

# MINT NEWS QUARTERLY™

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## Focus on Environment and Innovation at WMF Technical Forum



The Technical Forum took place for the 15th time at the World Money Fair in Berlin on 31 January, moderated – as usual – by Thomas Hogenkamp (Spaleck) and Dieter Merkle (Schuler Pressen). 15 presentations were made by representatives of public and private mints as well as the supply sector in front of an audience of 430 registered attendees.

The focus of this year's talks was on environmental protection and inspection. An abundance of case studies completed the program.

One of the coin industry's priorities is sustainability in waste water management. Water is one of our most valuable resources. The coin industry is dependent on the use of large amounts of water for several production processes. Three speakers presented examples of how water can be used in the best way possible.

### Cyanide-free electroplating

The Italian Istituto Poligrafico e Zecca dello Stato dedicated their presentation to copper plating of coin blanks for 1, 2 and 5 cent pieces. If struck in large numbers, extensive material savings are already possible by reducing the thickness of the plating from 25 to 15 micrometers for the 1 and 2 cent coins and 20 micrometers for the 5 cent coins – as was done in Italy in 2018.

In addition, the Italian mint developed a new procedure in the past two years which allows for the application of copper plating by use of a cyanide-free electrolyte. This solution was custom-developed for the Italian mint and its results can be compared to electrolytes containing cyanide.

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## The End of Krause Publications?

F+W, parent company of Krause Publications, has filed for bankruptcy. This could potentially result in the end of numerous numismatic publications in the US. Years of mismanagement and poor investments are considered the causes of these developments.

One could be inclined to compare this to a magnitude 9.0 earthquake in the field of numismatic journalism. At its epicenter is the headquarters of F+W in New York City. Coin collectors outside of the US might have never heard of this name, yet F+W has owned one of the global players of numismatic publishing ever since it acquired Krause Publications in 2002. Back then, business was still booming.

Now, the public has learned that the corporation has ruined itself by speculation and is being crushed by the burden of its debts. Last week, F+W had to file for bankruptcy and its holdings will be liquidated in the next few months. This could potentially bring about the end of numerous numismatic publications, such as Numismatic News and World Coin News, Krause's famous reference catalogs Standard Catalog of World Coins, and Krause's Coin of the Year (COTY) competition.

### F+W: a major corporation

F+W was founded in New York in 1913 and began its publishing work with two magazines. Today, the corporation is made up of two big departments: the publishing sector for books and their so-called communities, which encompass magazines, websites, e-learning and currently a total of 21 e-commerce shops. The range of topics covers all types of hobbies imaginable: arts and crafts, knives and antiques, hunting and painting – and coins.

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# WMF Technical Forum *(Continued)*

It is, however, considerably more expensive and demands high standards of production. Both the electroplating and coin striking process had to be adapted to this new approach. Even though the optimal adhesion of the copper plating is now guaranteed, a constant quality control remains necessary.

As a government-owned business, the Italian mint views the positive effects on the environment as more decisive than the increased costs and the more complex production process.

## Coin blank production in closed water circuit

Last March, Monea resumed coin blank production in the Slovakian city of Kremnica. Blank production and electroplating are now both located in the completely renovated factory site.

Just under 12 months were needed to get from the decision-making to the initiation of production. Due to all of the governmental permits needed for electroplating, this would not have been possible if Monea had not already decided early on that the entire site would be kept waste water free. Only the sewage produced by the dishwasher and toilets is discharged to the local water disposal. Everything else is cleaned by way of state-of-the-art vacuum distillation, and reused afterwards.

That is a crucial contribution to environmental protection since one hour of work at Monea, grossed up to a 24/7 production, produces 1,500 to 2,000 litres of waste water.

Monea decided to collaborate with H2O. The company works with vacuum evaporation: waste water is heated and evaporates, and the polluted components remain as a compact mass, which in turn is completely recyclable. In a next step, the evaporated water is condensed and can be reused in production without any losses.

One aspect is particularly remarkable: 95% of the used energy is also recycled. Only two H2O vacuum vaporizers of a theoretical capacity of 1,000 litres are needed for the waste water of Monea Kremnica.

Of course, the overall costs were the decisive factor that played in favor of H2O. According to the initial mission plan, said costs should not be higher than those caused by comparable systems. In the end, the entire investment amounted to only 70% of traditional CP systems. Therefore, Monea expects the amortisation to be within the first one and a half years.

Another reason for choosing to work with H2O was the extremely short time required for maintenance procedures. According to current experiential values, they take up only about 10-15 minutes per day. In addition, the machines are extremely unsusceptible to malfunctioning: in 2018, they were inoperative for less than five days, not due to malfunctioning but due to maintenance.

## New evaporator by Spaleck

Karin Geukes of Spaleck also dedicated her talk to waste water disposal by way of vaporisation. However, she didn't concentrate on vaporisation at high temperatures, but at 30-35°.

The vacuum steamer newly developed and distributed by Spaleck, which was designed specifically with the needs of mints in mind, allows the user to monitor whether or not sediments have developed inside the tank or pipes in order to remove them.

According to the speaker, infrequent usage of the evaporator and consequently frequent stand-by times can result in sediments that constitute a perfect environment for bacteria and fungi. This sediment is not only dangerous in terms of handling, it can also result in a loss of efficiency.

Spaleck's evaporator offers fast fault detection, easy fault removal and consequently a higher efficiency and a lower loss of production. In addition, as the water needs to be heated up or cooled down to lower temperatures, the system is very energy-efficient.

## The core business: coin production

Eight speakers in total dedicated their presentations to coin manufacturing: from die production (four) to striking (one) to material (two talks) right up to project management (one). In this section of the forum, half of the speakers were mint representatives. They presented the latest developments on the basis of case studies.

## ArtCAM – Delcam = CarveCo

Anyone wondering why attendees no longer saw those entertaining videos showing the latest creations of ArtCAM/Delcam at the Technical Forum 2017 and 2018 were enlightened by Robert Newman: in 2018, Delcam abandoned the development of ArtCAM – which caused some irritation among many users (and even more so among the developers).

The latter decided to continue the software at their own risk and their own responsibility. Last October, they reached an agreement with Delcam that resulted in the assigning of the rights of the well-known software ArtCAM, which they can now carry on and advance under the new label CarveCo.

CarveCo is a company which is wholly owned by former ArtCam creators. Ultimately, there is nothing new about this, except that ArtCam will keep going, albeit under a new name.

## Laser frosting

One of the few processes in coin production that is still mostly done by hand is the application of the finest layers of frosting by polishing the die. Hence, there is potential of labour saving in this field.

In this year's talk, Alexander Aminidis of ACSYS emphasized the various possibilities of applying different frostings through pico and nanolasers.

Upon customer request, a Frosting Assistant was developed which can be used to perfectly edit an image for the respective die. Two different systems – 2D Vector Files and Greyscale Image – allow for the choice between multiple modes of frosting. Greyscale Image even makes gradient frosting possible. Due to Dynamic Focus Control, these lasers can not only be used on flat pieces, but also on dies for blanks of special shape.

## Hundreds of dies for challenging commemorative coins

On January 25, the longest government shutdown in US history ended. Just in time for Ronald E Harrigal of the United States Mint to make his way to Berlin and present his talk at the Technical Forum. It was dedicated to the problems mints are faced with when they have to produce the most technically challenging commemorative coins in very large numbers.

Ronald presented a recent case study which focused on the domed commemorative coins the US had minted in celebration of the 50th anniversary of the moon landing. The US Mint had already applied this elaborate technology in 2014. Now, it had to be adapted for new denominations.

Four denominations were planned for this commemorative issue:

- 50 cent – no change necessary;
- \$1 in silver – technology had to be adapted to the change in alloy to .999;
- 5oz \$1 in silver – this new denomination with a diameter of 7.5cm posed the greatest challenges;
- \$5 in gold – no change necessary.

The technology department estimated that 400 pairs of dies would be necessary for the 100,000 5oz coins. What an incredible effort: a CNC mill needs 11.5 hours to produce just one of them. It takes an additional four hours to hand polish one individual die.





In order to complete this task in the planned production window of 90 days, the Philadelphia Mint purchased four additional CNC mills, so that six mills could be employed at the same time.

Additionally, the emission was prepared in meticulous detail. Computers were used to simulate the flow of metal so as to optimise the dies in a way that would prevent early die cracks. During the practical test, it became apparent that removing the chrome layer of the PVD coating led to a 4,000% (sic!) increase in the die's life. This resulted in only 125 reverse dies and 65 obverse dies being needed to fulfil the program requirements. The machining time was reduced from 11.5 to 4.5 hours.

Hence, the problem of producing the dies in time was solved. A different problem ultimately became the bottleneck for production: the supply of 5oz domed blanks.

### New materials

Dr Xianyao Li (Royal Canadian Mint) presented a project for a new generation of circulation coins which is aimed at making them even more secure, more attractive, and more cost-effective in their production.

The patented 'Multi Component Circulation Coins' are tri-metal coins consisting of one ring and not one, but two inserts. The numerous possible material combinations generate an even more exact EMS and an additional visible security feature in the form of various visual colours on the obverse and reverse – just as with the flip flop products that have been developed in Germany.

A custom-adapted minting process ensures the optimal connection of the various components. For this purpose, a tailored high-speed tri-feeding system as well as a special coin press were developed, which can produce up to 400 coins a minute.

Tri-metal tokens, which are very popular among collectors, have already been struck in the new system. It can be used for the production of circulation coins at any time.

In Germany, commemorative coins with polymer rings have attracted the attention of the media and collectors alike. This is considered proof of the collectors' acceptance of new non-metal materials. Now, the Portuguese Mint (Imprensa Nacional Casa da Moeda, or INCM) have developed their own polymer coins – bi-metal coins whose entire centre consists of polymer.

This presents minting technology with an entirely new problem as ring and centre cannot be joined automatically within the minting process. Polymer tends to crack easily or loosen after the minting process has been completed.

This is where INCM's engineers began their work. And they actually managed to develop a polymer which can be used as the centre of the coin. This results in an abundance of new possibilities for the creative department: they can now play with colours and holographic images.

In addition, RFID devices, which are used for data identification purposes in countless fields, have successfully been embedded within the coins. This results not only in attractive visual affects but also high security factors – and a vast array of possible applications thanks to RFID technology.

### Surface-finishing system

Rüdiger Böhm of the Rösler company presented the *MPA 17.1 E-SA*, a new system for the surface-finishing of commemorative coins which has been customised for this precise purpose. The new system offers easily accessible connecting points for energy, water, compressed air and waste water at minimised space requirements and thus guarantees a secure and quiet production process.

The drum used to polish the blanks with special compounds has been redesigned. It is made of acid-resistant stainless steel, has an optimised form and is constantly monitored by partially-patented sensors. They guarantee the exact dosing of water and compounds, adapted to every batch at every step of the process. Expensive overdosing can thus be prevented. The system also includes an integrated dryer. The developers paid particular attention to ensuring that processed blanks will not be damaged in any of the following steps.

State-of-the-art Siemens technology results in a user-friendly control and 4.0 solutions via touchpad.

### Future of minting technology

According to Wolfgang Schuman of Schuler Pressen, the production of bi- and tri-metal coins remains too complex.

First, the rings must be prepared, then they have to be joined with the centres in custom-optimised machines to make and strike the coin. Said coin then has to be inspected (this is very often still done manually). Those are too many steps, which is why the bi- and tri-metal coins are disproportionately expensive in terms of production.

Therefore, Schuler has one goal: all-in-one punching, joining, coining and quality control for both bi- and tri-metal coins.

This is what research already drew on when the German government decided in 2015 to have polymer coins minted in larger numbers for the first time. Hence, the construction of joining machines for polymer coins became a priority. The machines, designed and built by Schuler, are now used in Karlsruhe, one of the state mints of Baden-Württemberg, and at the Bavarian Mint in Munich.

This does not mean, however, that Schuler has lost sight of the overall objective. Engineers at the Innovation Tower in Göppingen are working on the development of one single machine for all of the numerous steps in the production of bi- and tri-metal coins.

To be continued ... at one of the next Technical Forums.

### Optimised project management

Munich-based BH Mayers Kunstprägeanstalt and Münz-Prägstatt presented at the Technical Forum for the first time. Jochen Diessner revealed how the high-tech company, which is very popular among private customers, manages to fulfill the demand of delivering on time a wealth of small emissions, most of which present incredible technological challenges.

A computer program called *IPPS* (Integration Planning Production Service) is the key to success. It perfectly synchronises all production processes and takes into account the availability of employees and machines.

The system automatically generates plans which list, assign and schedule all of the production steps in detail and controls their execution. It is still possible for the 'master' to intervene manually at the control station and to overwrite the system's recommendations.

Every single step can be traced on the basis of the work schedules. Hence, the company management is able to tell customers at any given time whether or not their suggested time schedule is reasonable or not.

### Efficient quality control – fast, perfect, and cost-efficient

Three companies dedicated their presentations to the various possibilities of how visual, computerised systems can distinguish good and usable coins from those that must be withdrawn from circulation as quickly, perfectly, and cost-effectively as possible.

Two types of machines are developing in divergent directions:

- Machines used to 'process' the coins at logistics centres, ie. machines that examine foreign, forged or useless coins according to ETSC standards;
- Machines used in the field of collectors' coins, which are used to ensure that only coins of highest perfection are approved for delivery.

Mühlbauer manufactures inspection machines for circulation coins that can inspect up to 3,000 items per minute in regard to visual features (obverse, reverse and edge), weight, diameter, EMS and numerous other factors. Some material combinations even allow for the exact determination of the plating's thickness. The inspection of the relief is also important for forgery detection.

All of the measured results can be combined for every single piece. The combination of various measurements increases the probability of detecting counterfeit coins and decreases the (accidental) rejection of real coins.

In addition, Mühlbauer recently applied for a patent of a new process which counts the pieces with 100% accuracy.

How do machines learn? This question was the pivotal one of the talk presented by Dr Anupriya Balikai of Spookfish. How much effort does it take to teach them how to distinguish real from false? Are there other alternatives? How secure and complex are those? How much data is necessary?

The Spookfish inspection systems *Microps X* and *Xi*, which can inspect up to 1,500 and 3,000 coins per minute respectively, offer the possibility of 'Automatic Teaching'. They enable the inspection system to independently acquire the data that characterises a 'good' coin.

During her research, Dr Balikai discovered that two methods in particular led to the highest decision accuracy: unsupervised learning, which requires a large number of objects the machine can learn from, and so-called 'deep learning', which requires an even larger amount of data. During supervised learning, one piece or a small number of examples demonstrating the range of features the machine is expected to use in the evaluation process can suffice.

'Semi-supervised learning' has proven particularly efficient. During this process, the user intervenes to teach the machine how to detect forged and real coins by way of a relatively small amount of coins.

The new tool for quality determination offered by Induvis targets those who produce collectors' coins. Its distinctive feature is that it can be implemented into various different production systems. The 2D inline inspection system does not interrupt the flow of material, is highly flexible and can be perfectly tailored to customers' needs.

At the moment, Induvis is developing a new system which will also be able to be integrated into existing production lines and will allow for 3D inspection of objects. Colour deviations and defects will be detected down to 50µm. The system's illumination is highly flexible and can also be tailor specifically to customers' needs.

The CEO of the Mint of Finland, Jonne Hankimaa, wrapped up this year's Technical Forum with the usual reminder that the future of cash and consequently the entire basis of the industry is anything but certain. And Dieter Merkle added a call to support the movement 'Cash Matters'.

It is nevertheless remarkable to see how much money mints invest in the development of expensive technology which is solely used for collectors' coins. Three out of five case studies presented by mints were dedicated to commemorative coins, only two of them studied circulation coins.

## H2O: VacuDest XS Clearcat

**For those mints who have to handle smaller quantities of wastewater, H2O GmbH has developed a new system, the VacuDest XS Clearcat. This is particularly interesting for companies with less than 300 cubic metres of oily liquid discharge per year.**

'Our VACUDEST XS to date could not, from a technical perspective, be offered with our tried-and-tested Clearcat module,' according to the Sales Director Jochen Freund. 'Given that our vision is to enable an increasing number of industrial enterprises to have liquid discharge-free production, over the past year we have worked meticulously on a solution. We changed the design of the VACUDEST XS, and the Clearcat module has now found its place in the highly compact XS system. Our little chick has not only now got better, but is more attractive.'

The Clearcat module enables crystal clear, virtually oil-free distillate and also satisfies strict requirements through the high COD reduction. As such, the distillate can be reused with greater frequency in the production process. Seven out of ten new VACUDEST systems have already been delivered with the Clearcat module.

'We are delighted to be able to now offer this option to companies with low liquid discharge volumes,' says Freund.

The system is available in two different sizes: the XS 200 Clearcat is the smallest system in the series and is ideal for up to 200 cubic metres of liquid discharge per year. The XS 300 Clearcat treats 300 cubic metres of wastewater per year.





# French Star Chef Wins 2019 COTY

The COTY trophies for 2019 were awarded on 2 February at the World Money Fair. The Coin of the Year was the 'Best Silver Coin' from France – the €50 'French Excellency Guy Savoy' coin.



The winners of the various categories are as follow:

- **Most Historically Significant Coin:** Austria – €20 silver / 175th Anniversary of the Vienna Philharmonic Orchestra;
- **Best Contemporary Event Coin:** South Africa – 2 Rand silver / South African Inventions: The Heart Transplant;
- **Best Gold Coin:** USA – \$100 gold / American Liberty 225th Anniversary Gold Coin;
- **Best Silver Coin:** France – (as above) – €50 silver / French Excellency Guy Savoy;
- **Best Crown Coin:** The Cook Islands – \$5 silver / Scarab Collection: Red Dawn;
- **Best Circulating Coin:** Mauritania – 20 Ouguiya tri-metallic / Camels;
- **Best Bi-Metallic Coin:** France – €2 bi-metallic / The Fight Against Breast Cancer;
- **Most Artistic Coin:** Austria – €50 gold / The Vienna Schools of Psychotherapy: Sigmund Freud;
- **Most Innovative Coin:** Palau – \$20 silver / Great Micromosaic Passion: Birth of Venus;
- **Most Inspirational Coin:** USA – \$2 silver / Boys Town Centennial Commemorative.

All coins in the contest are dated 2017. Joaquin Jimenez received the Lifetime Achievement Award in Coin Design. He is a designer, engraver and artist at the Monnaie de Paris.

# Coin Constellation Award: Call for Applications



The Russian publishing house Water Mark has announced that the application process for this year's Coin Constellation Award has begun.

Coin Constellation is the only international contest for commemorative coins held in Russia. National central banks, mints and coin distributing companies from all over the world can participate in the contest. A jury of international specialists from well-known world museums, auction houses and representatives of numismatic associations will determine the winners of each category.

Only coins issued between 1 January and 31 December 2018 are eligible for submission. The deadline is 25 March.

Awards will be made in nine categories under the following conditions:

**Unique concept:** the participant cannot present more than three coins for the nomination. Coins submitted in this category cannot be presented in the categories 'Best artistic solution' and 'Original technology'.

**Best artistic solution:** the participant cannot present more than three coins for the nomination. Coins submitted in this category cannot be presented in the categories 'Unique concept' and 'Original technology'.

**Original technology:** the participant cannot present more than three coins for the nomination. Coins submitted in this category cannot be presented in the categories 'Unique concept' and 'Best artistic solution'.

**Best circulation coin:** the participant cannot present more than three coins for the nomination. The coins must be made of base metals, as they are normally used in the manufacturing of circulating cash. Coins depicting any theme and made with the use of any technology can be submitted.

**Coin classic:** the participant can present only one coin for the nomination. Only round-shaped coins of classic design made by applying 'classic' technologies (without using insets of stones, holograms, pad printing, enameling and other similar technologies) can be submitted.

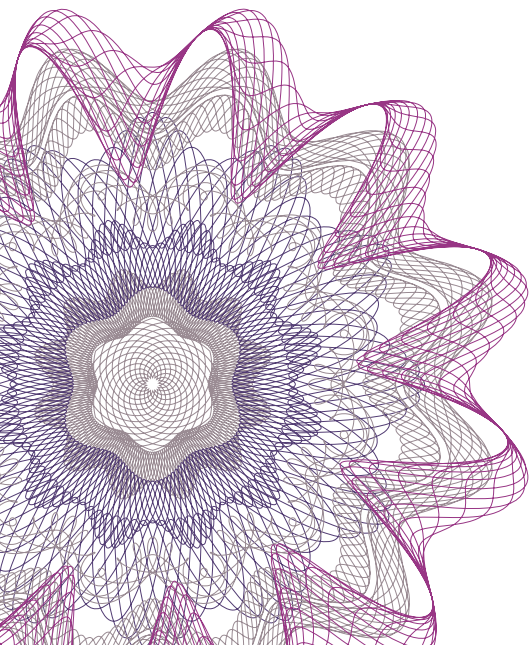
**Souvenir coin:** the participant can present only one coin for the nomination. The submitted coins must have been issued as souvenirs for numismatists and the general non-collecting public. The accepted coins are coins of different shape, designed inter alia by using non-typical technologies: insets, pad printing, enameling, thermal printing and others.

**Silver coin of the year:** the participant can present only one coin for the nomination.

**Gold coin of the year:** the participant can present only one coin for the nomination.

**Coin of the year:** the participant can present only one coin for the nomination. Coins made of any metals can be submitted.

A People's Choice Award will also be selected. Voting will be possible on the publishing house's website in due course. Further information is available on the Water Mark website at [www.gold10.ru/eng/](http://www.gold10.ru/eng/).



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## End of Krause Publications? *(Continued)*



F+W, the parent company of Krause Publications, has filed for bankruptcy.

Numismatics is the domain of Krause Publications, which in itself publishes 46 magazines (not only numismatic ones), organizes 15 coin shows and can list an impressive 750 titles. They include many reference catalogs for coins and banknotes such as *Bank Note Reporter*, *Standard Catalog of World Coins* and the *Standard Catalog of World Paper Money*.

### The spiral of debt

In 2018, the F+W company worked up \$67.7 million in sales, \$22 million alone coming from the publishing department. However, according to the bankruptcy petition, those numbers have to be considered against the backdrop of a total of \$105.2 million in active debts. (There are said to be between 1,000 and 5,000 debtors – nobody can tell for certain, the list itself fills 543 pages of the files!) Available funds make up only \$2.5 million. How could this happen?

Two opposite developments were the cause. On the one hand, the number of advertisers and magazine subscribers has decreased steadily over the years. Many types of media have experienced this, print newspapers in particular. The number of subscribers decreased from 33.4 million in 2015 to currently 21.5 million. Which in turn also meant that the products became less attractive for advertisers. As a consequence, advertising revenues dropped from \$20.7 million to \$13.7 million in the same time span.

The company management's desperate attempts to be in the black by introducing innovative approaches were problematic at best. F+W played the e-commerce card: products were purchased, stored and offered to customers in online shops.

In the bankruptcy petition, CEO Gregory Osberg states that the costs incurred by e-commerce were huge and it took a toll on the relationship with their customers. The F+W website had to undergo complete modernisation – which was one big mal-investment. The arts and crafts department spent about \$6 million on e-commerce in 2018 – only half of it was recouped.

### A fresh start

In 2017, F+W collected \$15 million for restructuring measures. According to Osberg, all of said money was lost within half a year due to mismanagement. As a consequence, the entire management team was replaced in the spring of 2018, and smaller branch publications such as 'Blade' as well as the e-commerce activities of 'Keepsake Quilting' were sold. The \$7 million that were cleared were nothing but a drop in the ocean.

Currently, F+W continues its business, while an attempt is made to sell shares in order to be able to reconcile the debts. F+W Books is supposed to be sold at the end of May, the communities are scheduled to follow by mid-June. This may well result in the end of F+W.

It remains uncertain which departments of the company will be sold successfully and in what form the work of the magazines, publishing companies and online platforms will continue. That also applies to Krause Publications and its vast range of products for coin collectors.