## PRESIDENT'S REPORT

By Steve Martens

As this is the annual printed issue of the IHMSA newsletter, please keep it handy for the rest of the shooting season as it includes the names of the ranges and the dates of matches this year. It also includes the contact information of the match directors. If you have any questions about location of a range or shooting times, please contact them for more information.

One membership change you may notice is that if you are a life member your new membership card will be stamped with "LIFE" instead of " 2018 ". The life members can use that card until it is full and then request a new "life" card from headquarters.

We recently returned from the 2018 shot show. We spent 5 days of walking over 30 miles, talking to hundreds of supporters of the firearm industry and the shooting sports. We thanked the people who donated prizes to the 2017 World Championships and got commitments of support for the 2018 World Championships. We were also on the lookout for new products that would be of interest to the members of IHMSA. One such item was a new device to quickly make your own gas checks for cast bullets. We plan to get a sample and do a test for the IHMSA news. Also there were a few new bolt actions on the Remington XP pattern for anyone interested in building a new unlimited gun. We talked to the major reflex sight manufactures and informed them about our trial of reflex sights on some of our production guns and what we are looking for in sights.

There are several large matches you should make plans to attend this year. Pringle, South Dakota puts on a great match just prior to the 4th of July each year. It is held in a beautiful canyon in the southern part of the Black Hills of South Dakota. Camping is available and you will have the time of your life with the great people there.

Next up in July is the World Championships in Oklahoma City at their world class range. There are plans to increase the number of trophies given out. We are also expecting an increase in the number of door prizes to be given away to competitors.

In late August and early September you have two great options for matches. If you are on the east side of the country you need to make plans to attend the East Coast Championships held this year at the Tusco range in Midvale, OH. If you are on the other side of the country plan to attend the extravaganza match at the LASC range in California. A great range that received some major damage to it during the recent wildfires. Please show your support for the rebuilding efforts by attending as many matches there as you can.

Early October has another fine match in Oklahoma, this being the South Central Championships. Again this is one of very few ranges that offers you all the possible silhouette courses of fire. From Ultra 500 to indoor air pistol they have it all.

While the big matches great to see old friends and test yourself against the competition, it is the local matches and your local match directors that give us the opportunity to shoot this great sport. Remember that when you are at your next local match and see if there is someway you can give the match director a helping hand. Also if there is not a range close to you, look into the possibility of starting a silhouette match at a range near you. There are targets available from ranges no longer shooting that can be purchased for a much lower cost than new.

Have a great season shooting silhouettes and I hope to see you at the matches.

Steve

## IHMSA Bulletin Board

## FOR SALE



40X40 IHMSA zinc buckle, limited quantity, $\$ 17.50$ each from IHMSA Headquarters.
IHMSA Inc; 3061 Sand Hill RD; Bismarck, ND 58503-6437
Pins for sale. $\$ 3.00$ each, 3 for $\$ 7.50,5$ for $\$ 12.00$; any mix of pins.




Small Bore, Field Pistol, Big Bore chamber flags. Small Bore chamber flags: $\$ 1.00$ each, 3 for $\$ 2.50,5$ for $\$ 4.00$. Field Pistol/ Big Bore chamber flags $\$ 1.25$ each, 3 for $\$ 3.00$, 5 for $\$ 4.50$. Shipping included. Order from IHMSA Headquarters. IHMSA, Inc; 3061 Sand Hill RD, Bismarck, ND 58503-6437

## TARGETS FOR SALE

If there are any clubs looking for "free standing" big bore targets or "auto reset" small bore targets contact your regional director as we have some extra targets from the Fort Stockton range that we are looking to sell. We will have more information on the available targets in the future.

2018 WORLD CHAMPIONSHIPS


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IHMSA NEWS, 3061 Sand Hill RD Bismarck, ND 58503-6437

## IHMSA Bulletin Board

## OKLAHOMA STATE CHAMPIONSHIPS

Oklahoma State IHMSA Championship
Oklahoma City Gun Club
June 1st, 2nd, 3rd, 2018
60 Round Match in Each
. 22 Rimfire,
Including $1 / 5$ Scale,
1/2 Scale Big Bore,
Full-Size Big-Bore
Field Pistol
AIR (Indoors)
500 Meter Course
Auto-Reset Targets
40 Round Match

Out-of-State Welcome Camping is Available Indoor Restrooms Pre-Registration Is Not Necessary
\$20. - Per Entry \$95.- Shoot as Many Entries as You Want (Juniors free)
Free Cook-Out on Saturday Evening

Contact Jim Fields, Match Director, Cell-405-203-1268 jimfokc@msn.com

## RULEBOOK CHANGES SINCE THE ISSUANCE OF THE 2016 RULEBOOK.

1. On page 11 Section VI: Handguns - A. Production 12; should be changed to read as below:
A) Sear engagement surfaces of the hammer and trigger may be smoothed and then rehardened.
B) Within the trigger / hammer assembly, springs from any manufacturer may be used to replace original springs, provided they are a catalog item and made specifically for the make of handgun to which they are fitted.
2. On page 16; Section IX: Match Procedures; A. Requirements for Match Sanction; 3.
Change "IHMSA Editor; 971 Mocho Street, Livermore, CA 94550" to "IHMSA, Inc.; 3061 Sand Hill RD; Bismarck, ND 58503-6437"
3. On page 26; Section XII: Practical Hunter Rules; Class Rules; 5. Add the following: Allow artificial support in practical hunter for shooters up to 12th birthday at non-championship matches.
4. Rules Addendum:
"To allow reflex sights for production, standing, and revolver guns across the board for Seniors (age 60 and over) for a one year trial period starting January 1, 2018. The weight limit of all guns affected by this addendum will be increased by 4 ounces per gun."

## US RESIDENTS IHMSA MEMBERSHIP APPLICATION

IHMSA membership, with newsletter from the website, is $\$ 35.00$. Included with the membership is a member/classification card, a copy of the IHMSA rule book, and one annual (start of year) paper issue of the IHMSA newsletter.
If you want the IHMSA newsletter mailed to you each issue add $\$ 20.00$. If you are a life member or not shooting anymore but still want to keep up on the sport the printed newsletter is $\$ 20.00$ per year.
For additional IHMSA information please use IHMSA website www.ihmsa.org or contact headquarters. Memberships for your spouse or children (under 18 years of age), are $\$ 10.00$ per person per year, and only include the IHMSA member/classification card. Fulltime students over the age of 18 are also \$10.00 per year tell they graduate.
Memberships will renew on January 1 each year!

## PLEASE PRINT CLEARLY

IHMSA \# $\qquad$

First Name $\qquad$ Last Name $\qquad$

Address $\qquad$

City $\qquad$ State $\qquad$ Zip Code $\qquad$

E-Mail Address $\qquad$
(18 and Under) Date of Birth $\qquad$ / $\qquad$

## Please fill out the appropriate lines below:

Please check if this is a new IHMSA membership: $\qquad$

Please check if National Rifle Association member: $\qquad$
** Air Pistol and Practical Hunter card inserts are no longer required as they are included in the new classification card!

## Please make check payable to:

IHMSA Inc.
3061 Sand Hill RD
Bismarck, ND 58503-6437

## NON-U.S. RESIDENTS IHMSA MEMBERSHIP APPLICATION

Basic IHMSA membership is $\$ 50.00$ (US) per year. Included with your basic membership is a membership/classification card, a subscription to the IHMSA News, and a copy of the IHMSA Rulebook, and a set of target templates and window sticker to new members. For an additional fee these last two items are available for purchase in addition to your membership fees. Family memberships, for your spouse or children under 18 , are $\$ 10.00$ per person per year and include only the IHMSA membership/classification card. Membership Kits will be mailed first class. Please allow 3-4 weeks for processing. Postage rates for delivery of the IHMSA News outside the U.S. (except Canada and bulk delivery to the Brazilian and New Zealand Directors) are:
(Choose one) Air/First class-\$55/yr.* $\qquad$ Surface Rates - \$18/yr.*
*Note: Bulk delivery of the IHMSA News to Brazil is $\$ 12 / \mathrm{yr}$, and Canada are $\$ 5 / \mathrm{yr}$. Air/First class for Canada- \$15/yr.*

Make all payments payable to: IHMSA, Inc. (Membership \& postage) must be made in U.S. funds

## Please print clearly, your delivery is depending on it!

If this is a renewal please fill in your IHMSA Number $\qquad$

## Last Name:

## First Name:

## Address:

## E-Mail Address:

## City:

## State/Providence:

## Country: <br> Zip/Postal Code:

## Date Of Birth:

11 / (required for child)

Submit to:

IHMSA, Inc.
3061 Sand Hill Rd.
Bismarck, ND 58503-6437
Officer Directory
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Steve Martens
VICE-PRESIDENT AND PHYSICALLY CHALLENGED COORDINATOR
Bruce Barrett
SECRETARY/TREASURER
Ray Utter

| President | Steve Martens P.O. Box 177, Kandiyohi, MN 56251 ihmsaprez@gmail.com |
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| Region 4 Director | Jim Fields <br> 5612 NW 58th Terrace, Oklahoma City, OK 73122 (405) 203-1268 <br> jimfokc@msn.com |
| Region 5 Director and Industry Relations Committee | John Richards (952) 292-4432 jrich@mchsi.com |
| Region 6 Director | Dell Taylor 8899 Midvalley Dr, West Jordan, UT 84088 (801) 566-2939 redfordjewelers@gmail.com |
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| Region 8 Director | Russell Plakke 12110 W. Alabama Pl, Lakewood, CO 80228 russell.plakke@denverwater.org |
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| Paraguay Director | Luis Britez britezluiz22@hotmail.com |

IHMSA.ORG
INTERNATIONAL


## ATTENTION ALL MATCH DIRECTORS

Match forms available at: http://ihmsa.org/forms.html

## REGION DIRECTORY

## REGION 1

REGION 1 DIRECTOR
Allan Olsen 908-756-4317

## STATE DIRECTORS

| Connecticut: | Open |
| :--- | :--- |
| Massachusetts: | Open |
| Maine: | Open |
| New Hampshire: | Open |
| New Jersey: | Allan Olsen 908-756-4317 |
| New York: | Open |
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## REGION 2 DIRECTOR

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Madison, MS 39110

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## REGION 4 DIRECTOR

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Carroll Pilant 660-620-6307
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REGION 5 DIRECTOR
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John Richards 952-292-4432
Joe Lipp 414-761-9425

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## REGION 6 DIRECTOR

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West Jordan, UT 84088

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Hawaii:
Idaho:
Nevada:
Utah:

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Open
Richard C. Martineau 208-522-6980
Open
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## REGION 8 DIRECTOR

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Lakewood, CO 80228
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North Dakota:
Nebraska:
South Dakota:
Wyoming:

Ron Schott 303-452-4837
Ray Utter 701-595-1136 rayutter@netscape.net
Ben Wilson 308-485-4755
Richard L. Pattison 605-393-1870
Open

## REGION 7

## REGION 7 DIRECTOR

Joe Cullison 541-317-8801
28988 Berlin Rd.
Sweet Home, OR 97386

## STATE DIRECTORS

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Alaska:
Open
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Daniel Hagerty 925-321-8407
Montana:
Oregon:
Glen Kapitzke 406-232-3232
Joe Cullison 541-317-8801
Washington:

www.buymylabradar.com

## REQUEST FOR NOMINATION

## STATE DIRECTOR

Article XI, Section 1. of the Corporation's bylaws, as amended in July 2003, states in part, "States and Regions shall elect their State and Region Directors by a majority vote of the resident members who participate in such a ballot. State Directors shall serve until such time as their successor is elected in accordance with these By-laws."

Article XI, Section 3. of the Corporation's bylaws, as amended in July 2003, states, "A call for an election of a state or region director in which the incumbent continues to serve may be made by the officers or members of any club holding IHMSA sanctioned matches within the respective state or region, providing such members and clubs are in good standing. Such call for an election must be made in writing and mailed to the Secretary/Treasurer. If the call for election involves a position held by an incumbent for less than two years, the call must also include a "due cause" justification for holding the election. Such "due cause" calls must be reviewed and approved by majority vote of the Executive Committee before an election is held."

Such a call has been made for the position of State Director of:
(circle one) Alabama, Alaska, Alberta, Arizona, Arkansas, Connecticut, Florida, Hawaii, Illinois, Indiana, Maine, Maryland, Massachusetts, Michigan, Mississippi, Nevada, New Hampshire, New Mexico, New York, Rhode Island, South Carolina, Tennessee, Texas, Vermont, Virginia, Wyoming.

Accordingly, nominations are now sought for the position of State Director of the state listed above. Nominations are to be submitted to the Secretary/Treasurer on the nomination form provided no later than May 31, 2018.

Any member in good standing, who is a bona-fide resident of the state for which they nominate, is eligible to contest the election. A bona-fide resident is someone who has resided in the particular state for a period of not less than six months immediately prior to the election.

## REQUEST FOR NOMINATION <br> FOR THE POSITION OF STATE DIRECTOR

In accordance with the Bylaws of IHMSA, Inc. as amended in 2003, an election has been called for the position of State Director of the state listed above.

I do hereby declare my intention to stand as a candidate for election to the office of State Director of the state listed above and authorize my name to be placed in nomination for said office as a member in good standing of IHMSA, Inc.

Signed: $\qquad$
We, the undersigned members in good standing of IHMSA, Inc. do hereby endorse the above candidate's nomination:

Signed: $\qquad$ IHMSA \# $\qquad$

Signed: $\qquad$ IHMSA \# $\qquad$
The bylaws of IHMSA, Inc. require nomination for this office be submitted on this form to the IHMSA Inc., 3061 Sand Hill Rd, Bismarck, ND 58503, or emailed to, ihmsasectreas@gmail.com. no later than May 31, 2018.

## MEMBERSHIP SPECIAL ANNOUNCEMENT

By Steve Martens

Over the past two years the board of IHMSA has been dealing with a very difficult situation. I'll break down the timeline for the membership. Shortly after I was elected President in July of 2015 I informed past president Nancy LaCroix and Cindy Smith that we needed to switch over the Wells Fargo accounts. We needed to remove Nancy from the accounts and add myself. Wells Fargo required that everyone who is on the account and everyone who is going to be on the account to be at a local branch of a Wells Fargo. Cindy had many excuses as why she was unable to make to a branch. This drug into December of 2015 and by that point Ray Utter had accepted the position of Secretary Treasurer so we had to get him on the account and take off Cindy Smith who was the acting Secretary/Treasurer. We gave her the date (January 15,2016 ) that we were going to do the transfers and told her she had to get to a branch on that day. The transfer of people on the account went smoothly. While at the bank, I noticed the balances of both the savings and the checking accounts were very small. After checking with Nancy that there were no other accounts with IHMSA funds, I went on line that evening and downloaded the statements for the past 2 years. I was shocked to find the IHMSA accounts had been drained of funds from the time that Cindy Smith took over the volunteer position of headquarters. There were countless unauthorized withdrawals of cash and the use of the debit card for personal expenses such as shopping, dining, travel, airfare, pet hospital, car repair and many others. I called Ray Utter that evening and told him we had a big problem. We both proceeded to do an informal audit of the Wells Fargo accounts and we came to the realization that we had over $\$ 75,000$ in unauthorized charges. At this point Cindy Smith admitted to taking the funds from the accounts to Nancy, Ray, and myself. She promised to repay the funds, but never followed through. The next day Ray and myself contacted Wells Fargo and had Cindy removed from the accounts and her debit card deactivated. Ray went to Cheyenne Wyoming to recover the IHMSA property that Cindy had in her possession. Cindy was then removed from the headquarters position. The board then made the decision to permanently remove Cindy Smith from the organization under article 13 of the bylaws. It was decided by the board to impeach and permanently remove Dave Smith from the positions of Vice President, Region 8 director and membership in the organization as he was most likely aware of the unauthorized charges as he benefited from them. At this point Tina Cullison volunteered to look into our legal options. It was decided by the board to proceed with legal action against her in the state of Wyoming. Tina wrote a civil demand letter that resulted in Cindy Smith's written admission of guilt and sending a check with offer for installment repayment over many years. The board rejected that offer and demanded full payment immediately. We received no response, so charges were filed in 2016 and the case has slowly made it's way thru the legal system. During this time the board was advised not to discuss this case with the general membership as this could affect the case against the defendant. A warrant for her arrest was issued and on February 12, 2018, Cindy Smith
turned herself in to the Cheyenne authorities where she was booked on a single count of felony theft. Her mug shot was published in the Wyoming Eagle. It is now public record and we are able to inform the membership of this situation.

That is where the case is now. We are committed to recovering the funds that were stolen from us. We will keep the membership informed as this case comes to a conclusion.

The total draining of IHMSA funds put us in a tough position in the beginning of 2016. But several board members made no interest loans to IHMSA so we could print the newsletters, membership cards and rule books. Board members also covered the postage costs for the membership packets and funded the trophies for the World Championships. Over the next 6 months the funds in the accounts steadily grew, the loans were repaid, and we are now stable financially. In fact the past two years the IHMSA funds have steadily grown.

We have taken several steps so that this cannot happen again. We have multiple people now monitoring the Wells Fargo accounts. I would like to thank the many people who helped us get though this tough time. First, the board of IHMSA who had to make some tough decisions regarding people we considered trustworthy and friends. Tina Cullison, who while not being a lawyer, was able to give the board valuable guidance in the legal world. She spent countless hours putting together materials and filing the police report in Wyoming. She was and is still in contact with the authorities in Wyoming. Bruce Barret, who stepped up and took on the Vice President position. Russel Plakke, who took over the Region 8 directorship and has been a great help. Ray Utter, who soon after taking the position of Secretary/Treasurer had this fall into his lap. I'd also like to thank the membership of IHMSA for seeing us thru this difficult time and for not asking too many questions that we were under orders not to answer. I believe that IHMSA has come out of this stronger and we can get back to the fun of knocking down silhouettes.

## Steve Martens

President IHMSA

# PRE-REGISTRATION FORM <br> 2018 IHMSA $42{ }^{\text {nd }}$ World Championship 

July 13 - July 21,2018
Oklahoma City, OK
IHMSA World Championship Joe Cullison 28988 Berlin Rd Sweet Home, OR 97386
Send mail entries to:


Each relay will be 20 min . Each entry is scheduled to last 80 minutes. A total of 24 relays are scheduled each day, Friday (13th) through Thursday (19th), Friday (20th) Shoot-offs. If you want to coordinate your times with your spotter, please send in your registration forms together. You may switch guns, but nottimes or disciplines. Shooting starts each day at 8:00 AM and runs to 3:00 PM each day. Air Pistol will be Sunday (15th) \& Monday (16th) 6:00 PM- 11:00 PM as time is needed. Ultra 500 (40RD) will be shot July 21. Sign up at match.
SMALL BORE
BIG BORE
AIR PISTOL

| DATE | TIME | GUN | CLASS | DATE | TIME | GUN | CLASS | DATE | TIME | GUN | CLASS |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
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| HALF SIZE |  |  |  | FIFTH SCALE |  |  |  | FIELD PISTOL |  |  |  |
| DATE | TIME | GUN | CLASS | DATE | TIME | GUN | CLASS | DATE | TIME | GUN | CLASS |
|  |  | UHS |  |  |  | UFS |  |  |  | P |  |
|  |  | UASHS |  |  |  | UASFS |  |  |  | PAS |  |
|  |  |  |  |  |  | Practical Hunter |  |  |  | PH 22 |  |
|  |  |  |  |  |  |  |  |  |  | PH SC |  |

ENTRY FEES: $\mathbf{\$ 2 5 . 0 0}$ / GUN. JUNIORENTRIES: $\mathbf{\$ 1 0 . 0 0 / G U N ~ O R F R E E ~ W I T H ~ E A C H ~ P A I D ~ A D U L T E N T R Y . ~}$
TEAMS: $\$ 10.00 /$ entry fee, each team member. Please list team members.
Country Member

Teams for States and Regions will be free. Sign up your team at match. See IHMSA News for more info.
Banquet Tickets: $\qquad$ @ $\$ 25.00$ perAdult $\qquad$ @ \$12.00 Per Child (15 and under)

| $\$ \_$ | TeamFees |
| :--- | :--- |
| $\$ \_$ | EntryFees |
| $\$ 35.00$ | Registration (per shooter) |
| $\$ \quad$ Banquet Tickets |  |

\$25.00 PER/GUN for First 8 guns. (\$200 max entry fee)
A JUNIOR ENTRY IS FREE WITH EACH PAID ADULT ENTRY.
An $80 \times 80$ plaque will be given for perfect score.
MAKE ALL CHECKS, OR MO'S PAYABLE TO IHMSA, INC CREDITCARDREGISTRATIONFORMS MAYBE-EMAILEDTO: jcunclejoe@aol.com
$\qquad$ (\$20.00 discountfor pre-registration, payment due at registration)
(1 T-Shirt FREE per Registration)
T-Shirt size S M L XL XXL $\qquad$ (+\$2.00) XXXL (+\$4.00)
$\$$ $\qquad$ Extra T-Shits
\$ $\qquad$ Total SPOTTER NAME: $\qquad$ SPOTTER IHMSA NO: $\qquad$

## THE NEW SILHOUETTER

Ballistic Basics

By Ken Horowitz

(Originally written for September, 2016 but not published)
Some time in last millennium, I wrote a two part article about basis ballistics. The idea was to keep it simple - no math. Since there has been quite a change in membership over these years, I decided to resurrect the article; well, here we are again. Throughout this article, there will be three areas of interest, not necessarily treated in order, and sometimes co-mingled in discussion, but nevertheless, it is a good idea to keep them separately in mind. The first is interior ballistics, which deals with what takes place inside the chamber and within the barrel of the gun. Next is exterior ballistics, which addresses the flight of the projectile(s), including velocities and paths of travel. Last, there is terminal ballistics, or the action of the projectile(s) on the target, including impact, penetration and damage. In our case, we're talking about the ability to topple the target, particularly those rams. Each of these is variously more or less important to particular individuals, but some basic understanding is good for everyone.

So, what happens when a gun is fired? To answer this, we must first look at the makeup of a modern shooting system, consisting of gun and cartridge. The gun is a barrel, usually rifled, attached to a chamber, into which a cartridge is inserted. It is then locked tightly, with the cartridge held securely, to be actuated by a pin, causing the cartridge to fire. There are many variations on this description, mainly due to action type, and in some cases, such a revolver, there may even be a gap between the chamber and the barrel. With the exception of the cartridge being a selfcontained unit of primer, propellant and bullet, the concept isn't very different between a breechloader and a muzzleloader. The principles of containment and actuation remain the same.

Rather than deal with the separate components of a muzzleloader, the breechloading cartridge is a great convenience. It consists of four components which can be rapidly inserted into the chamber and can be pre-manufactured to exacting specifications for consistency and reliability. Most silhouetters, being a large fraternity of handloaders, are already familiar with the makeup of a modern cartridge. It consists of the case, the powder (propellant), the primer and the bullet. When a gun is fired, the primer is hit by the firing pin, which causes an explosion; this explosion, in turn, starts the powder burning; the gasses released by the burning of the powder push the bullet out of the gun. It all works as a package, and without the gun, the cartridge is relatively innocuous. To get a better understanding, let's mentally crawl our way inside the chamber.

The chamber, cartridge case and barrel form a classic pressure vessel; that is, they contain the pressure of the expanding gases which are generated by the burning powder. Think of it in these terms. Inside the cartridge case, there is a continuous tubular
wall created by the case itself. On one end, there is the base of the case, in which there is a small hole (the primer flash hole), which is covered by the primer cup resting against the breech face. In a properly designed and maintained firearm, this end is well sealed. At the other end, the bullet is seated within the cartridge case. In effect, when pressures rise within the case, the bullet acts as a pressure release valve, because the seal between the case neck and bullet is the weakest point of the pressure vessel and the bullet is pushed away from the cartridge. This is where the barrel comes into play. If the barrel were not there, the loosened bullet would allow all pressure to quickly escape as soon as it fell away and the bullet would not fly very far. However, the barrel creates a secondary chamber which constrains the pressure as it pushes on the bullet causing it to accelerate in velocity. With a proper loading, the bullet will continue to accelerate until it leaves the barrel.

It is extremely important that the above process be a controlled one, because the uncontrolled rising of pressures can cause the pressure vessel itself to fail, if the pressure relief valve is inadequate to the task of relieving the pressure. In other words, the chamber or barrel can crack or explode if the bullet doesn't get out of the way fast enough, such as when there is an incorrect powder charge or a barrel obstruction.

Contrary to popular belief, modern smokeless powders do not explode, but, rather, burn rapidly. The difference between exploding and burning rapidly is one of degree. The burn rate of even so-called slow burning powders is quite rapid, but considerably slower than any number of other familiar items, particularly liquid flammables. Current powders (mostly nitrocellulose) are manufactured to burn at specific rates of speed, either by shape or the use of burn inhibitors, or both, but invariably need a heat source to get started. While I've heard that modern smokeless powders will not ignite by impact, older propellants, such as blackpowder, will. In any case, such experimentation is not recommended. Burning rates can also be greatly affected by pressure, with more pressure generating more heat, in turn causing more rapid burning and therefore, more pressure. Once again, controlled burning is the key both to ballistic performance, and more important, safety.

When the powder is ignited, it generates large volumes of gas. At the same time, the process of conversion of the solid to gas also generates oxygen, which in turn, allows the balance of the powder to continue burning. This happens so rapidly, that before the bullet can get out of the chamber and barrel, the pressures begin to rise rapidly. These pressures cause the case to bulge until the case wall is tightly pressed against the chamber wall, causing a tight seal and preventing the gas from escaping along a route through the case mouth and back around the case wall. This pressing of the case wall against the chamber wall is called obturation. At this time, the same pressure which is causing the bulging presses against the bottom, or head, of the case, pressing the primer cup against the breech face and causing its wall to obturate against the wall of the primer pocket, also creating a seal
at this point. The pressure continues to rise and the only potential relief is by way of the bullet moving through, and subsequently out, of the chamber. Initially, the bullet base is subjected to the pressure, which is still rising, more rapidly than the bullet movement can relieve it. This crushes the bullet against the rifling, tight against the lands and into the grooves, sealing the gas behind the bullet and preventing its unwanted escape in front of the bullet. The bullet continues to accelerate until it reaches the end of the barrel where it exits into the atmosphere and all the pressure inside the chamber and barrel is relieved. Along with the rise in pressure came considerable heat, and at this point, with the decline in pressure, there is a decline in heat, causing a contraction of the cartridge away from the chamber walls and a return of the primer cup to near its original position.

If everything is done correctly, the above process will take place safely, with no dangerous conditions and no uncontrolled loss of gases during the burning process. Correctly means with the proper cartridge loaded in a safe firearm. Frequently, the obvious needs to be stated: Do not use unsafe loads; do not use unsafe firearms; if unsure, don't use either one.

Back to the chamber activity, let's look at the primer. Unlike the powder propellant, the primer is designed to explode on impact. There is a piece of material which is impregnated with lead styphnate sandwiched between the inside of the primer cup and an anvil. When the gun is fired, the cup and anvil violently crush the primer compound, causing a controlled explosion. This explosion carries through the flash hole in the bottom of the cartridge case and, in turn, ignites the powder inside the cartridge. While differentiated from the older muzzleloader variety, modern primers are, in fact, percussion caps; that is, they will explode on impact. Primers must be used in conjunction with their appropriate cartridges and powders. In addition to coming in various sizes, they also come in varying strengths and should be carefully matched with other components, both for safety and performance.

All having gone well, the bullet will have left the barrel with a sufficient spin imparted by the rifling which will give it stability in flight. More on that later, but for now, let's turn to the subject of terminal ballistics. For this, it is necessary to examine the varied objectives of different shooters. An edible game hunter, for example, is interested in stopping game quickly and humanely, generally with a minimum amount of damage to the meat; a paper puncher might be interested in merely making holes, but may also prefer clean cut round holes such as those made by a wadcutter or semi-wadcutter. A metallic silhouette shooter looks for any bullet which will reliably take down the target, without regard to the size hole it might have made or the potential wound channel. Each other type of shooter, including varmint hunters, law enforcement personnel, the military, even plain old plinkers, has his or her own objective with respect to bullet performance on the intended target. Any of these objectives are met by considering bullet weight, caliber, velocity and design (including the materials from which it is made).

There was a time, early in the development of firearms and bullets, when conventional wisdom determined that bullets should be round and made of lead. We have since learned that round is a poor ballistic shape and for flight purposes, the shooter is more often better served by a projectile which is more or less cylindrical, with some modifications. We will return to flight characteristics later, but for now we will assume that we are dealing with conical bullets for terminal ballistics analysis. While lead is still the major bullet material, modern bullets are manufactured from a variety of alloys, from the very soft to quite hard, and using a variety of techniques, such as casting or swaging. In addition, many otherwise lead bullets are clad, or partially clad, in jackets, which will affect interior, exterior and terminal ballistics in several ways.

Tentatively ignoring bullet design, we turn to mass and velocity. It doesn't take a rocket scientist to figure out that a big, fat, heavy bullet moving very rapidly will have more effect on the downrange target than a slow, skinny, light one. However, if we eliminate the diameter for a moment, and just consider various weights and various speeds, the question can become more complicated. How about a light bullet traveling very fast compared with a heavy, but slow, bullet? If your answer is that it depends, give yourself a star. It's a relative question depending on how light (or heavy) and how fast (or slow). Ballisticians have addressed this question with the concept of bullet energy, based on a formula that factors bullet mass and bullet velocity. It has been argued that the energy factor gives too much emphasis to velocity, but nevertheless, it is very useful if used properly. Remember, this is a relative figure and should generally be used in comparing two or more scenarios; also, it is somewhat less useful in comparing extremes. Just about every ammunition manufacturer publishes its energy numbers in its own ballistic tables. Also, they are available in reloading manuals.

If the shooter is just punching paper, energy isn't very important. Silhouetters, on the other hand, find it extremely important. For each animal, there is a generally accepted level of energy required of the bullet in order to be considered adequate for making it topple. Note that energy continues to drop the farther the distance; this is because the velocity continues to decrease. At some point, even a round with adequate energy will be under the minimum due to this continued decline. At the same time, the larger and heavier silhouette targets are farther downrange and the energy required to knock them down is required at the farthest point. Make sure you have enough for the rams and you will be adequate for all the other targets.

At the extremes, energy numbers alone are less useful. As an example, consider a very light bullet moving rapidly, compared to a heavy bullet moving slowly. Assume that you have a 200 meter target and have determined that a minimum of 400 foot pounds of energy is required to do the job at hand. Further assume that the choices are a 223 Remington 52 grain bullet loaded at 2800 fps for a downrange energy of 438 foot pounds, or a 44 Magnum 240 grain bullet starting at 1200 fps for a downrange energy of

431 foot pounds. Take the 44 ! Even though the resulting energy levels are similar (the 223 even being ever so slightly greater), the results will be markedly different. The 223 has a good chance of only denting the ram, leaving it proudly on both of its feet, while the 44 will bring it to the ground almost every time. The purpose of this exercise was to demonstrate that energy is not the end of the consideration, that it is only one factor and that it has its limitations when dealing with extremes.

Turning to bullet caliber, shape and design as they affect the terminal ballistics in silhouette shooting, there is not much of a difference. For other types of shooting, where wound channels and the like are of great importance, the shape matters, but for silhouettes, a pointed, jacketed bullet is about the same as a soft lead bullet. The in betweens don't matter either, at least not for the terminal side - for flight purposes, that's another matter. For the metallic silhouette shooter, retained weight and velocity seem to be more important than the shape or the design of the bullet at the terminal end. While shape and design may greatly influence flight, they seem to have little, if any effect on the target falling, if properly hit. That 200 meter ram, weighing 55 pounds doesn't seem to notice whether the bullet is fully clad, hollow, round, flat or pointed. Exterior ballistics will be much more important than terminal ballistics for the silhouette shooter.

Having addressed the happenings in the chamber and barrel, and then considering the impact on the target, we now turn our attention to the area in between these points in an analysis of the flight of bullets. After the bullet leaves the barrel, it is subjected to a number of physical obstacles, all of which impede its course to the target. Were it not for these obstacles and the effort required to overcome them, our discussion would be nearly complete. However, the best is yet to come in terms of interesting phenomena affecting the ballistic performance of bullets. Air pressure will do its best to stop the bullet head on; gravity will try to pull it to the ground; friction will grab at it; tail drag will pull it back from its intended target; wind will push it to its side; leaves and twigs will try to deflect it. All of this and more will be happening while the bullet, independent of these outside forces, is attempting to cure its wobble, correct its yaw, gain and maintain stability. Differing atmospheric conditions and angle of shooting will also impact the flight pattern.

Hopefully, the study of this section will help you to get your bullets through this arduous journey and more on your intended targets.

Focus on stability. As stated earlier, a round bullet is ballistically poor. In the old days of round ball, smooth bore muzzle loaders, the effective, or accuracy, range was severely limited. It was quickly discovered that cylindrical or conical bullets, shot from a rifled barrel, were much more accurate at greater distances. What happens is that the rifling imparts a gyroscopic spin to the bullet which stabilizes it much the same way that a good quarterback can stabilize a football for greater distance and accuracy. A round ball has no obvious axis around which to rotate and therefore,
is difficult to get stable and to keep stable. Conical bullets, on the other hand, have a definite axis and simple physics dictates that once spinning, the bullet will attempt to find this axis; once obtained, it will try to keep it. Think in terms of a child's top, which will initially wobble upon spinning, but soon stabilize and stay in one area, determined by it axis; getting a ball to spin in one area is a much more difficult task.

All else being equal, a fat bullet (that is, large diameter in relation to its length) will stabilize more easily and retain this stability more readily than a skinny, long bullet. The larger diameter bullet will require a slower rate of twist to get it going and will be less subject to the forces acting upon it during its flight. A skinny bullet will require a faster rate of twist to get it started and will attempt to wobble on it axis much earlier in flight. Again, turning to the child's top and other spinning toys, we all know that a short, wide toy takes an easy spin to stabilize it, but that as it gets longer, and therefore, less wide in relation to its length, the task becomes more and more difficult and at some point, not possible. Improperly stabilized bullets will wobble, tumble in flight (keyholing on target) and otherwise fly in erratic, unpredictable and unreliable trajectories.

Speed for speed, a heavy bullet will retain its course, and be much less subject to forces acting upon it, than a lighter bullet. The above reasons are why, at short ranges, hunters using so called brush guns usually opt for fat, heavy bullets instead of their more svelte counterparts. That 200 grain 35 Remington is a much better choice in the woods than that 130 grain 270 Winchester. Deflection by leaves and twigs while in flight will be much less severe for the 35 . On a much more universal scale, heavier bullets will not be as severely affected by the action of the wind, which we term wind drift.

The worst wind drift comes when there is a direct cross wind in relation to the bullets flight path. Even moderate winds, at 10 miles per hour or less can cause a bullet to stray an inch or more off target. The more the wind turns from the 90 degree position, the less impact on the flight path, until a parallel wind, either from the rear or the front, will have little or no measurable effect. Vertical wind problems are virtually unheard of, but I suppose that if you were shooting in a thunderstorm, you could be theoretically impacted by a severe downdraft.

Resistance by the atmosphere is much more important in general. Air has mass, and as the bullet travels through this mass, it is resisted by it in a number of ways, each of which will slow the bullet and some of which will act to disturb stability of flight. At the same time, gravity is pulling the bullet toward the earth at a constant acceleration. While air resistance does not cause the bullet to fall, its effects will cause the bullet to hit the ground closer to the shooter. To put it another way. The time it takes the bullet to fall from muzzle height to the ground is not affected by the horizontal travel toward the target. (Because of the arcing trajectory of the bullet, the preceding simplification is not exactly true, but for these purposes, let's assume that its close enough.)

Traveling horizontally, the bullet will reach the ground at the same time, regardless of the distance traveled. Therefore, a slower bullet will hit the ground closer to the shooter and a faster bullet will hit the ground closer to the target, even though they both hit the ground at the same time. In order to hit the target at the same point, the slower bullet will need a higher trajectory than the faster bullet. Considerations of air impact on bullets are addressed by rating bullets in terms of their ballistic coefficients. In general, the higher the ballistic coefficient of the bullet (which is rated at various speeds), the better the bullet's ability to withstand or avoid the adverse consequences of air resistance. Most bullet manufacturers publish their own ballistic coefficients.

But, as previously stated, bullets do not travel horizontally, even to targets that we see horizontally. When sighting a target head on, remember that the bullet will exit the barrel below the line of sight. While iron sights may sit directly on top of the barrel, thereby putting the line of sight slightly above the bullet as it exits the muzzle, scopes and specialty sights can be considerably higher. Also, we now know that the bullet will immediately be subjected to the downward pull of gravity as soon as it leaves the barrel and that this pull will be constant and continuous until the bullet finds its mark. In order to get the bullet to its proper downrange appointment, the path of the bullet must arc upward, cross the line of sight, continue its arcing over the line of sight until it is arcing downward and meets the line of sight again at the intended target. If sighted in at this distance and the target were not there, the bullet would continue the downward arc until it hit the ground.

Back inside the barrel, we previously noted that expanding gasses continued to cause the bullet to accelerate within the barrel, providing that it was a proper (in this case, not squib, or undersized) load. The impact with the atmosphere is sudden and violent and immediately causes the bullet to begin to slow. Since the processes that slow bullet travel are cumulative, the rate at which a bullet slows increases with time. Awkward as it may sound, it gets slower more quickly. Coupled with the constant accelerated pull of gravity, this is what causes bullets to arc more rapidly downward as they get farther from the shooter. Instead of a smooth parabolic curve, the arc of a bullet's travel more clearly looks like a fishing rod with a whippy end when subjected to weight.

While we've mentioned air resistance, we should look more closely at the causes and the potential solutions which are available. The leading edge of the bullet is heading directly into the mass formed by the air. It will compress the air in front of it, confirming the resistance. The sharper the point of the bullet, the less this phenomenon occurs, and many aerodynamic designs incorporate some kind of gradual front end entry into the air mass. There is also a degree of resistance caused by the passing of the sides of the bullet through the air, but this is generally negligible. Also, there are differences between the levels of effect caused by the body of the bullet, depending on the speed
(particularly, differences among sub-sonic, super-sonic and intra-sonic speeds), and also depending on what we have done to alter the shape of the leading edge of the bullet. All this is negligible compared with the adverse impact of drag, caused by the characteristics of the trailing edge.

As the bullet cuts through the air, the air stream passes around the front of the bullet and along its sides. Continuing around the back end of the sides and to the rear of the bullet, two very adverse occurrences take place. First, because of the gap created between the air molecules and the very tail end of the bullet, a vacuum is created. At the same time, the air that does move rearward of the bullet, does it so rapidly and without support, that the turbulence is quite violent. Nature abhors a vacuum and the logical candidates to fill it are the air and the bullet. Moving the bullet creates drag, which will slow the bullet and moving already turbulent air will make it more so. The turbulence causes the bullet to attempt to lose stability, which the bullet is trying so hard to maintain through gyroscopic spin. The most traumatic time for the bullet after initial chamber launching and its forced entry into the rifling grooves is at the point of entry into the atmosphere. The violent impact of the drag and turbulence is occurring at this point prior to the bullet having achieved stability.

This aerodynamic drag and turbulence caused by the exit design of bullets is among the worst offenders in reducing bullet flight performance. Fortunately, there is a cure, or at least a remedy. The boat tail design forms a more gradual curve around the tail end of the bullet, drastically reducing drag. For longer range accuracy, I am more concerned with the tail than with any other part of the design. Fortunately, many boat tail designs also incorporate aerodynamically superior front ends as well. Unfortunately, the benefits of a good boat tail are not generally realized at the typically limited 200 meter range of handgun silhouetting. Nevertheless, if only for ease of reloading, they are my favorite design.

Good bullet design considers all the problems of trading off of features. Given a bullet weight, elongation of the leading edge and the addition of a boat tail will impact the surface area of the main body of the bullet. It is important to have sufficient surface area here in order to gain purchase on the rifling. That is why the bullet cannot be shaped like a football, with great leading and trailing ends. Unlike the football, whose stabilizing spin is imparted by the quarterback's hand, the bullet must rely on the meeting of the middle part of the bullet with the lands and grooves of the barrel.

Speaking of footballs, did you ever notice, particularly in a slow motion replay, that the football's axis is rarely directly in line with the axis of the line of trajectory? This phenomenon is called yaw, a term familiar to sailors; and yes, bullets also fly with some degree of yaw. The centerline axis of the bullet is slightly canted in comparison with the centerline of the trajectory. This
is normal and if the cartridge is properly constructed, will have little effect, if any, on your shot. Another phenomenon which should cause no undue alarm, is the tendency of a bullet to move slightly left or slightly right, in the direction of the rifling. In other words, a right hand twist will shoot slightly to the right and rifling with a left hand twist will shoot slightly to the left. Your adjustable sights can easily correct this, if noticeable

Return for a moment to the subject of gravity and it effects on uphill and downhill shots. (Remember that up until now, we assumed that all of our shots were substantially horizontal.) We had said that the pull of gravity was constant and that it was unaffected by the horizontal movement of the bullet. It is also not affected by the vertical rise of the bullet shooting uphill or the vertical drop of the bullet shooting downhill. Gravity will pull the bullet down the same distance in any scenario, given the same time period. The rub is, that a shot at a high angle, or a low angle, is farther from the line of sight, measured vertically (the direction in which gravity is pulling), than it would be in a horizontal shot at the same distance. Therefore, the bullet will be pulled down less of the total spread between the two lines (sight and trajectory), by gravity, by the time the bullet finds its mark, than it would otherwise have been pulled down if the horizontal shot had been taken. In either case, the shot will be too high for the target. Sight adjustments to compensate for this phenomenon are important to consider when taking far ranging cross-canyon shots such as those encountered in the western part of the country. Fortunately, the upward or downward angles encountered on the silhouette range are less severe and most times unnoticeable.

Altitude, atmosphere, humidity and temperature are important only when there are extreme changes in the circumstances under which your gun was sighted and the conditions under which you are now shooting. The real importance relates to the difference in the density of the air which can be encountered under varied conditions. This change in air density can impact resistance and drag, as discussed previously. Change the conditions and the impact is similarly changed. Those of you who travel the silhouette circuit and/or shoot in all kinds of weather may notice that your loads perform differently in different locales or climates. Now you know why.

Well, there you have it. Plain vanilla, simple. Not the scientific treatise of the century, and not one single formula or mathematical equation. It's what I promised you - a no nonsense basic discussion of the entire process, in the chamber, through the barrel, downrange and into the target. Hopefully, you'll enjoy shooting even more than before you had this basic information. I know I do.

## REQUEST FOR NOMINATION FOR THE OFFICE OF PRESIDENT OF IHMSA, INC.

In accordance with the Bylaws of IHMSA, Inc. as amended in 2002, the office of President of IHMSA, Inc. will be filled by election prior to the annual meeting. The individual elected shall serve a three-year term ending in 2021.

I $\qquad$ do hereby declare my intention to stand as a candidate for election to the office of President of IHMSA, Inc. and authorize my name to be placed in nomination for said office as a member in good standing of IHMSA, Inc.

Signed: $\qquad$
We, the undersigned members in good standing of IHMSA, Inc. do hereby endorse the above candidate's nomination:

Signed: $\qquad$ IHMSA \# $\qquad$

Signed: $\qquad$ IHMSA \# $\qquad$
The bylaws of IHMSA, Inc. require nomination for this office be submitted on this form to the Nominations Officer, Dell Taylor, 8899 Midvalley Dr., West Jordan, UT, 840889023, and received not later than June 1, 2018.
(IHMSA bylaws provide for candidates to submit a statement of their candidacy of 500 words to be included with the declaration of their candidacy for inclusion in the IHMSA NEWS. Due to publishing schedules, a candidate's statement must be received by the editor no later than June 1, 2018.)
2018 MATCH SCHEDULE

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