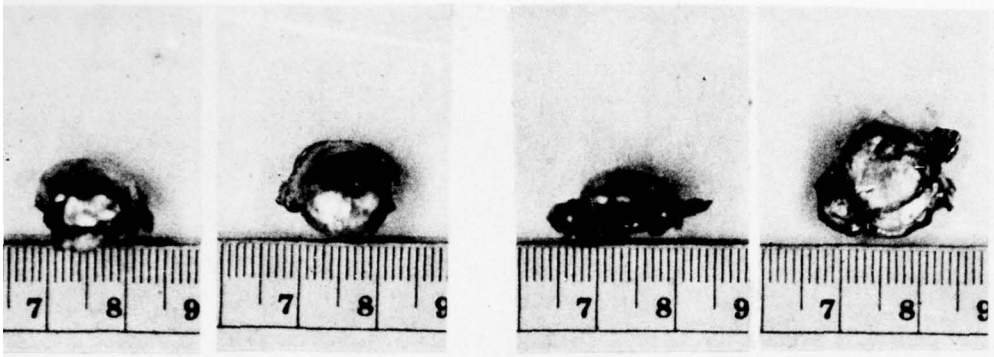
Velocity = 265 m/s

Figure 45 Effects of Striking Velocity on Bullet Deformation for SMITH & WESSON, .38 SPECIAL, RN, 158 GRAIN



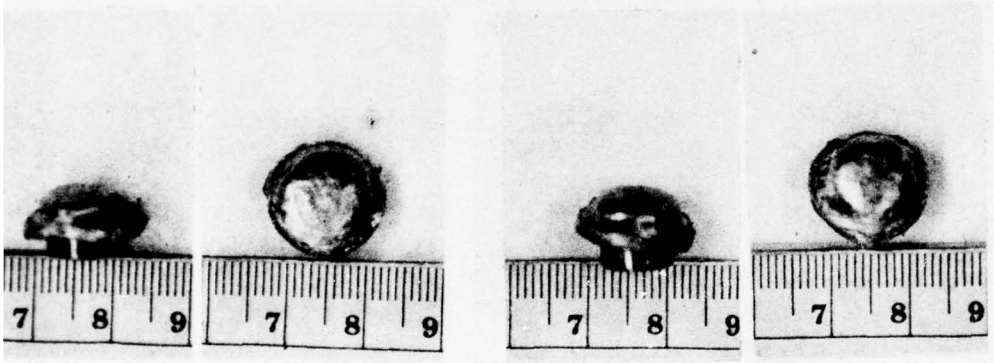
Velocity = 250 m/s

Figure 46 Effects of Striking Velocity on Bullet Deformation for SMITH & WESSON, .38 SPECIAL, WC, 148 GRAIN



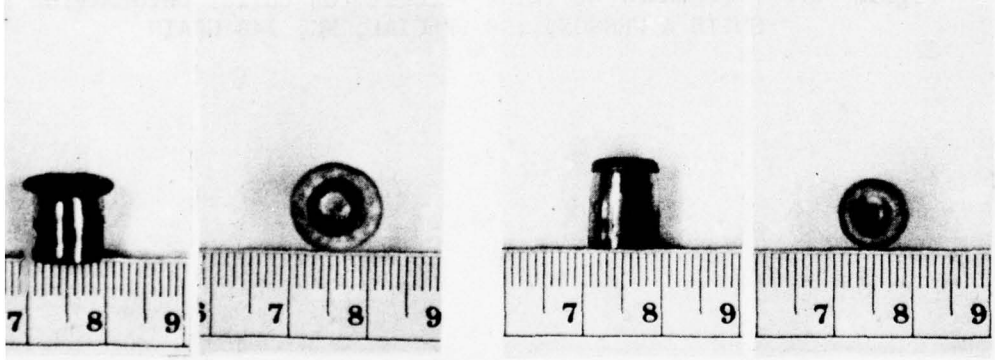
Velocity = 453 m/s

Velocity = 439 m/s



Velocity = 380 m/s

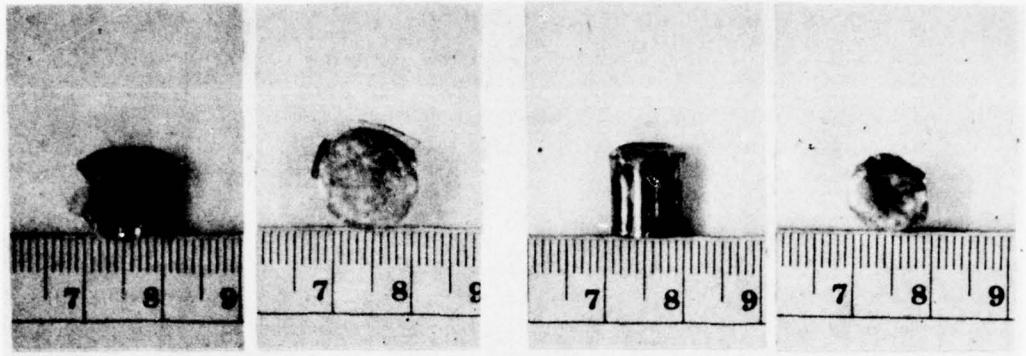
Velocity = 369 m/s



Velocity = 297 m/s

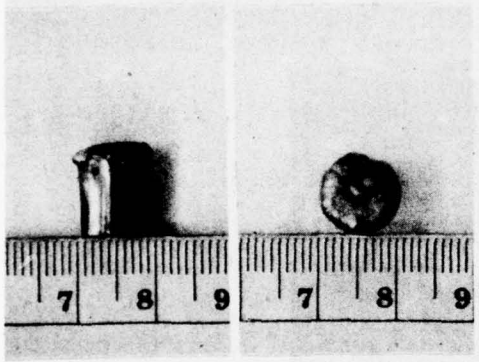
Velocity = 267 m/s

Figure 47 Effects of Striking Velocity on Bullet Deformation for SPEER, 9MM, JHP, 100 GRAIN

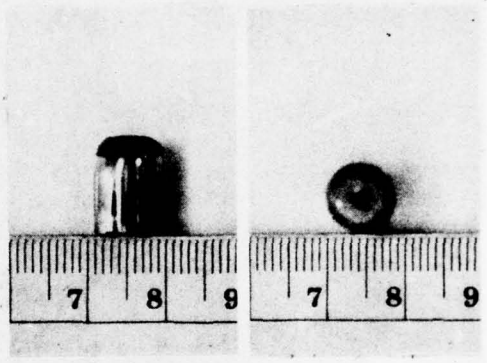


Velocity = 412 m/s

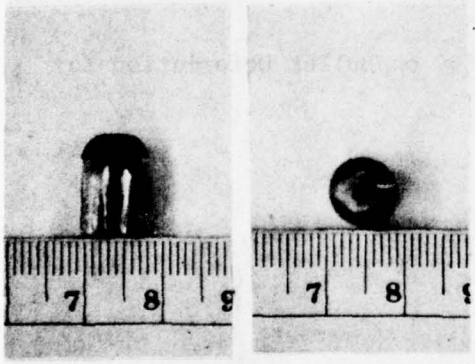
Velocity = 387 m/s



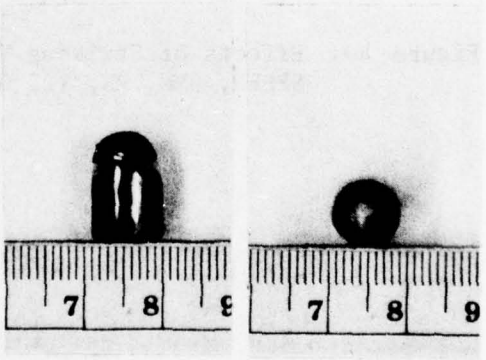
Velocity = 385 m/s



Velocity = 344 m/s

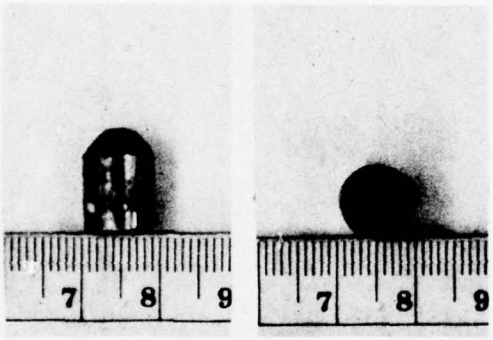


Velocity = 326 m/s



Velocity = 267 m/s

Figure 48 Effects of Striking Velocity on Bullet Deformation for SPEER, 9MM, JSP, 125 GRAIN



Velocity = 418 m/s

Figure 49 Effects of Striking Velocity on Bullet Deformation for SPEER, 9MM, RN, 125 GRAIN

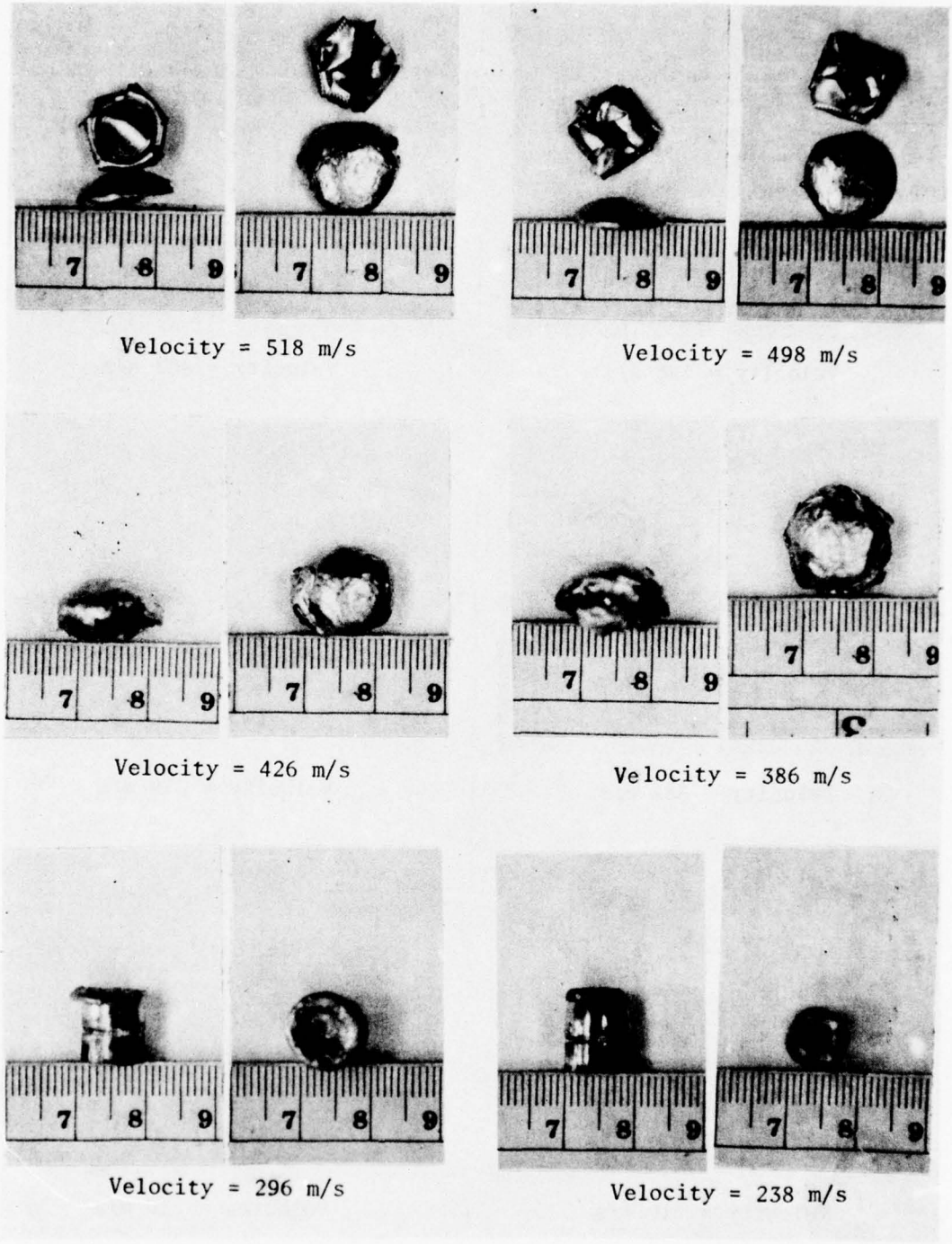


Figure 50 Effects of Striking Velocity on Bullet Deformation for SPEER, .357, JHP, 110 GRAIN

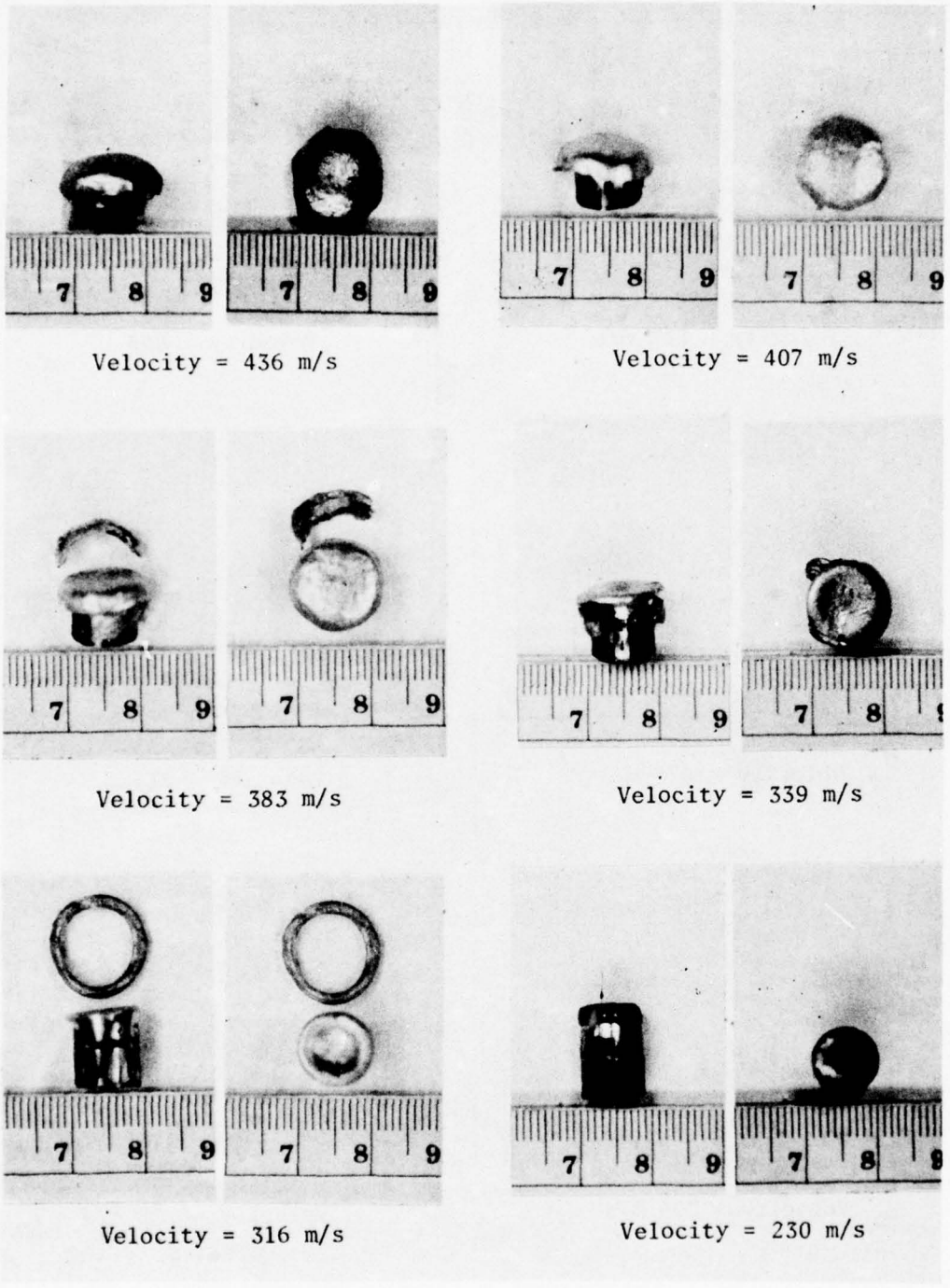
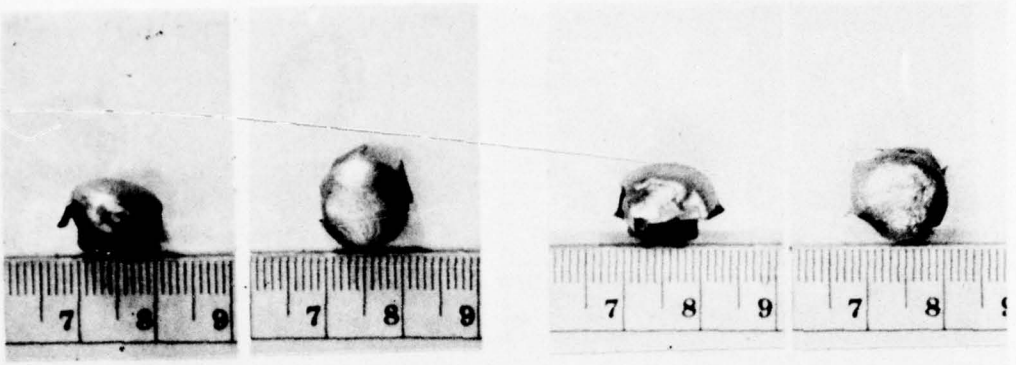
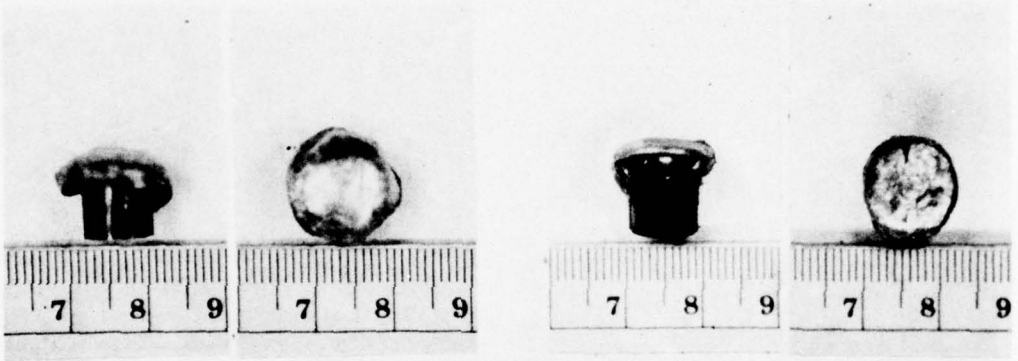


Figure 51 Effects of Striking Velocity on Bullet Deformation for SPEER, .38, JHP, 125 GRAIN



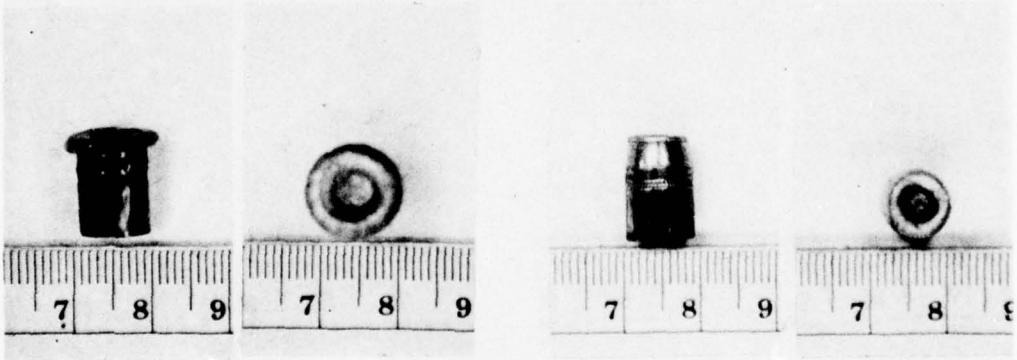
Velocity = 461 m/s

Velocity = 432 m/s



Velocity = 378 m/s

Velocity = 315 m/s



Velocity = 306 m/s

Velocity = 232 m/s

Figure 52 Effects of Striking Velocity on Bullet Deformation for SPEER, .38, JHP, 140 GRAIN

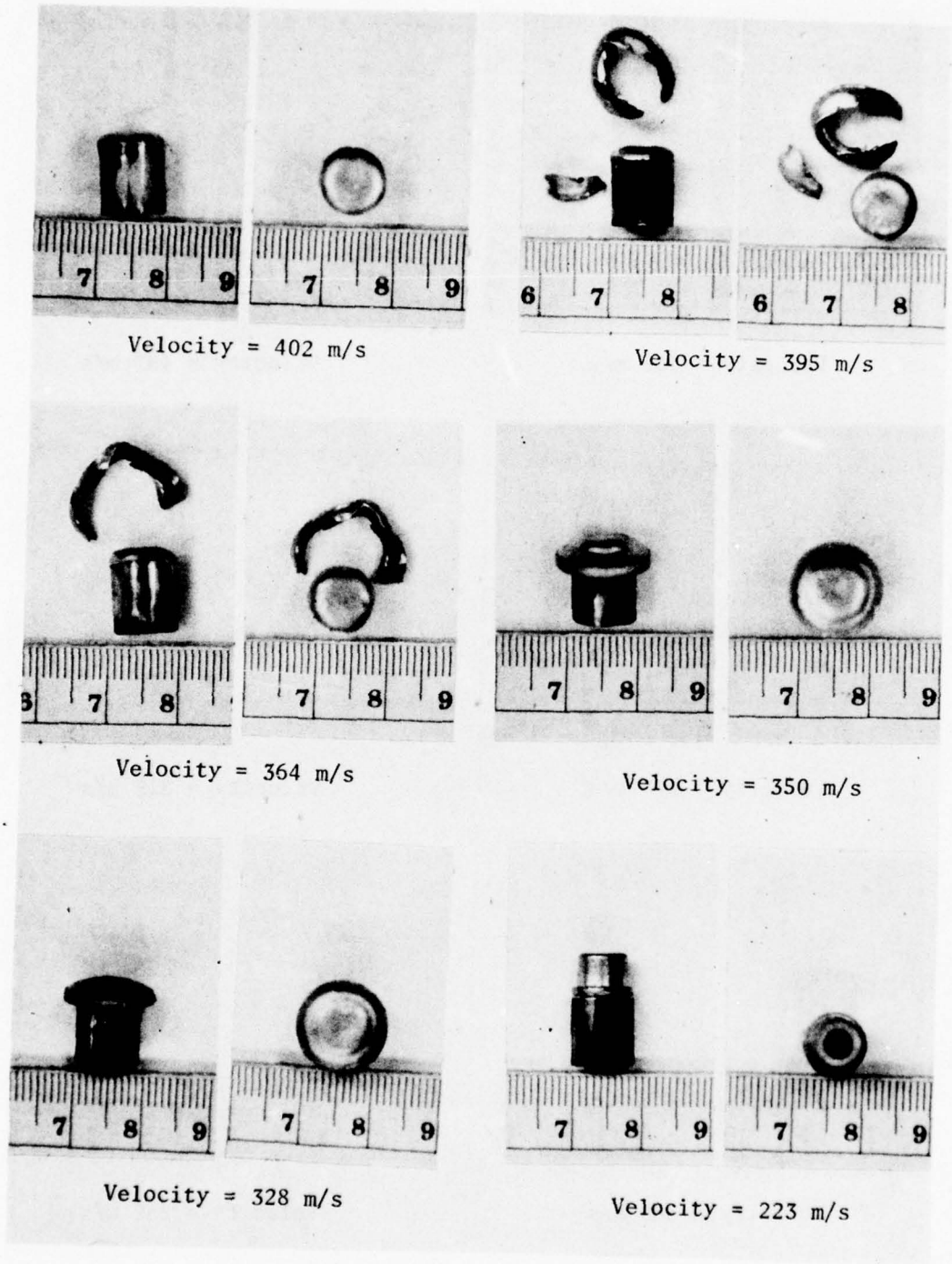


Figure 53 Effects of Striking Velocity on Bullet Deformation for SPEER, .38, JHP, 146 GRAIN

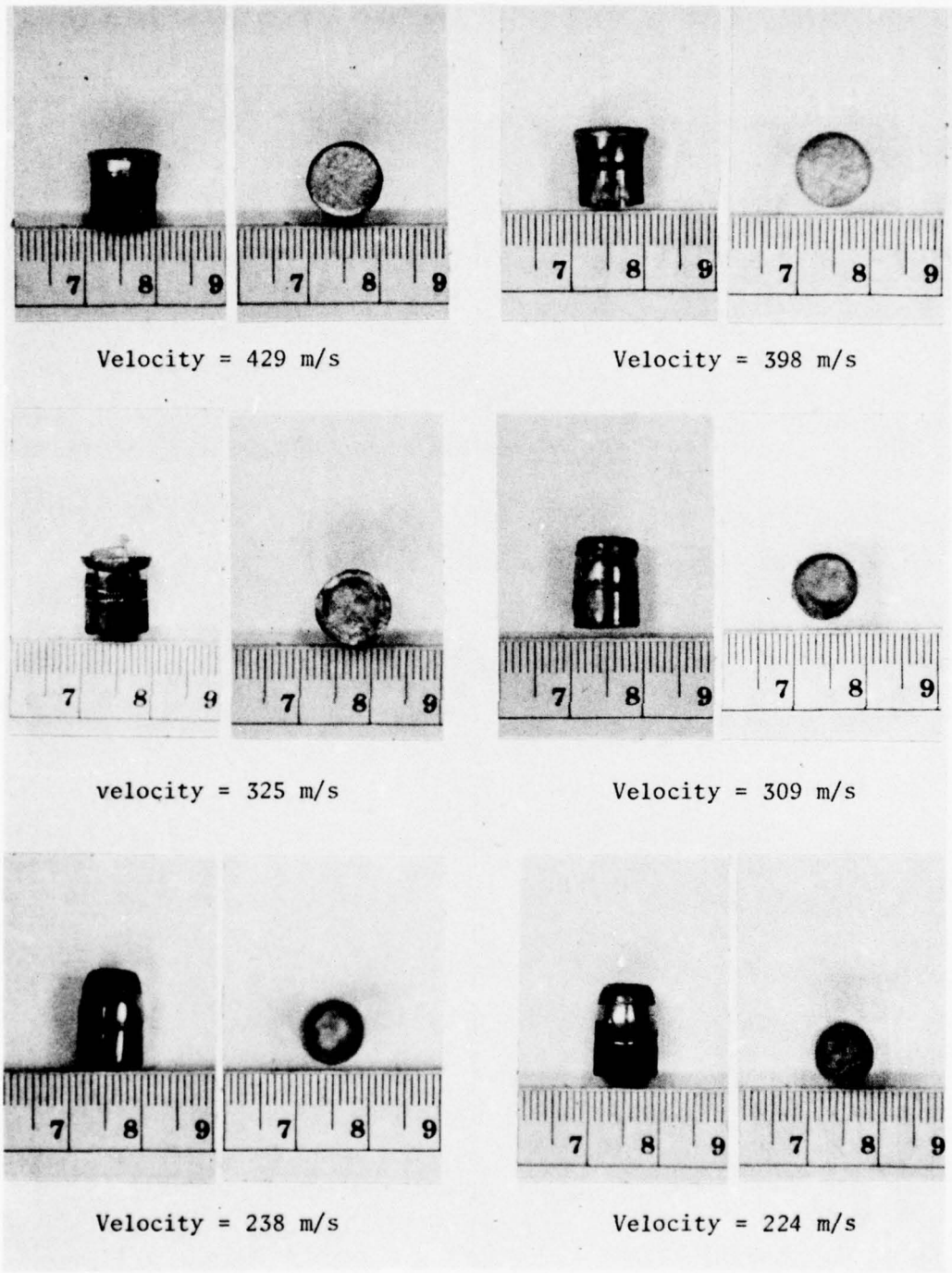


Figure 54 Effects of Striking Velocity on Bullet Deformation for SPEER, .38, JSP, 125 GRAIN

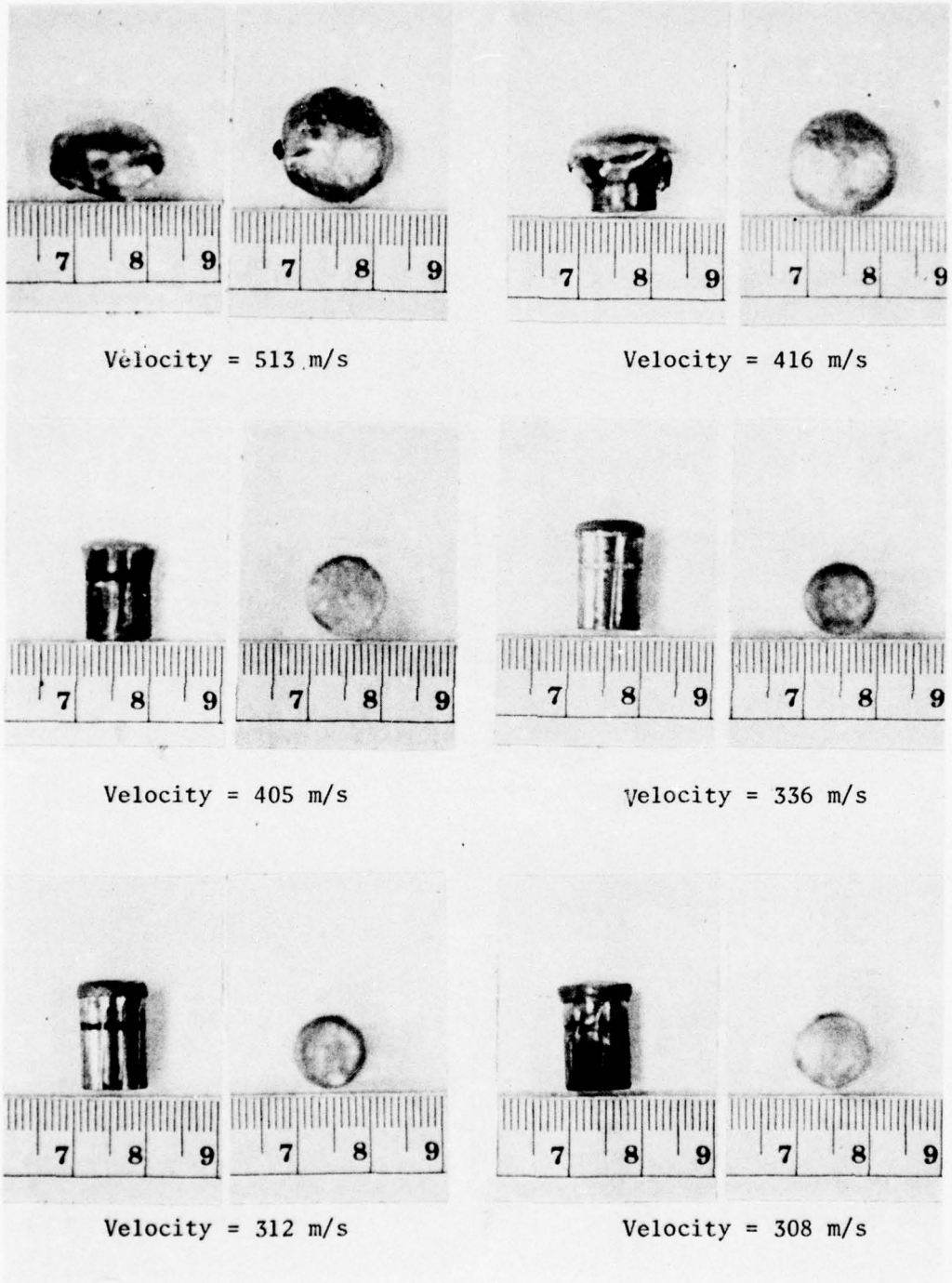


Figure 55 Effects of Striking Velocity on Bullet Deformation for SPEER, .38, JSP, 158 GRAIN

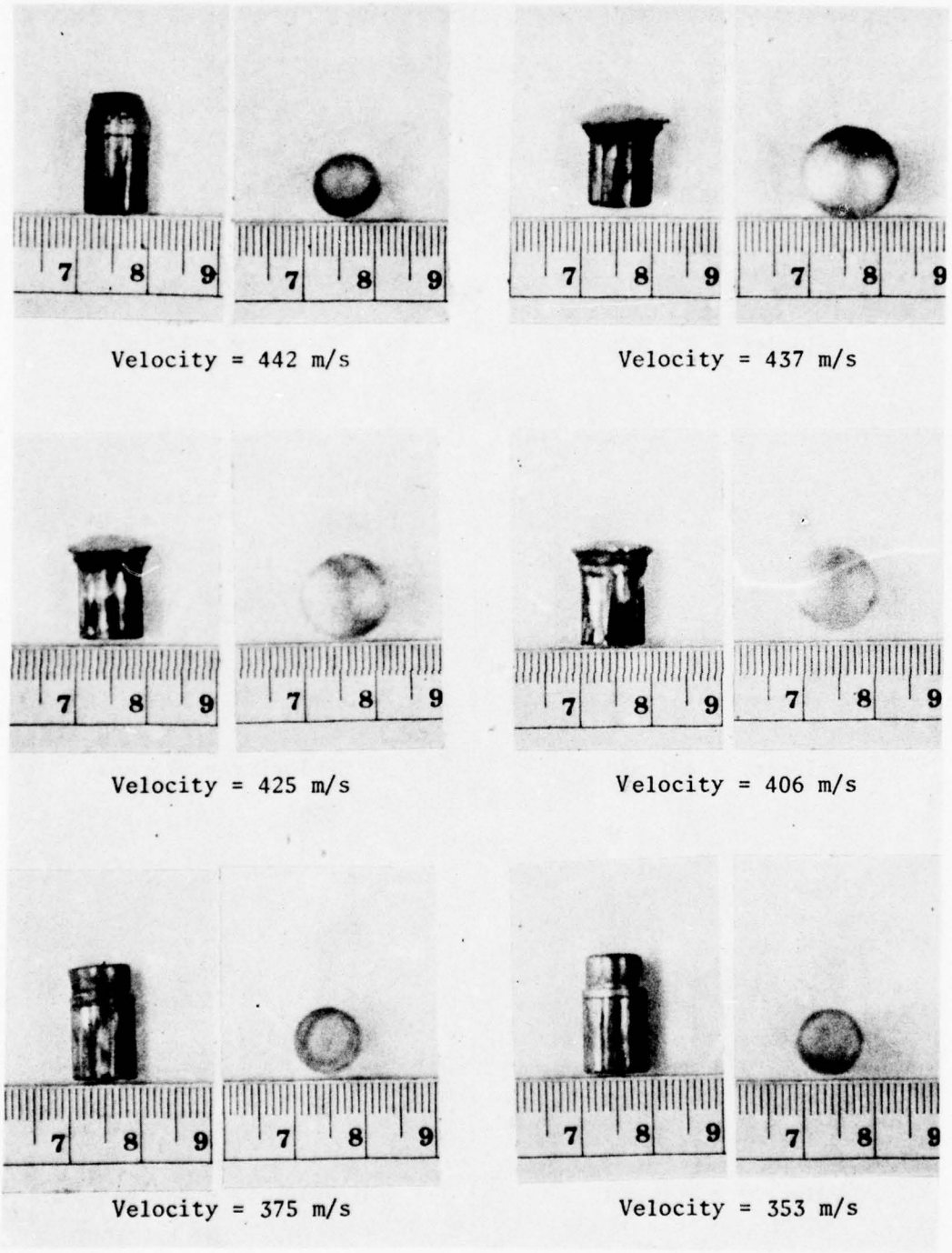


Figure 56 Effects of Striking Velocity on Bullet Deformation for SPEER, .38, JSP, 160 GRAIN

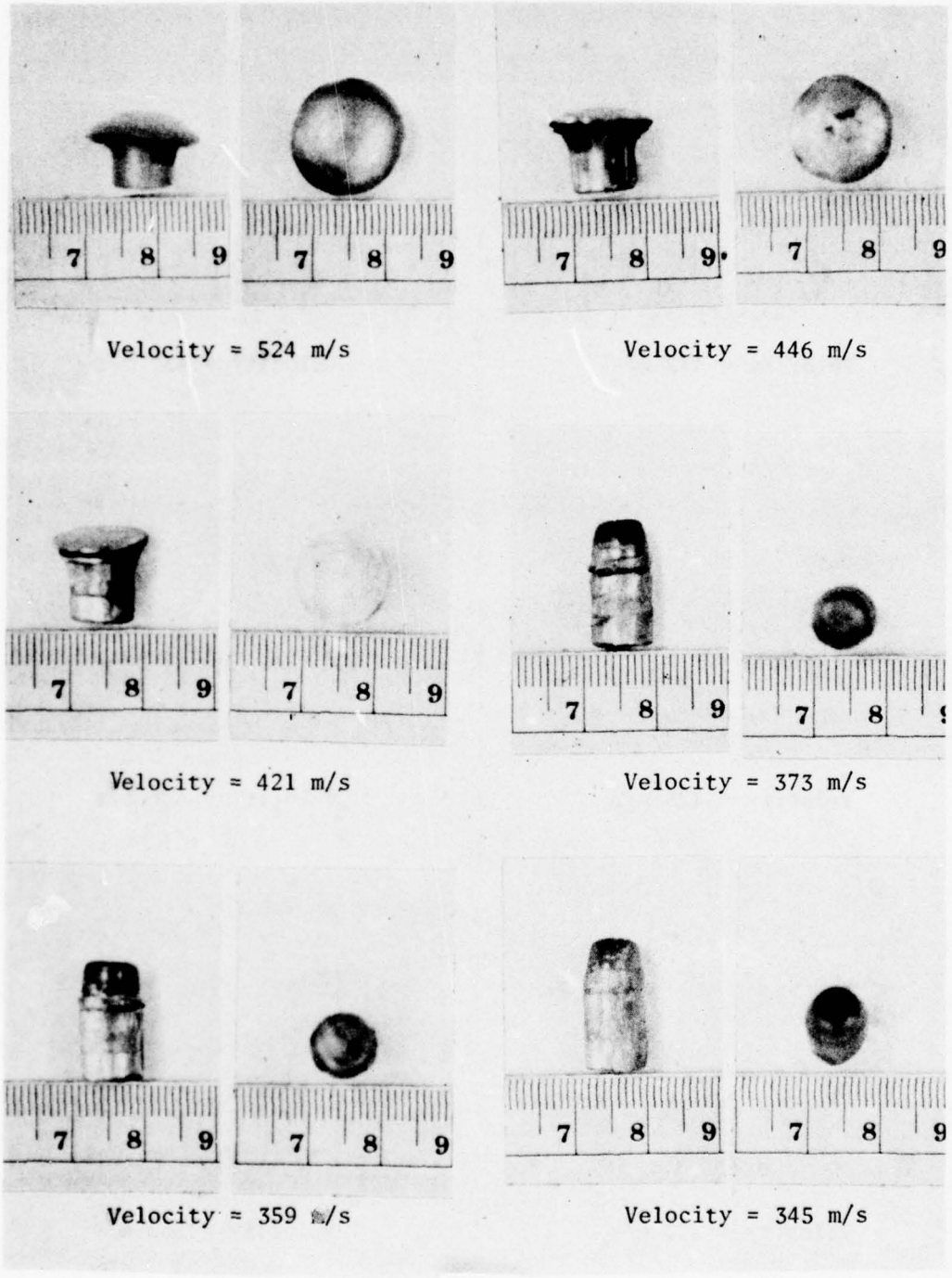


Figure 57 Effects of Striking Velocity on Bullet Deformation for SPEER, .38, SWC, 158 GRAIN

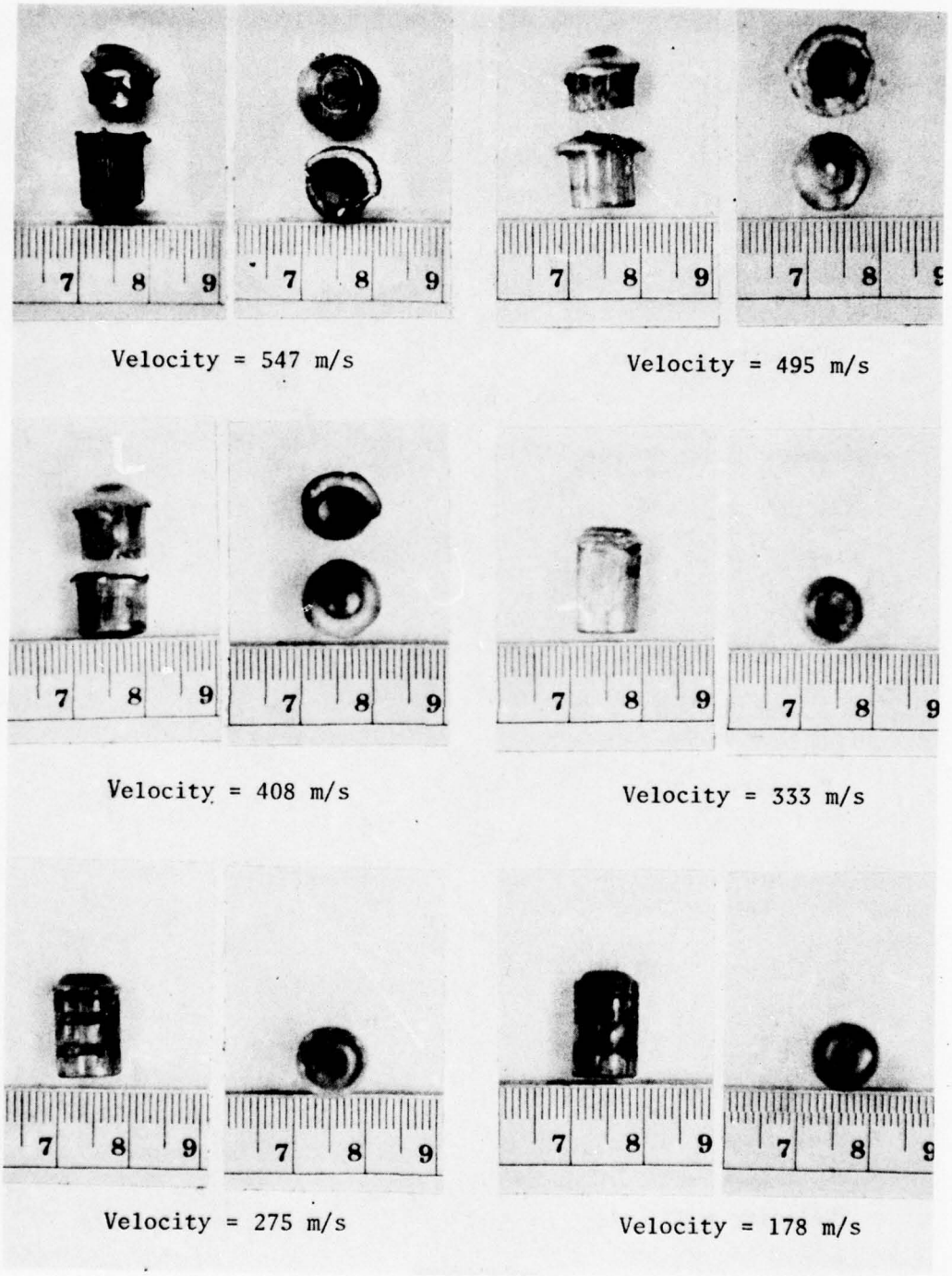


Figure 58 Effects of Striking Velocity on Bullet Deformation for SPEER, .38, WC, 148 GRAIN

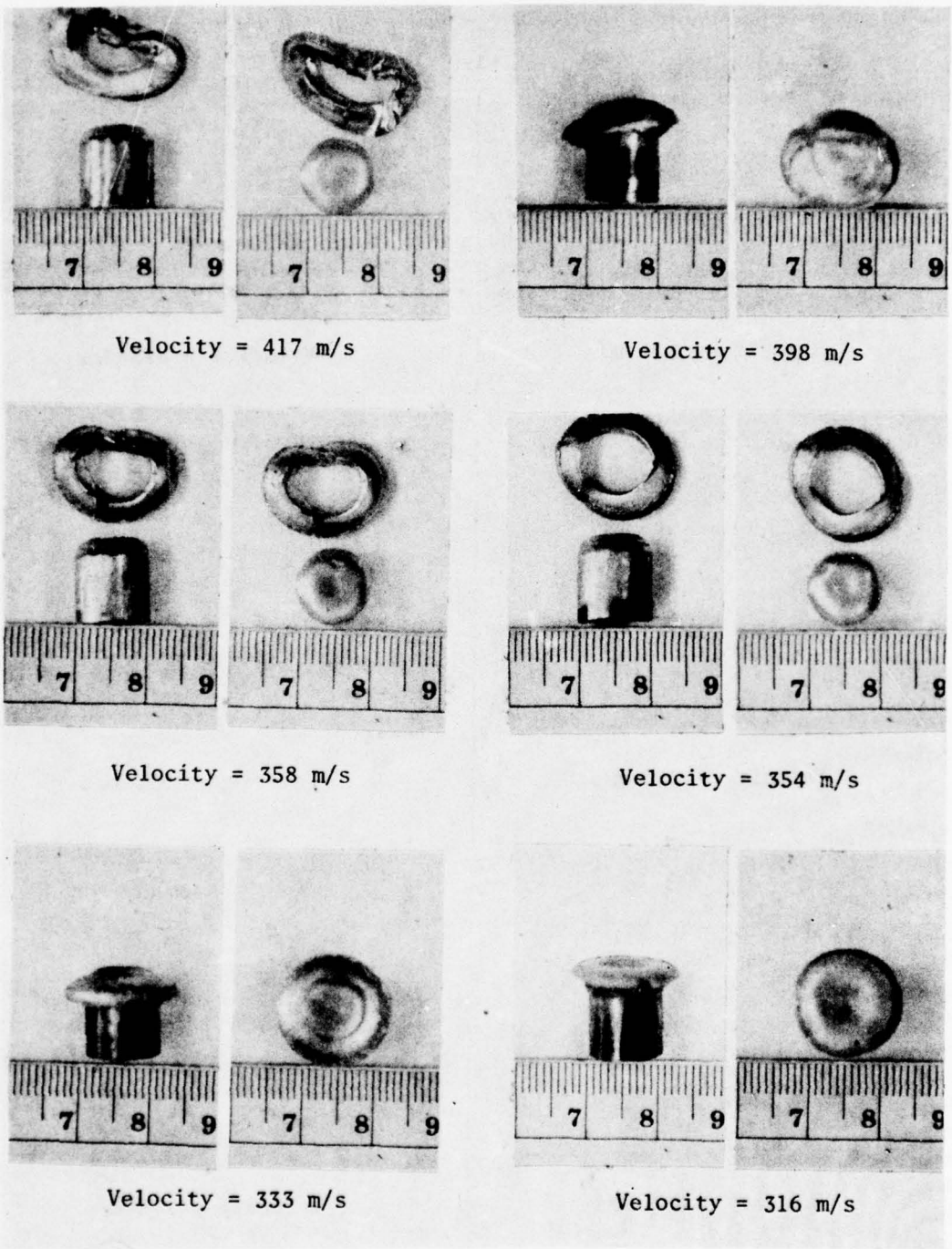
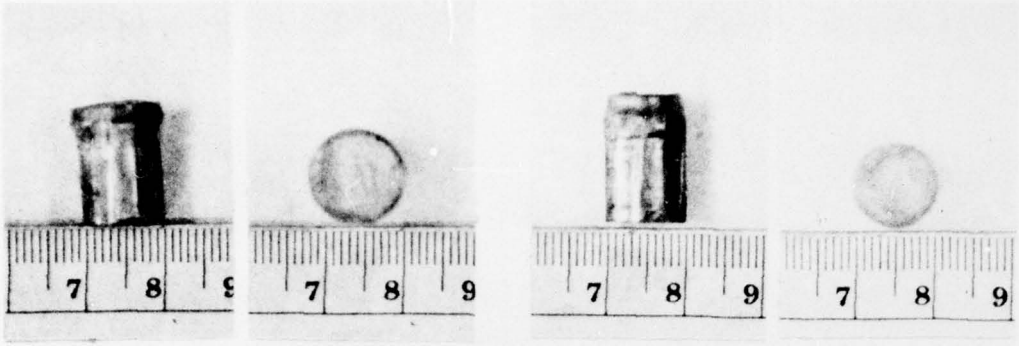


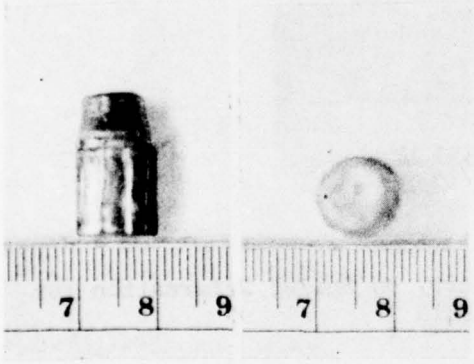
Figure 59 Effects of Striking Velocity on Bullet Deformation for SPEER, 41MAG, JHP, 200 GRAIN



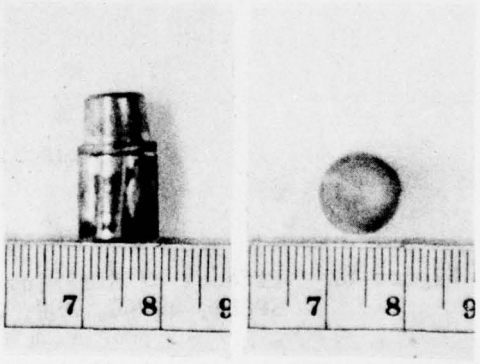
Velocity = 395 m/s

Velocity = 382 m/s

Velocity = 358 m/s

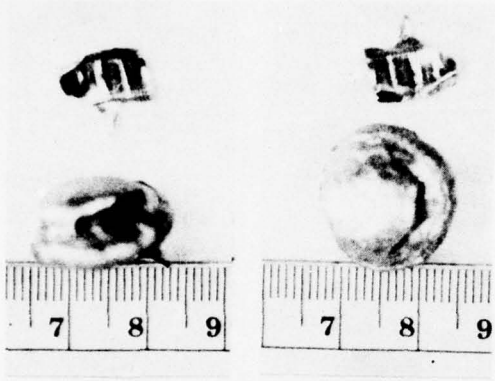


Velocity = 336 m/s

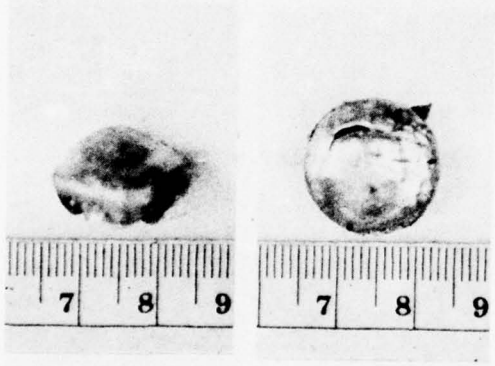


Velocity = 290 m/s

Figure 60 Effects of Striking Velocity on Bullet Deformation for SPEER, 41MAG, JSP, 220 GRAIN

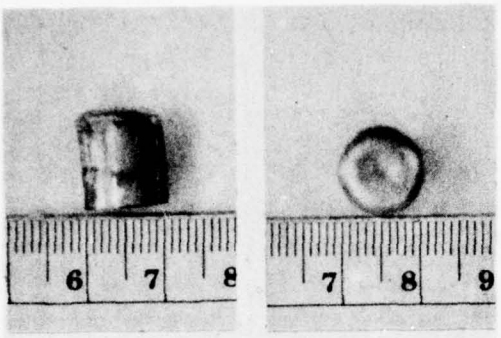


Velocity = 378 m/s

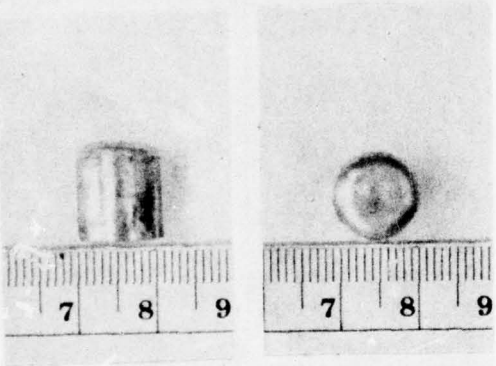


Velocity = 337 m/s

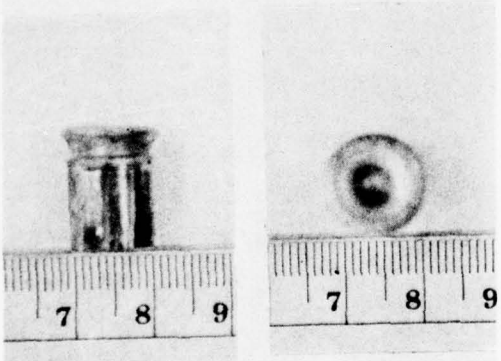
Figure 61 Effects of Striking Velocity on Bullet Deformation for SPEER, 44MAG, JHP, 200 GRAIN



Velocity = 356 m/s

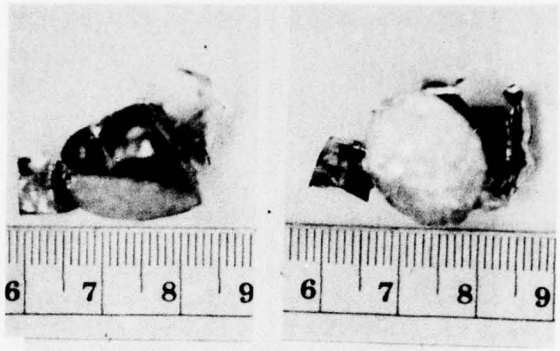


Velocity = 353 m/s

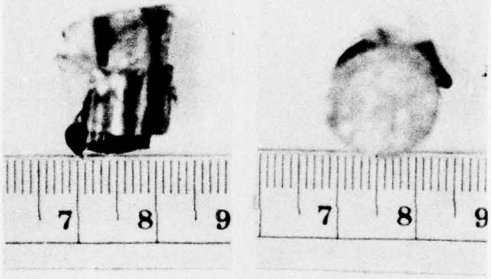


Velocity = 304 m/s

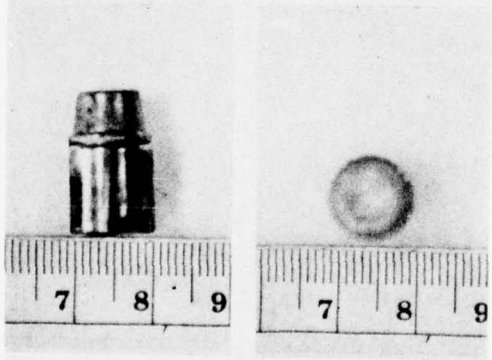
Figure 62 Effects of Striking Velocity on Bullet Deformation for SPEER, 44MAG, JHP, 225 GRAIN



Velocity = 390 m/s

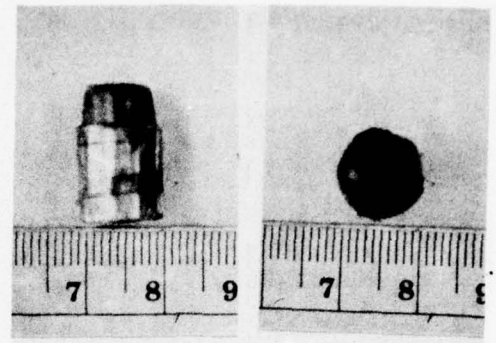


Velocity = 370 m/s

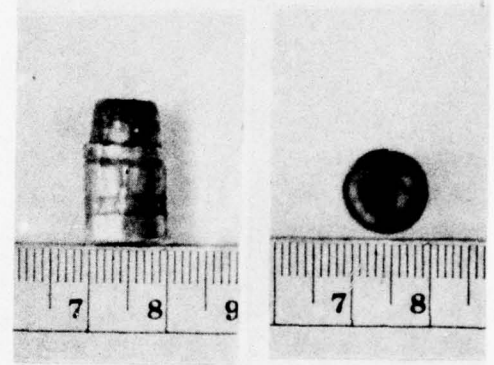


Velocity = 299 m/s

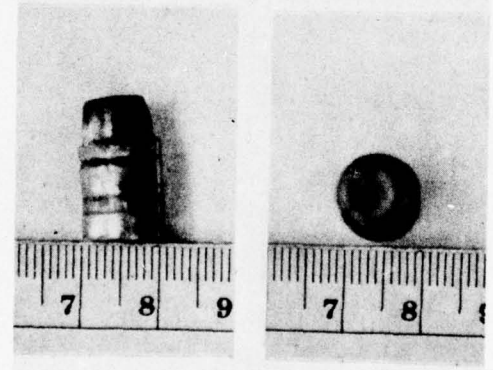
Figure 63 Effects of Striking Velocity on Bullet Deformation for SPEER, 44MAG, JSP, 240 GRAIN



Velocity = 411 m/s

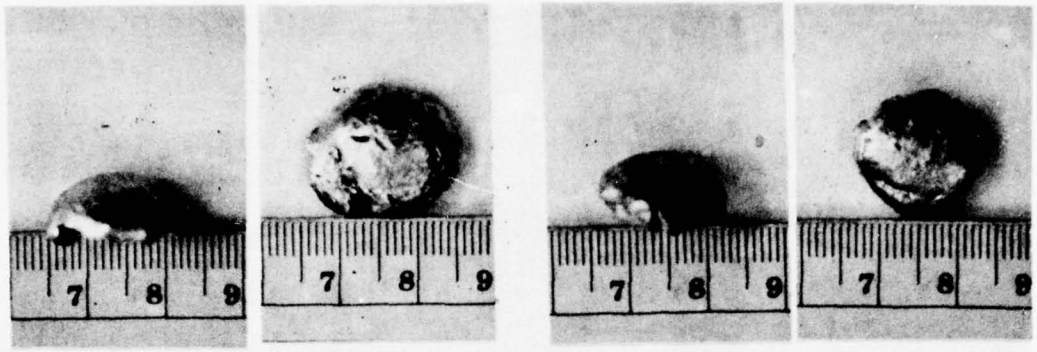


Velocity = 322 m/s



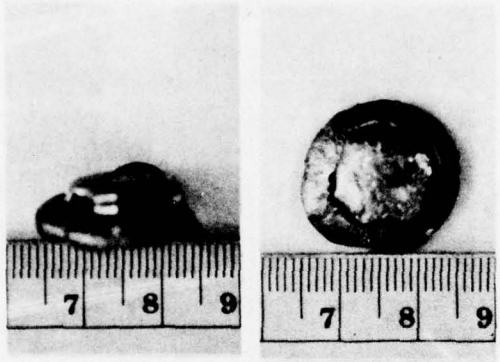
Velocity = 307 m/s

Figure 64 Effects of Striking Velocity on Bullet Deformation for SPEER, 44MAG, SWC, 240 GRAIN

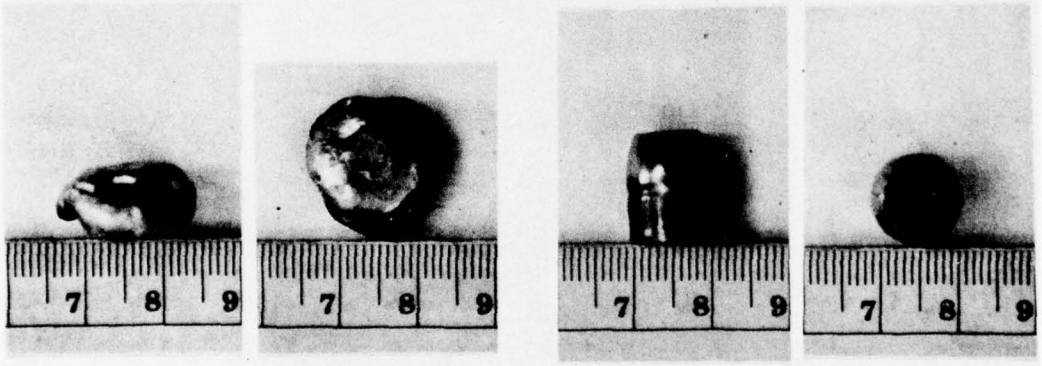


Velocity = 460 m/s

Velocity = 374 m/s



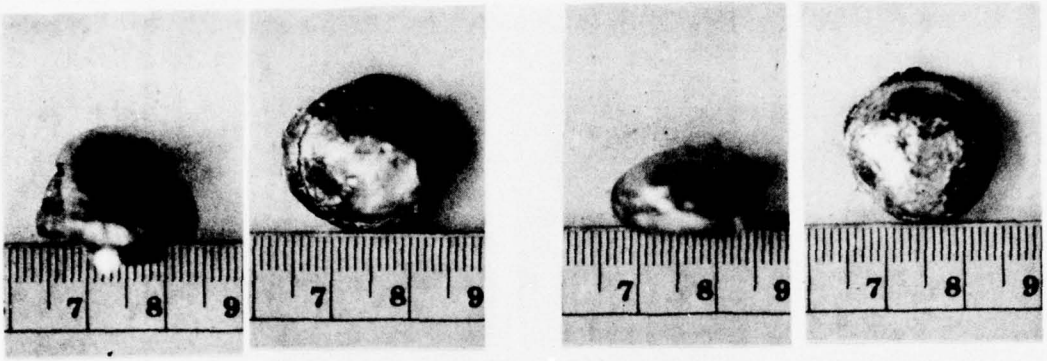
Velocity = 319 m/s



Velocity = 283 m/s

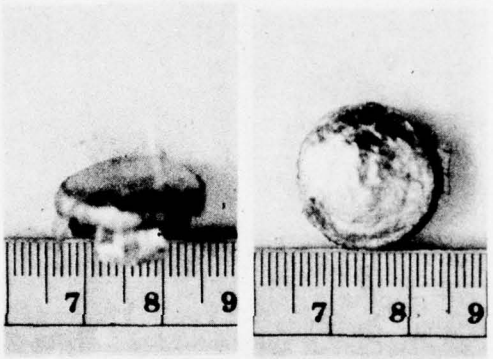
Velocity = 189 m/s

Figure 65 Effects of Striking Velocity on Bullet Deformation for SPEER, .45, JHP, 200 GRAIN

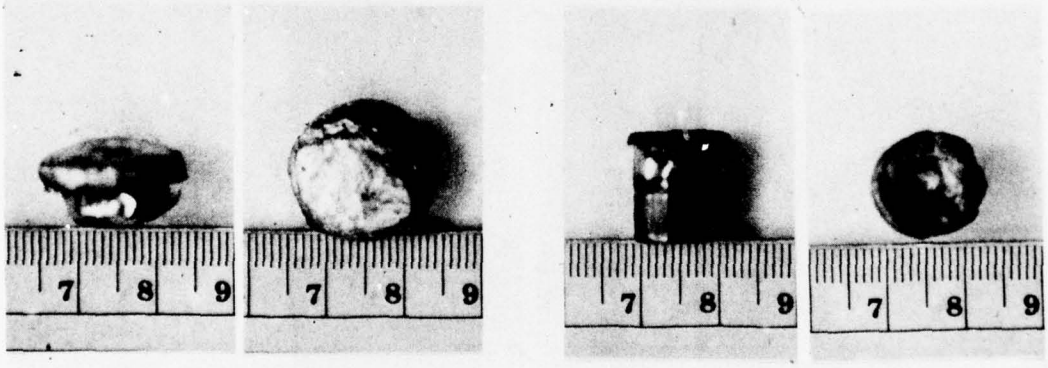


Velocity = 423 m/s

Velocity = 389 m/s



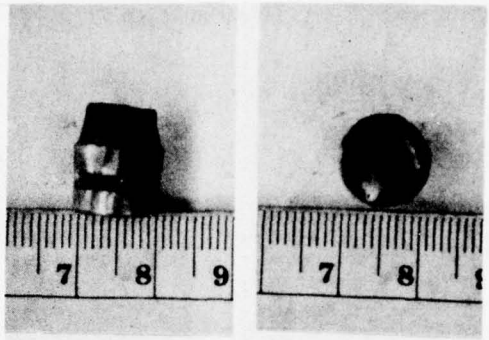
Velocity = 371 m/s



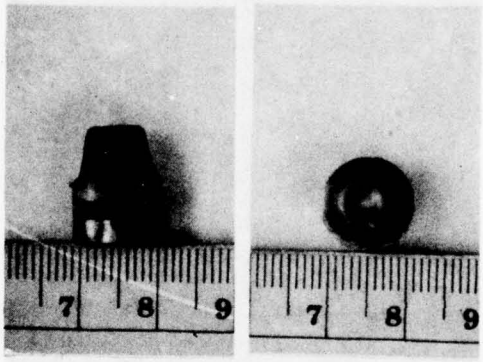
Velocity = 338 m/s

Velocity = 291 m/s

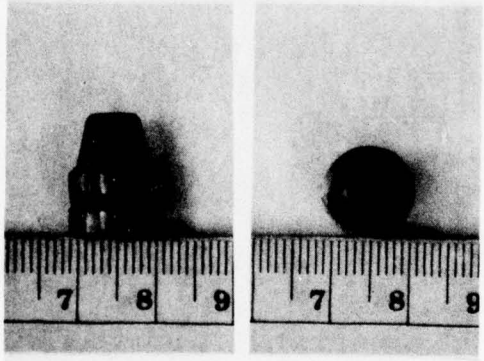
Figure 66 Effects of Striking Velocity on Bullet Deformation for SPEER, .45, JHP, 225 GRAIN



Velocity = 454 m/s

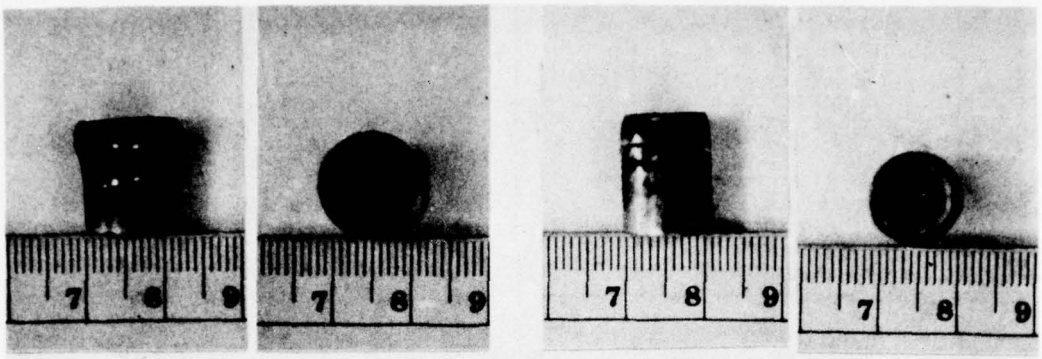


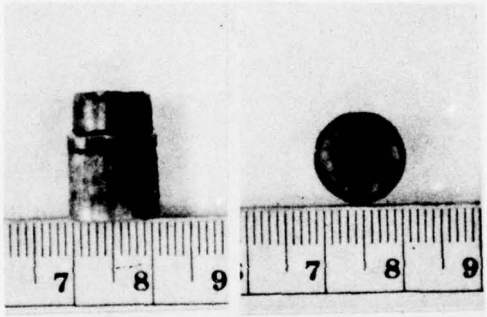
Velocity = 369 m/s



Velocity = 313 m/s

Figure 67 Effects of Striking Velocity on Bullet Deformation for SPEER, .45, SWC, 200 GRAIN





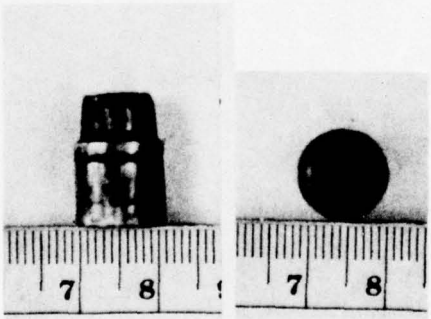


Figure 68 Effects of Striking Velocity on Bullet Deformation for SPEER, .45, SWC, 250 GRAIN

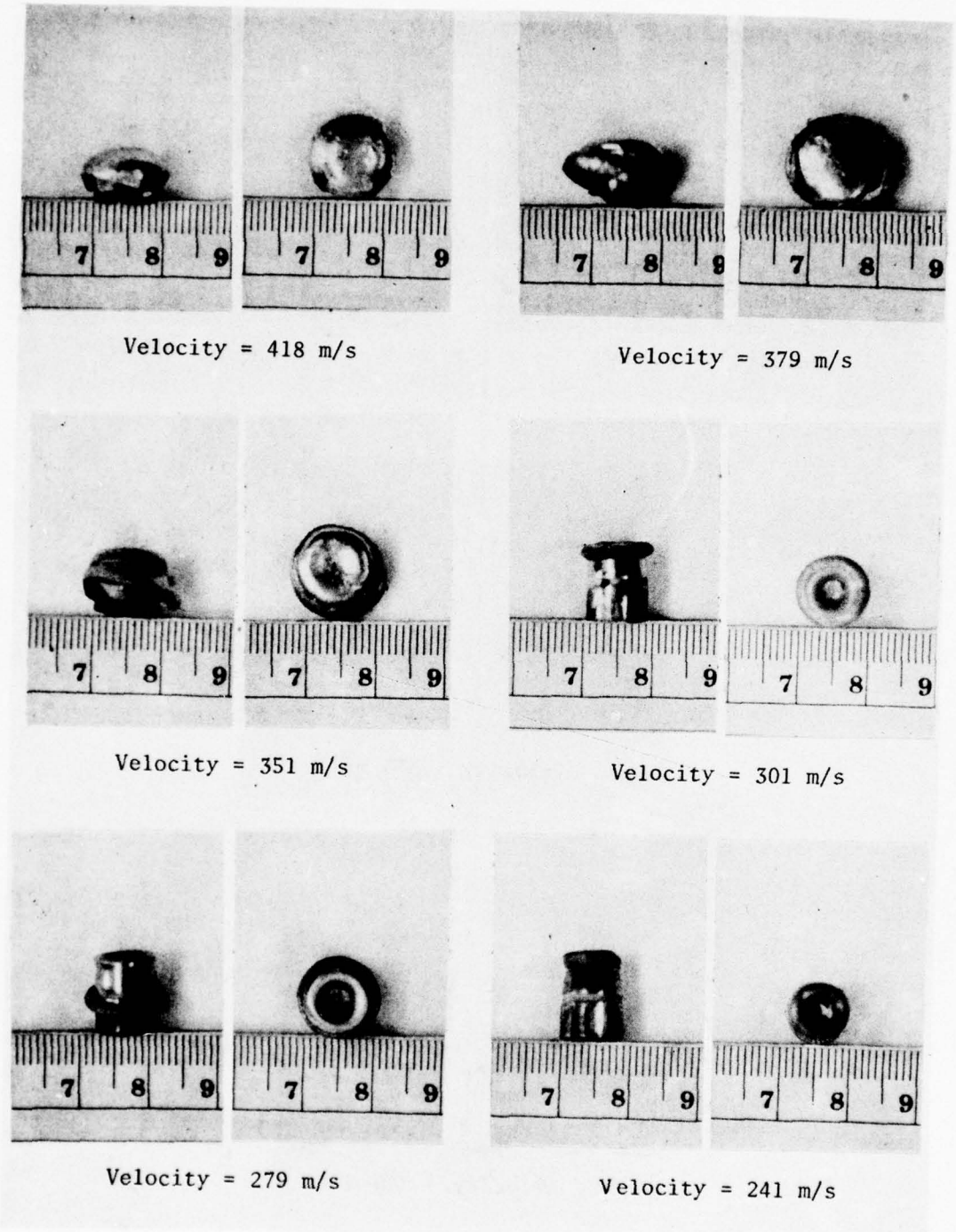


Figure 69 Effects of Striking Velocity on Bullet Deformation for SUPER VEL, .38SP, JHP, 110 GRAIN

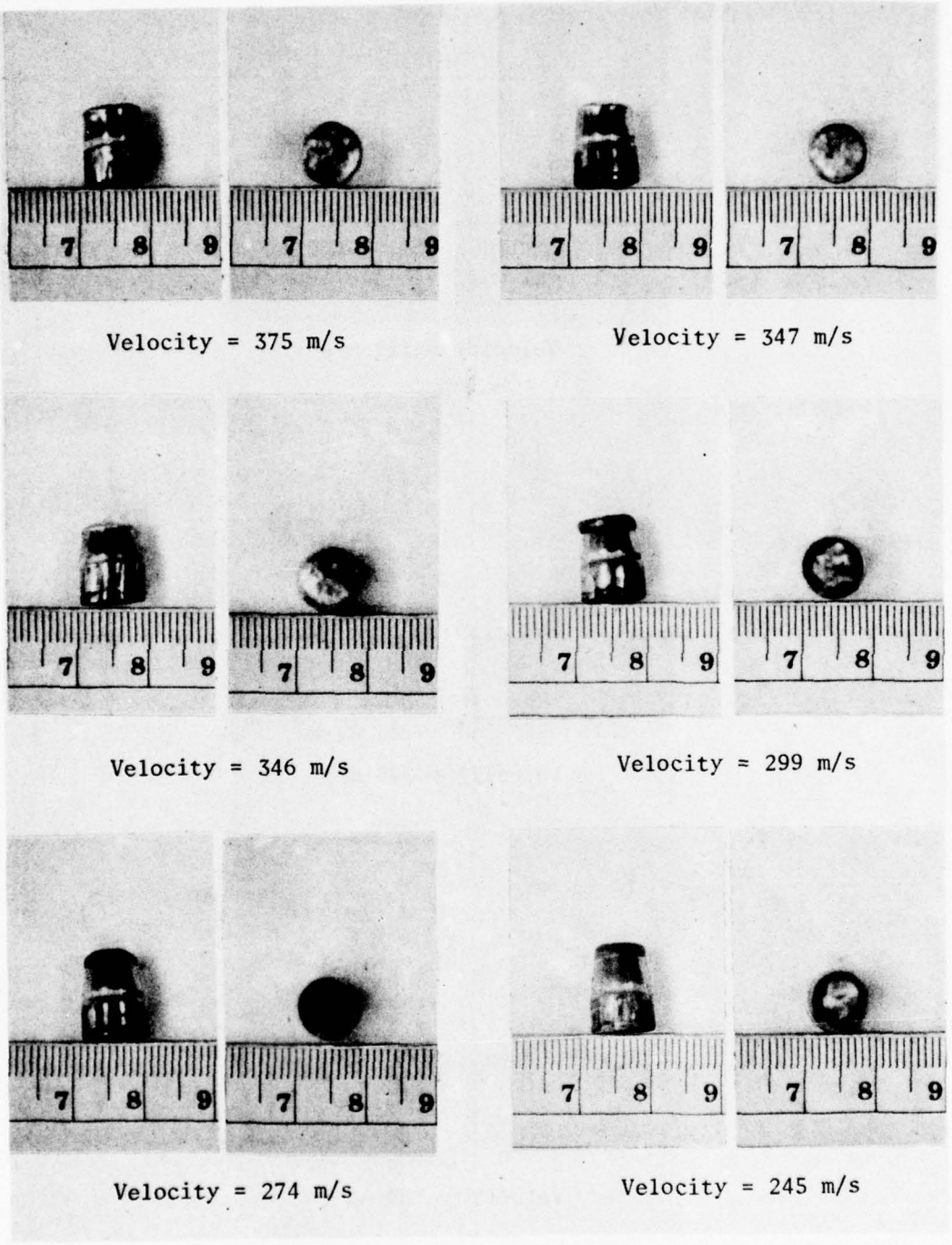
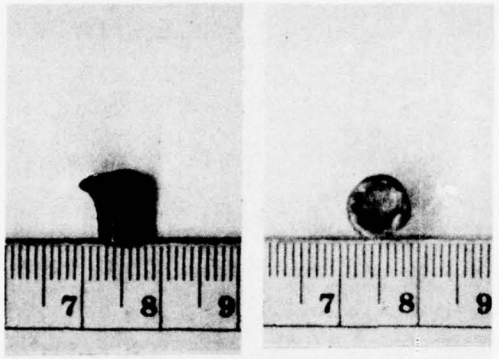
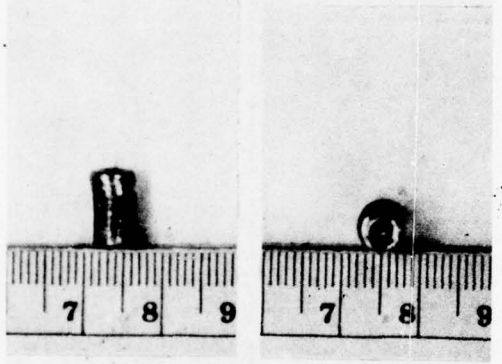


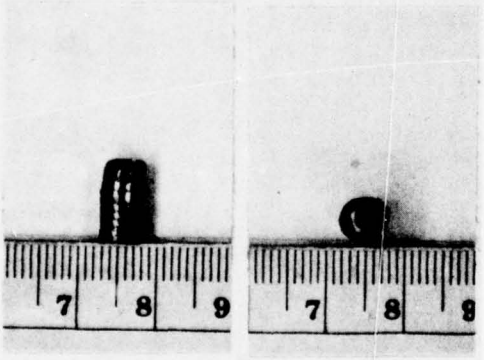
Figure 70 Effects of Striking Velocity on Bullet Deformation for SUPER VEL, .38SP, JSP, 110 GRAIN



Velocity = 311 m/s

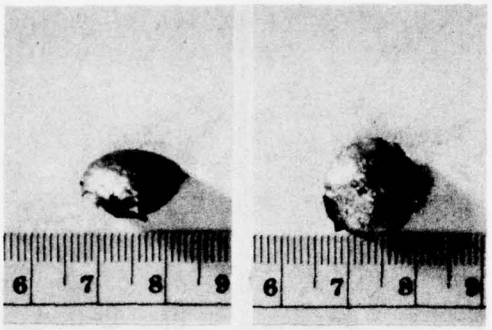


Velocity = 290 m/s

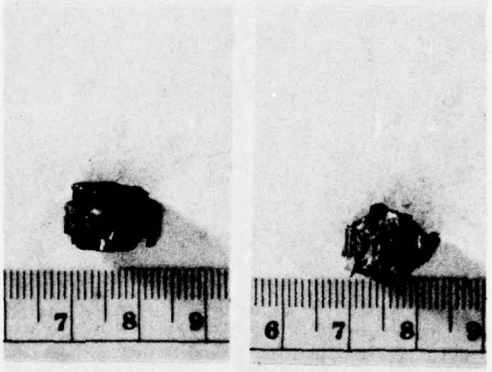


Velocity = 266 m/s

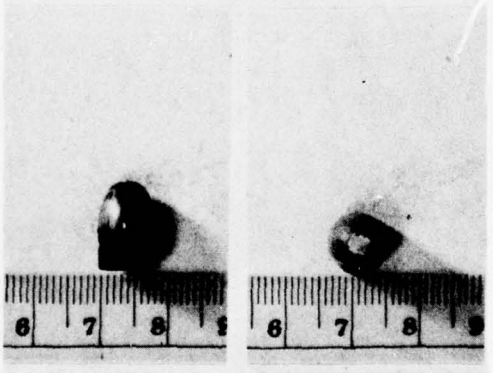
Figure 71 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .22, LHP, 37 GRAIN



Velocity = 478 m/s

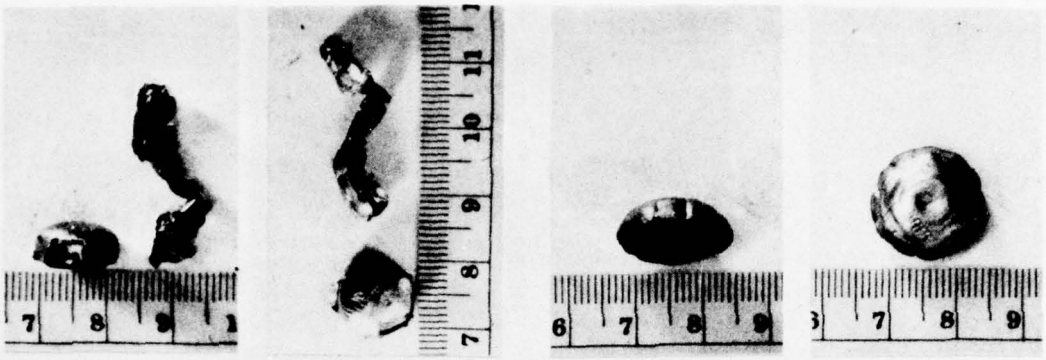


Velocity = 411 m/s



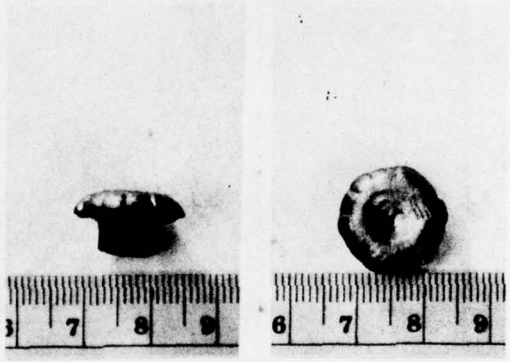
Velocity = 216 m/s

Figure 72 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, 9 MM, JSP, 100 GRAIN

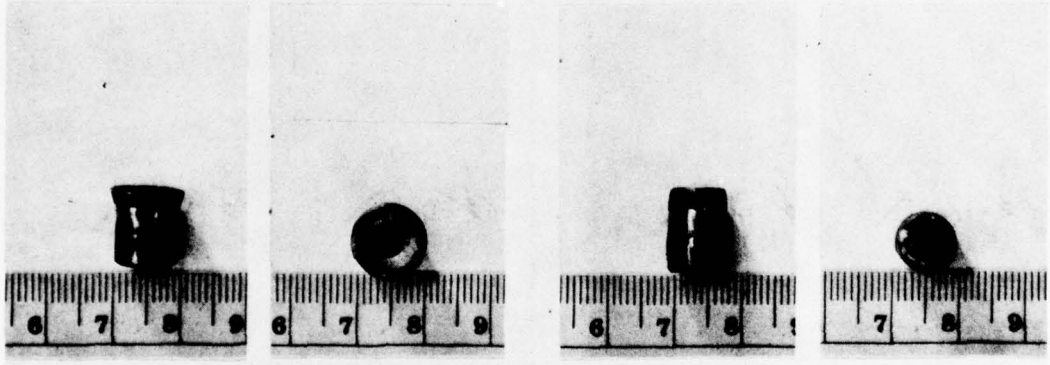


Velocity = 407 m/s

Velocity = 361 m/s



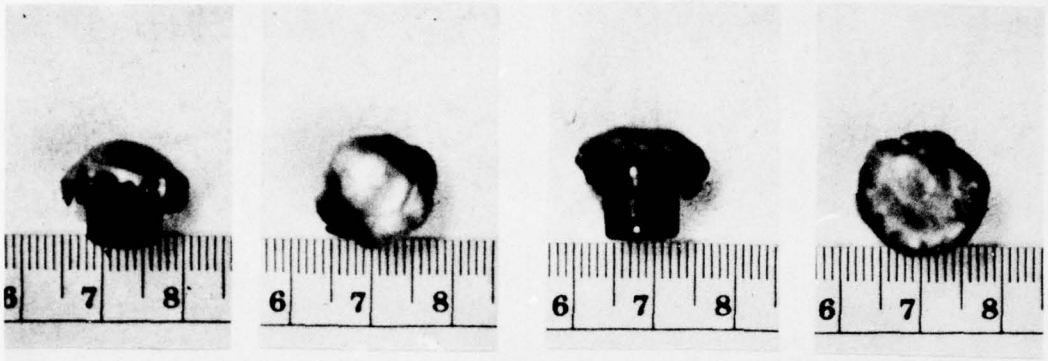
Velocity = 309 m/s



Velocity = 239 m/s

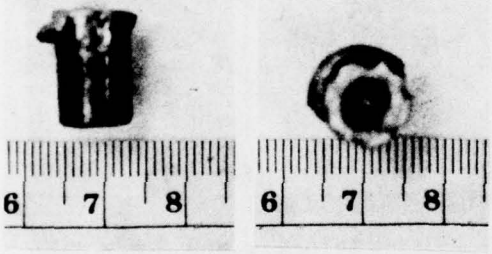
Velocity = 200 m/s

Figure 73 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .38 SPECIAL, JHP, 110 GRAIN

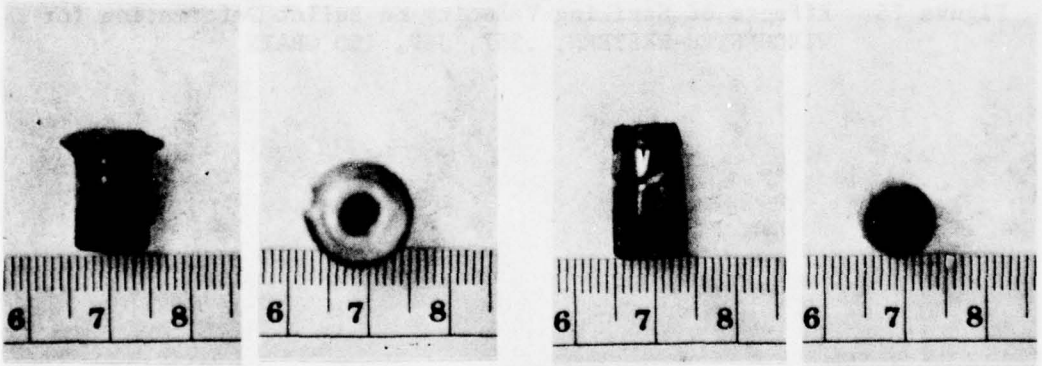


Velocity = 381 m/s

Velocity = 335 m/s



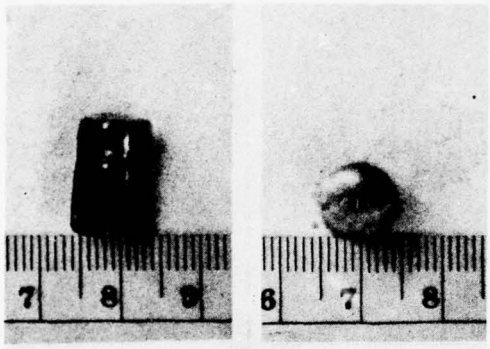
Velocity = 291 m/s



Velocity = 267 m/s

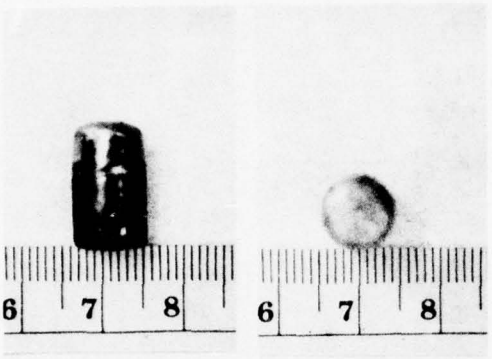
Velocity = 210 m/s

Figure 74 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .38, JHP, 158 GRAIN

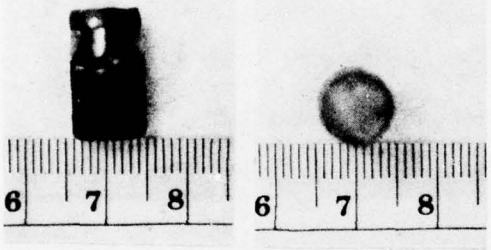


Velocity = 393 m/s

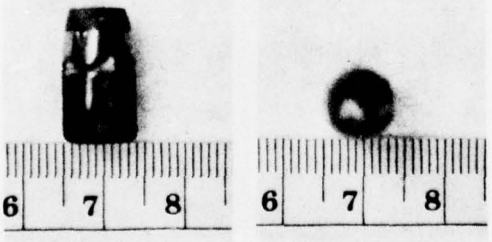
Figure 75 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .357, JSP, 150 GRAIN



Velocity = 348 m/s

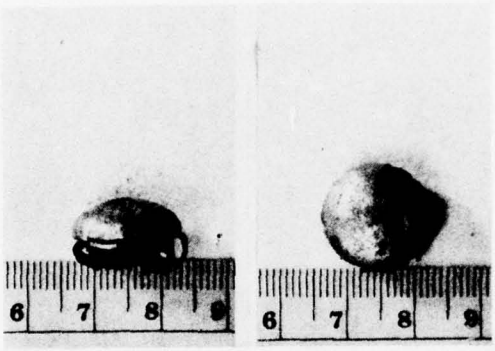


Velocity = 301 m/s



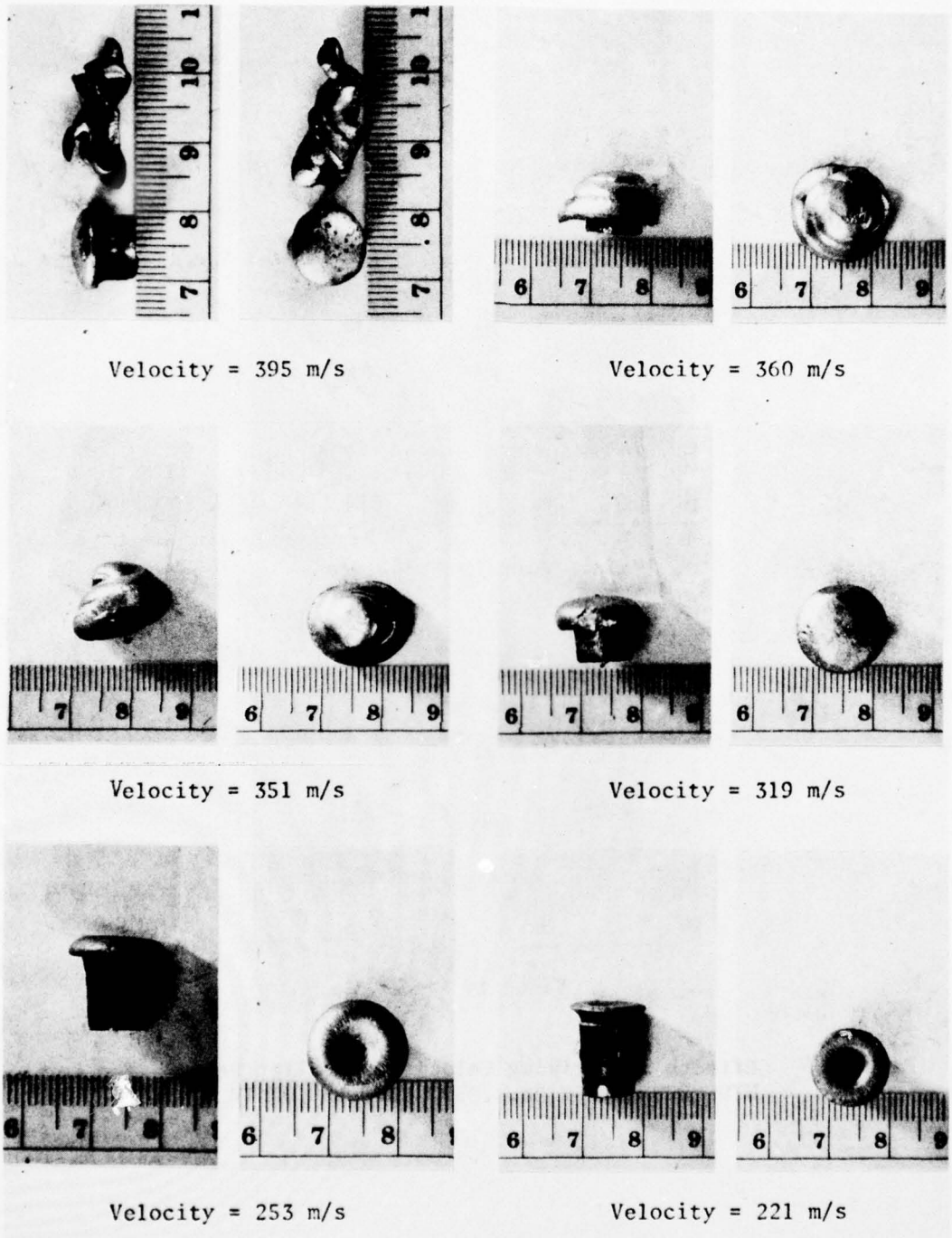
Velocity = 236 m/s

Figure 76 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .38, JSP, 158 GRAIN



Velocity = 488 m/s

Figure 77 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .357 MAG, JSP, 158 GRAIN



Velocity = 395 m/s

Velocity = 360 m/s

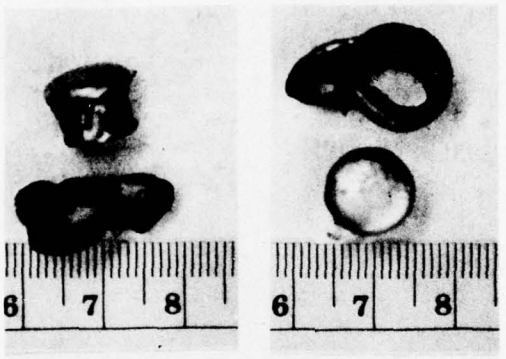
Velocity = 351 m/s

Velocity = 319 m/s

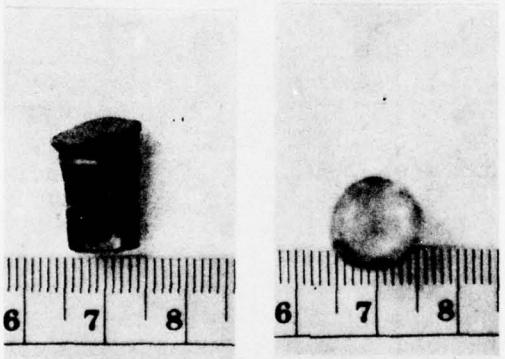
Velocity = 253 m/s

Velocity = 221 m/s

Figure 78 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .38 SPECIAL, LEAD, 158 GRAIN



Velocity = 381 m/s



Velocity = 359 m/s

Figure 79 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .357, LHP, 158 GRAIN

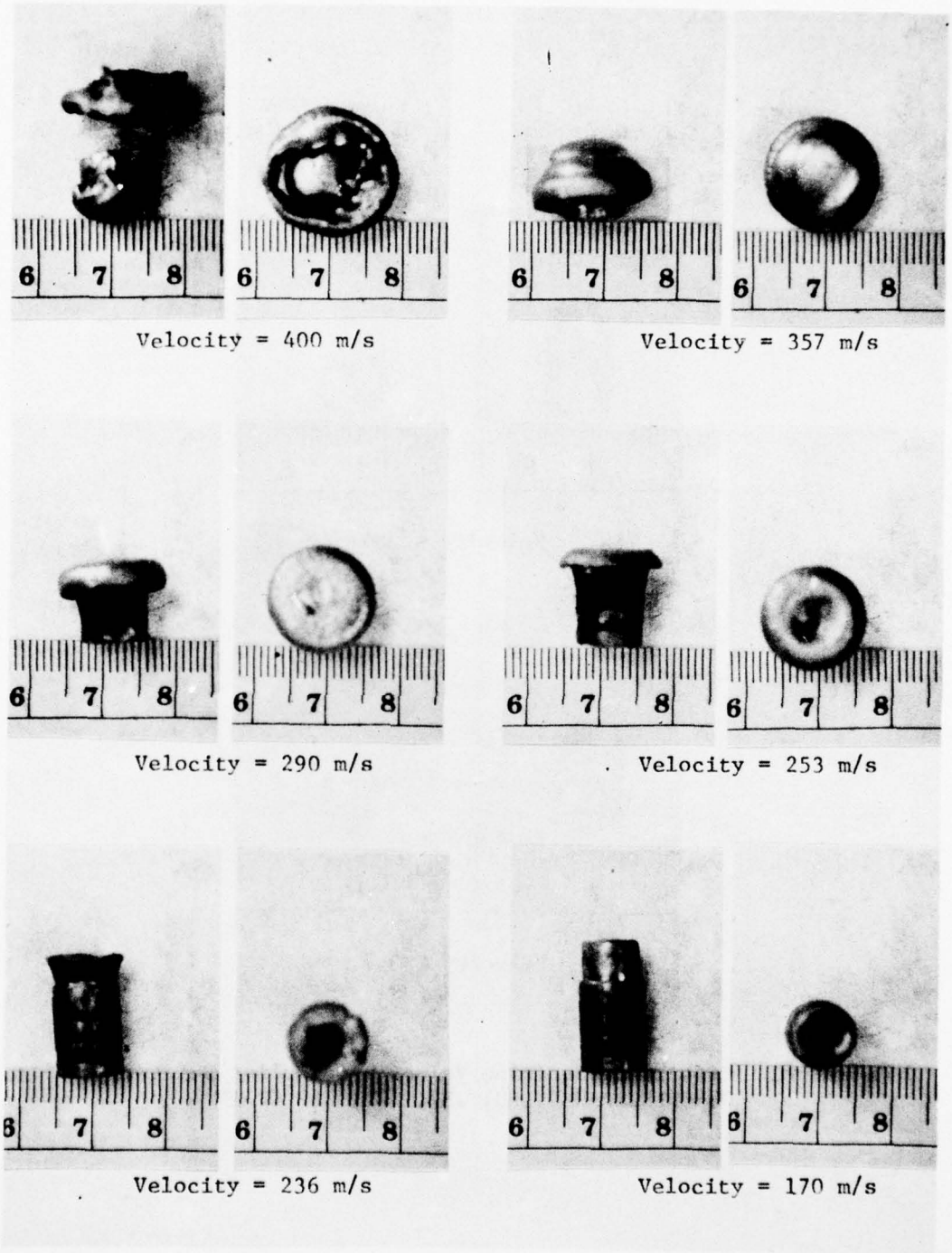


Figure 80 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .38, LHP, 158 GRAIN

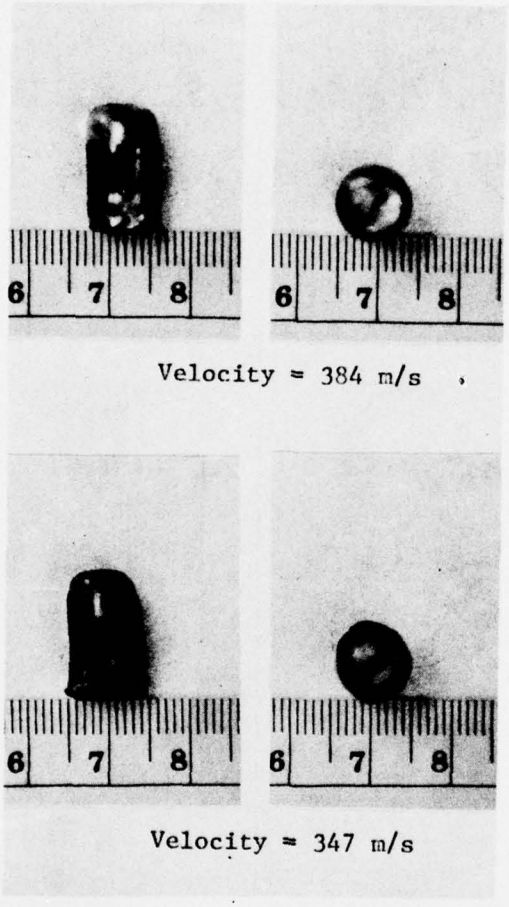
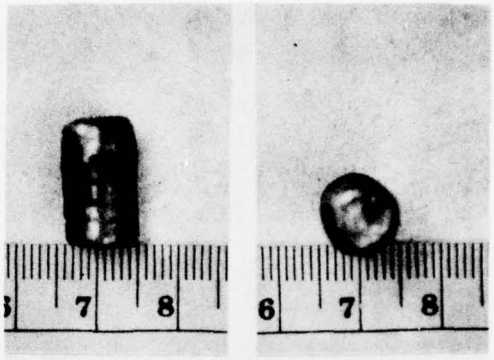
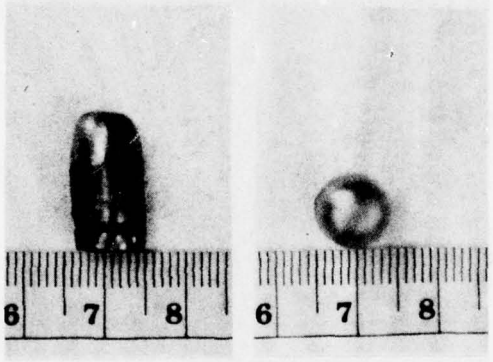


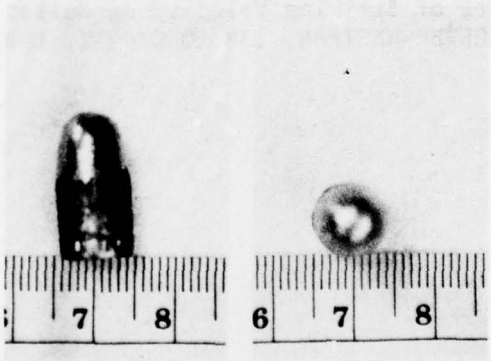
Figure 81 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .38, LRN, 150 GRAIN



Velocity = 381 m/s

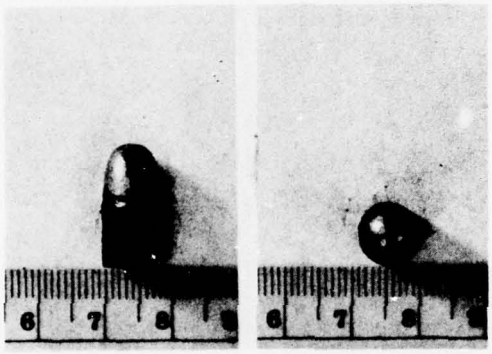


Velocity = 332 m/s



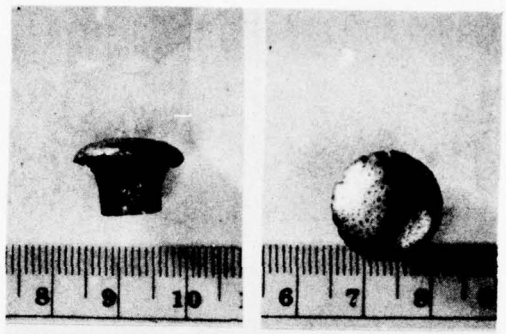
Velocity = 288 m/s

Figure 82 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .38, LRN, 158 GRAIN

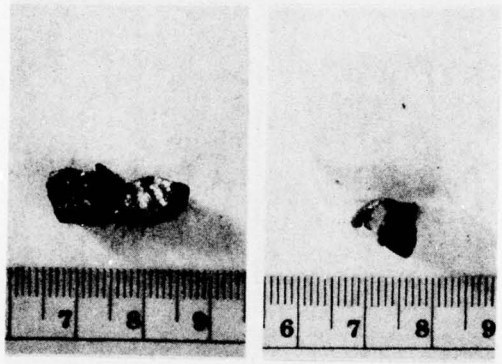


Velocity = 248 m/s

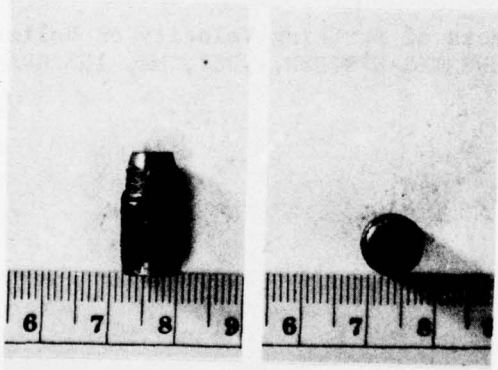
Figure 83 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .38 LONG COLT, LUBALOY, 150 GRAIN



Velocity = 343 m/s

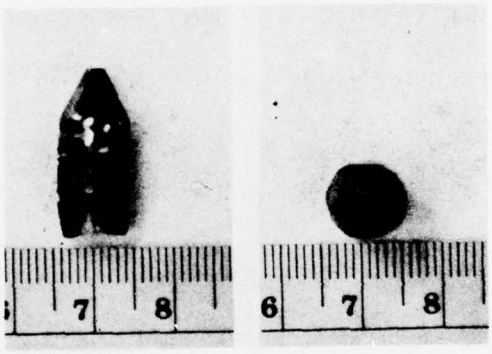


Velocity = 331 m/s



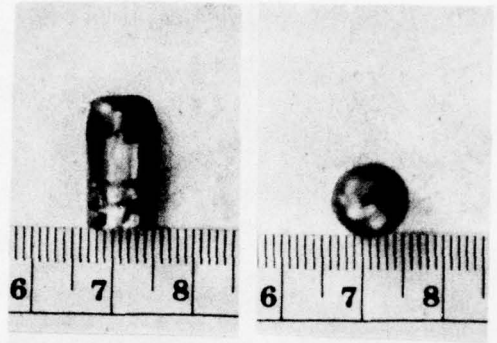
Velocity = 115 m/s

Figure 84 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .357 MAG, LUBALOY, 158 GRAIN

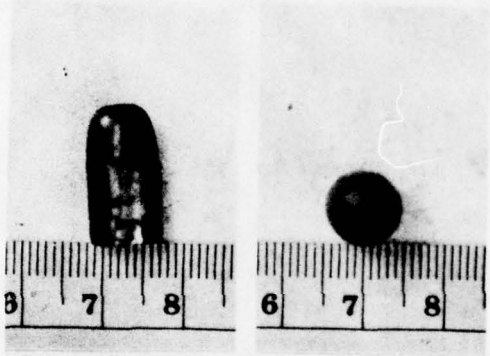


Velocity = 391 m/s

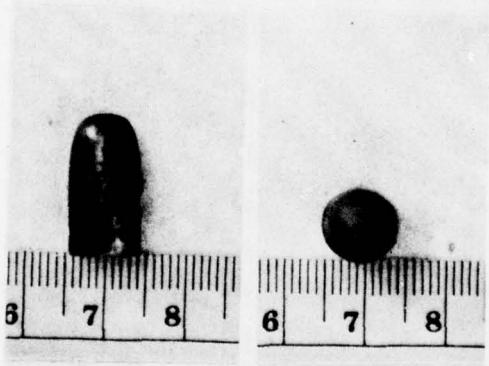
Figure 85 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .357, MP, 158 GRAIN



Velocity = 377 m/s

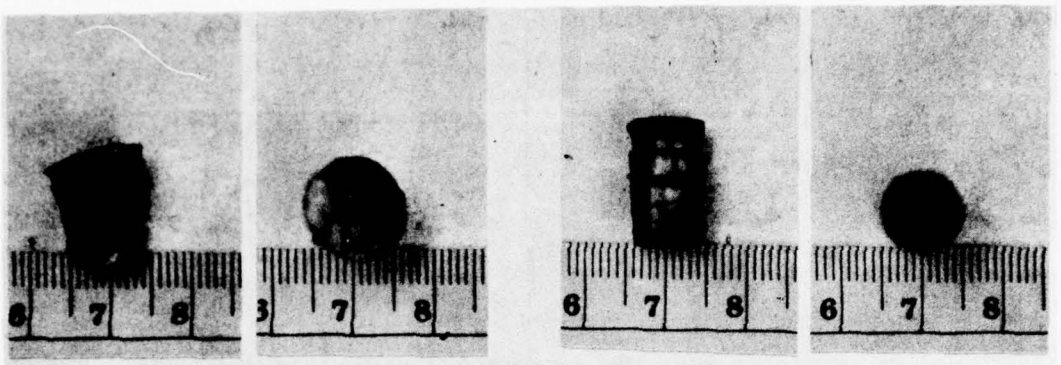


Velocity = 335 m/s



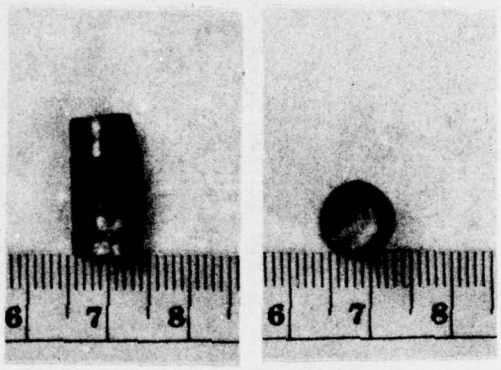
Velocity = 304 m/s

Figure 86 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .38, RN, 158 GRAIN

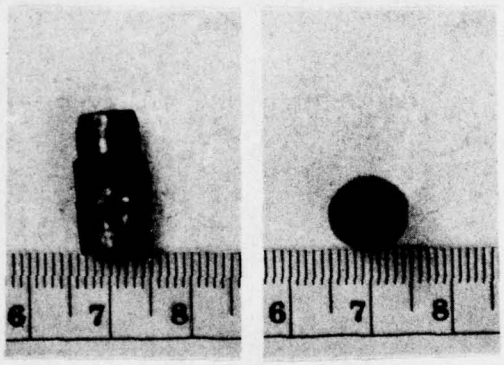


Velocity = 392 m/s

Velocity = 343 m/s

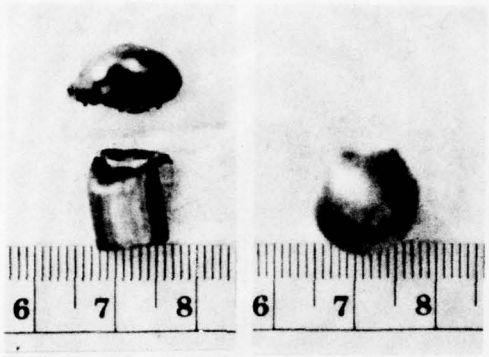


Velocity = 262 m/s

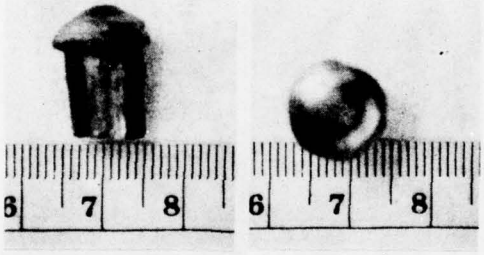


Velocity = 241 m/s

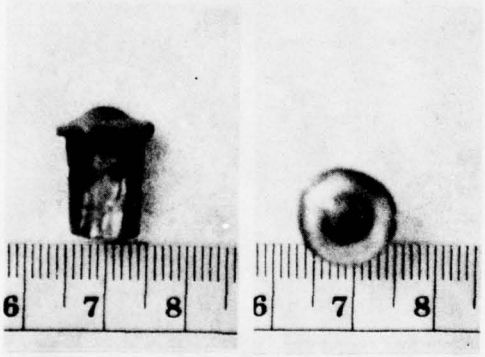
Figure 87 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .38, SUC, 158 GRAIN



Velocity = 495 m/s



Velocity = 319 m/s



Velocity = 265 m/s

Figure 88 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .38, WC, 148 GRAIN

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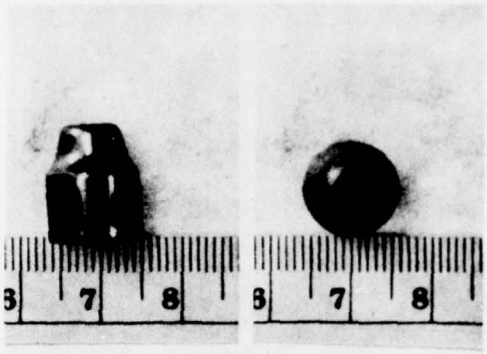
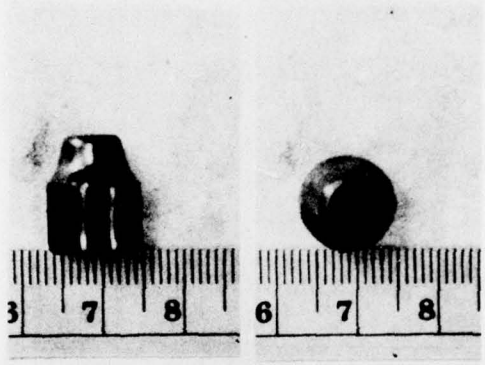
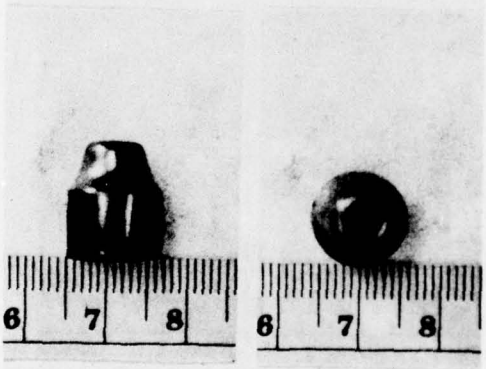


Velocity = 388 m/s

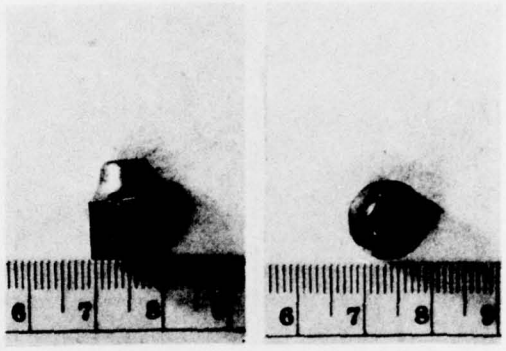


Velocity = 335 m/s



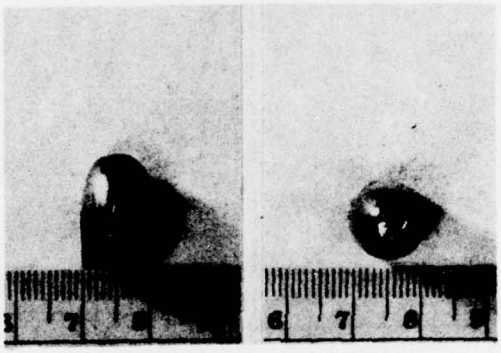
Velocity = 283 m/s

Figure 89 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .45, FMJ, 185 GRAIN



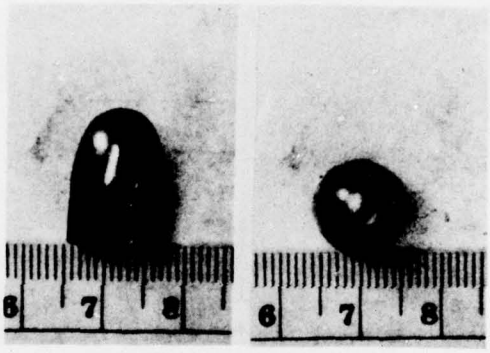
Velocity = 268 m/s

Figure 90 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .45 AUTOMATIC, FMC, 185 GRAIN



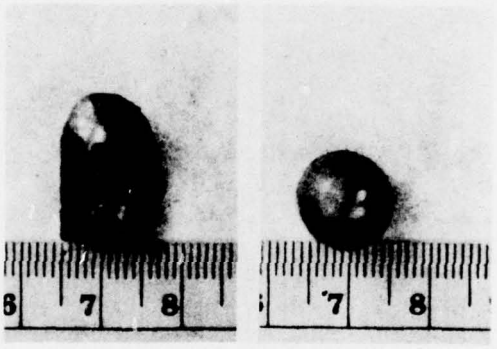
Velocity = 323 m/s

Figure 91 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .45 AUTOMATIC, FMC, 230 GRAIN



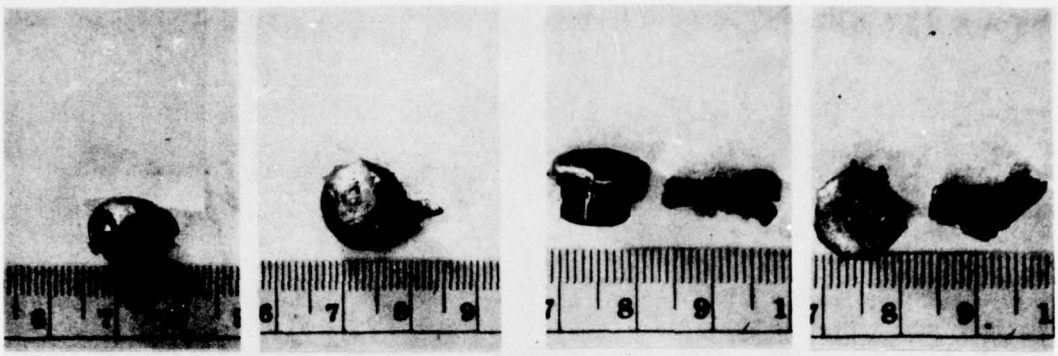
Velocity = 355 m/s

Figure 92 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .45, FMJ, 230 GRAIN



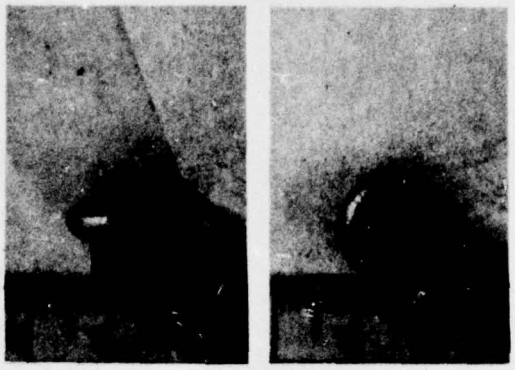
Velocity = 335 m/s

Figure 93 Effects of Striking Velocity on Bullet Deformation for WINCHESTER-WESTERN, .45, LRN, 255 GRAIN

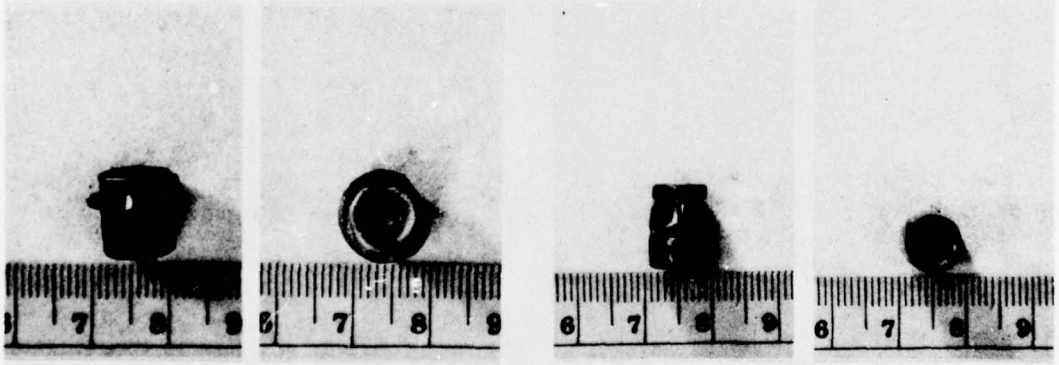


Velocity = 391 m/s

Velocity = 331 m/s



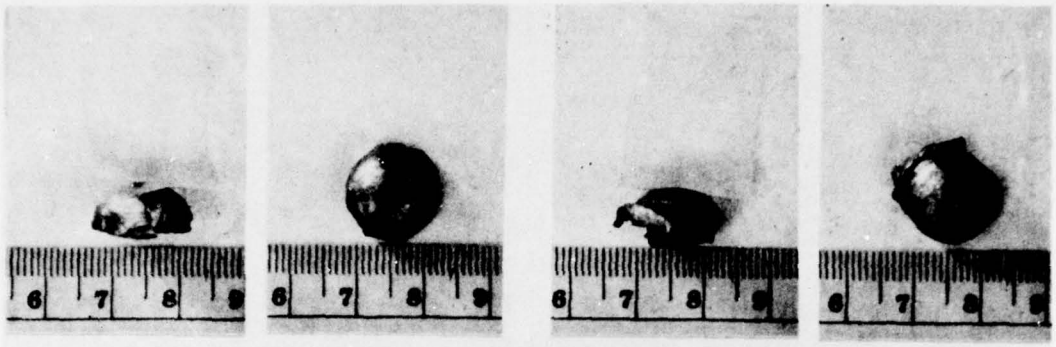
Velocity = 286 m/s



Velocity = 232 m/s

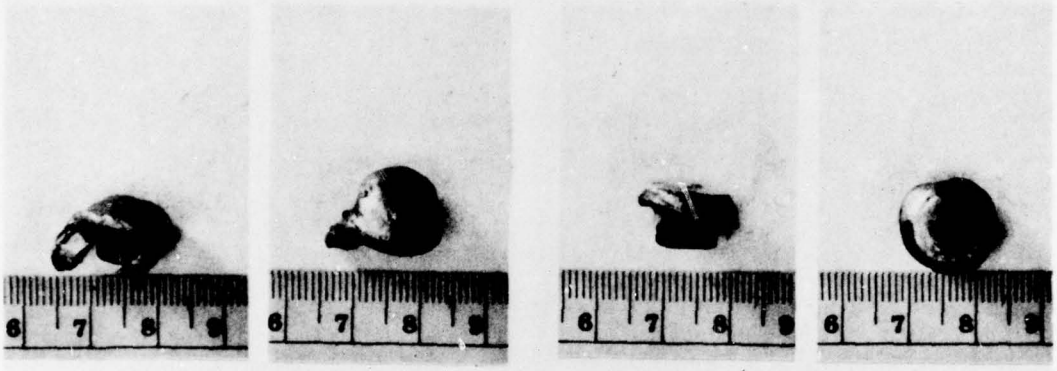
Velocity = 155 m/s

Figure 94 Effects of Striking Velocity on Bullet Deformation for ZERO, .38 SPECIAL, JHP, 100 GRAIN



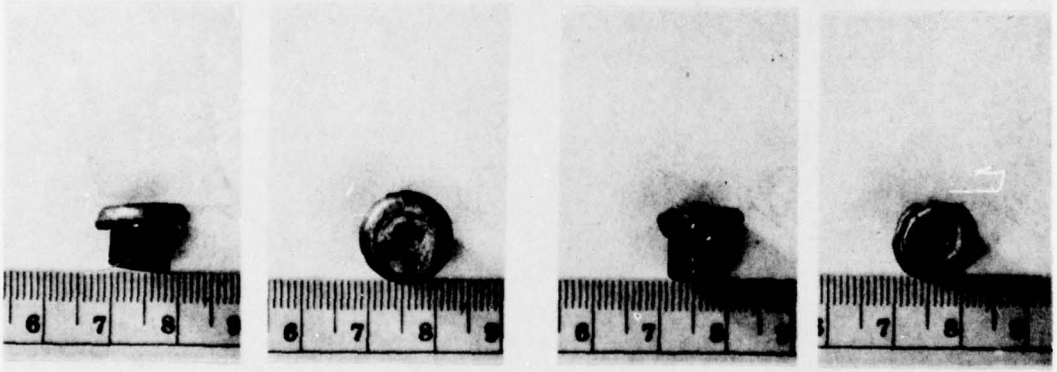
Velocity = 454 m/s

Velocity = 412 m/s



Velocity = 364 m/s

Velocity = 312 m/s



Velocity = 292 m/s

Velocity = 266 m/s

Figure 95 Effects of Striking Velocity on Bullet Deformation for ZERO, .357 MAG, JHP, 110 GRAIN

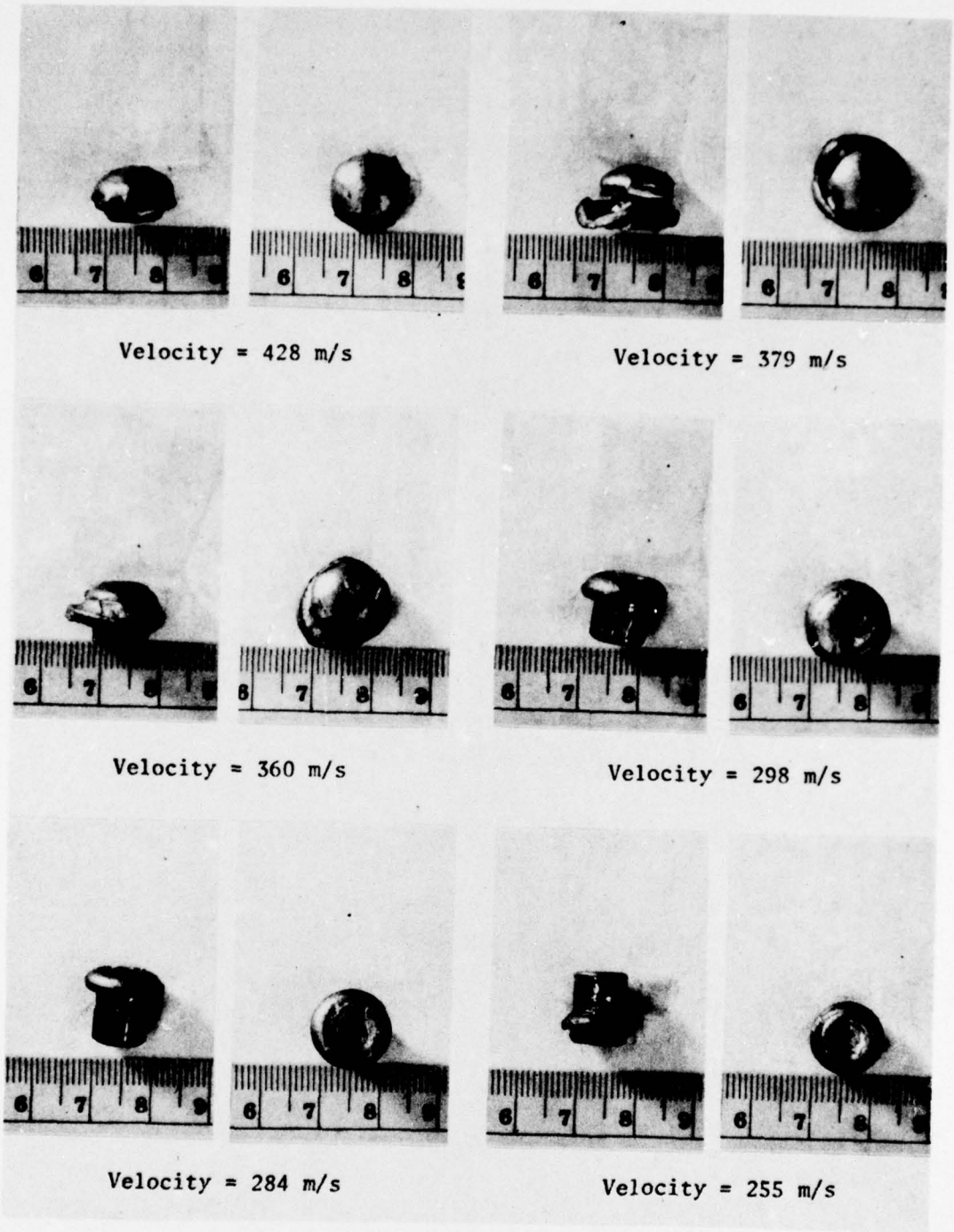


Figure 96 Effects of Striking Velocity on Bullet Deformation for ZERO, .357 MAG, JHP, 125 GRAIN

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