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Report on SASEG's 84th Annual Convention, 17-19 June 2017, at Monte Verità, Ascona Heinz M. Bürgisser¹

Participants (82): Antognini, Marco; Bachmann, Bettina; Bachmann, Martin; Bernoulli, Daniel [E, Sp]; Bichsel, Matthias; Bolliger, Renate; Bollinger, Daniel; Boulicault, Lise; Brumbaugh, William & Michele; Bürgisser, Heinz & Trudy; Burri, Marzella [N]; Burri, Reto [N]; Cagienard, Pius & Olga; Carmalt, Sam; Cartier, Edi; Christe, Fabien [St]; Eckardt, Peter & Buchmann, Johanna; Eckert, Ruedi & Trudi; Felder, Theodor; Fiebig, Bernd; Fleckenstein, Martin & Stenner-Fleckenstein, Margit; Fraenkl, Res & Katrin; Franks, Sybille; Fricker, Peter & Marie Luise; Graf, René & Helena; Grasmück, Kurt & Madlen; Gunzenhauser, Bernhard & Censier, Kathrin; Häring, Markus; Häusler, Mauro [St]; Heinz, Roger; Hemsted, Tim; Huber, Marius [StN]; Kappenberger, Giovanni [Sp] & Oehninger, Irene; Keller, Franz; Knup, Peter; Leu, Werner; Lodetti, Florence [N]; Matter, Albert & Dora; Meier, Beat; Meylan, Benjamin; Minnig, Christian & Tamara; Moscariello, Andrea; Müller-Merz, Edith & Hansjakob Müller; Müller, Werner; Pozzorini, Diego [E]; Reichetseder, Peter & Iris; Reinhard, Benedict & Eva; Scherer, Frank; Schmid, Stefan [E, Sp]; Schwendener, Brigitte; Schwendener, Dario [N]; Seemann, Ulrich; Simantov, Vlasta; Stockar, Rudolf [E] & Römer, Neria; Stumm, Fred; Teysen, Thomas & Irmtraud; Trümpy, Daniel; Uttinger, Jörg; Wach, Hans; Walde, Michel [N]; Wyss, Roland; Ziegler, Martin & Rosemarie.

[E] Excursion leaders 18 or 19 June; [N] Non-member (Guest); [Sp] Speakers 17 June; [St] Student member; [StN] New student member

Preface

A special hill site above Ascona, with breathtaking views of Lago Maggiore, hosted our 84th Annual Convention (Fig. 1). It has been a magnet for ideas, trends, experiments and historical figures at least since the turn of the 20th century. Then, artists, anarchists, philosophers and thinkers of the elite of the time founded an alternative, vegetarian colony on Monescia hill and renamed it Monte Verità («hill of truth»). The colony was established first on prin-



Fig. 1: Monte Verità with conference centre seen from WSW (Balladrüm hill); Lago Maggiore and town of Locarno in background (Photo: H.M. Bürgisser)

ciples of primitive socialism, but later practised a rigid code of morality and strict vegetarianism.

In 1926 Monte Verità was purchased by the German banker and art collector Baron Eduard von der Heydt. A modern hotel complex, including the Bauhaus hotel where most of the Convention participants stayed, was constructed on the hill, visited by high-profile people from the worlds of art, politics and culture.

The Baron bequeathed Monte Verità to the Canton Ticino in the 1950s. In the late 1980s it was turned into a conference centre thanks to a partnership with the Swiss Federal Institute of Technology in Zurich.

Today, Monte Verità is a state-of-the-art conference and cultural centre, managed by the foundation of the same name. On its seven hectares of tranquil, lush parkland there are still several witnesses of its special history (text modified from a panel on Monte Verità). What an appropriate place for our Annual Convention!

¹ Vorstandsmitglied SASEG

Saturday 17 June: Administrative and Scientific Sessions (Conference Centre Monte Verità), Partners' Programme (Monte Verità), Cocktails and Dinner (Monte Verità Restaurant)

I Generalversammlung / General Assembly

(Protokollentwurf, zu genehmigen am 16. Juni 2018 an der GV in Chur)

Um 13.45 Uhr begrüsst Präsident Bernhard Gunzenhauser die 40 anwesenden Mitglieder im Auditorium des Monte Verità Konferenzentrums. Er schlägt auf Englisch vor, die Geschäfte der Vereinigung wie vor 2016 auf Deutsch durchzunehmen. Es gibt keine Einwände.

B. Gunzenhauser informiert, dass er Entschuldigungen von den Vorstandsmitgliedern Peter Heitzmann und Michael Suana sowie von den Mitgliedern Walter Baumgartner, Peter Diebold, Martin Glaus, Wolfgang Herget, Bruno Huber und Volkmar Pümpin erhalten hat.

1 Genehmigung des Protokolls der GV vom 25. Juni 2016 in Heidelberg / Adoption of the Minutes of the General Assembly of 25 June 2016 at Heidelberg

Der Protokollentwurf der letztjährigen Generalversammlung, publiziert im Swiss Bulletin für angewandte Geologie (Heft 21/2, S. 67-78) wird ohne Diskussion mit Handmehr ohne Gegenstimme genehmigt.

2 Bericht des Präsidenten, Juni 2016 – Juni 2017 / President's Report, June 2016 – June 2017

B. Gunzenhauser ehrt zuerst zwei Mitglieder für ihre langjährige Mitgliedschaft: 60 Jahre

dabei ist J. Dietrich Frey, 50 Jahre dabei J.P. Vernet, der Gründer des Limnologischen Instituts Forel an der Universität Genf. Den Jubilaren wird eine vom Präsidenten unterzeichnete Urkunde zugeschickt, mit einem persönlichen Begleitschreiben.

Dann wird stehend und schweigend den fünf Mitgliedern gedacht, die in der Berichtsperiode verstarben:

- Andreas Jordi (67 Jahre Mitglied; er nahm an der Jahrestagung 2015 in Baden noch persönlich die Urkunde für 65 Jahre Mitgliedschaft in Empfang)
- Ralph Schoop (63 Jahre Mitglied)
- René Blau (59 Jahre Mitglied)
- Frédéric Lonfat (28 Jahre Mitglied)
- Martin Eduard Gerber (25 Jahre Mitglied)

Danach verliest B. Gunzenhauser die Namen der 10 innerhalb der letzten 12 Monate zugeetretenen persönlichen Mitglieder.

Die Mitgliederbewegung der letzten 12 Monate sieht wie folgt aus:

Mitgliederzahl am 25. Juni 2016	340
Eintritte (persönliche Mitglieder)	+ 10
(zum Vergleich: Juni 2015 bis Juni 2016: +29)	
Wiedereintritte	+ 2
Austritte	- 19
(Juni 2015 bis Juni 2016: -15)	
Ausschlüsse	- 13
(Juni 2015 bis Juni 2016: -1)	
Todesfälle	- 5
(Juni 2015 bis Juni 2016: -5)	
<hr/>	
Mitgliederzahl am 17. Juni 2017	+ 315

Die Reduktion der Mitgliederzahl ist demnach vor allem auf deutlich weniger Eintritte und mehr Ausschlüsse (wegen Nicht-Zahlens des Mitgliederbeitrags für zwei Jahre) zurückzuführen. Die Gründe für die Austritte sind wie in vorhergegangenen Jahren mannigfaltig.

B. Gunzenhauser zeigt die Zusammenfassung der vor einem Jahr durchgeführten Umfrage zu den Jahrestagungen und zieht den Schluss, dass für die Antwortenden (vor allem Teilnehmer der Tagung Heidelberg) Format und Kosten der Tagungen okay sind. Die detaillierten Resultate der Umfrage stehen auf der Website der Vereinigung.

Zum Schluss informiert der Präsident die Mitglieder, dass der Vorstand an der heutigen Sitzung eine weitere Förderung von Erdwissenschafts-Studenten an Schweizer (Fach-)Hochschulen beschlossen hat. Es geht um Beiträge von bis zu Fr. 1'000 für z.B. Teilnahme an Kongressen oder Analysen von Proben, wobei die Zuerkennung zweimal jährlich nach einer formellen Bewertung der Anfrage durch vier Vorstandsmitglieder stattfinden soll. Diese Förderung soll die SASEG in den kommenden 12 Monaten mit maximal Fr. 4'000 belasten.

3 Bericht des Kassiers: Finanzlage 2016 / Treasurer's Report: Financial Situation 2016

René Graf erinnert daran, dass die im Sommer 2015 eingeführte einfache Buchhaltung (prinzipiell ohne transitorische Beträge) weitergeführt worden ist, und zeigt dann deutlich Ertrag, Aufwand und Vermögensveränderung im Kalenderjahr 2016 (Table 1).

Obwohl in 2016 um Fr. 7'000 höhere Ausgaben ausgewiesen wurden als in 2015, war der Verlust lediglich Fr. 2'000, da in 2016 Fr. 7'200 an Mitgliederbeiträgen für 2015 und 2014 einbezahlt wurden. Die am 31.12.2016 noch ausstehenden Mitgliederbeiträge für 2016 machen Fr. 3'480 aus.

Vermögen per 1. Januar 2016	Fr. 94'891
Verlust 2016	Fr. 1'998
Vermögen per 31. Dezember 2016	Fr. 92'893

Eine Frage zur Ausgabe «Steuern» erläuterte R. Graf so, dass nun im Kanton Baselland (Wohnsitz des Präsidenten) Steuern bezahlt werden, und dass infolge der Verluste in 2015 und 2016 in Zukunft die Steuern Null betragen würden.

4 Bericht der Revisoren / Auditors' Report

Der von Revisorin D. Decrouez am 12. Juni 2017 und von Revisor W. Frei am 13. Juni 2017 unterzeichnete Bericht wird projiziert. B. Gunzenhauser liest den Antrag der Revisoren an die GV vor, dem Kassier unter Verdankung der geleisteten Dienste Décharge zu erteilen. Mit Handmehr ohne Gegenstimme wird die Décharge erteilt und damit die Rechnung 2016 genehmigt sowie Kassier R. Graf entlastet.

5 Bericht des Redaktors / Editor's Report

Roger Heinz erwähnt die 14 Artikel des kommenden Bulletins 22/1 (worunter 10 Beiträge von Referenten von dem im Oktober 2016 durchgeführten Symposium «Rohe Stoffe, Fluch oder Segen?») und gibt eine kurze Vorschau der geplanten Artikel für das Bulletin 22/2. Er ruft die SASEG-Mitglieder auf, mehr Artikel einzureichen. Es werden keine Fragen zum Bulletin gestellt.

6 Décharge des Vorstandes / Discharge of the members of the management committee

F. Stumm beantragt Décharge des Gesamtvorstandes. Die anwesenden Mitglieder erteilen diese durch Handmehr ohne Gegenstimme und sprechen damit dem Vorstand ihr Vertrauen aus.



Swiss Association of Energy Geoscientists
 Schweizerische Vereinigung von Energie-Geowissenschaftlern
 Association suisse des géoscientifiques de l'énergie
 Associazione svizzera geoscientifici dell'energia

		31. Dec. 2016	31. Dec. 2015
Assets	Cash	56	218
	Visa Credit Card pre-paid balance	579	
	Post Giro Account	10'800	9'655
	ZKB Account	99'191	85'018
	...Bulletin 2016 (paid 2017)	(16'140)	
	...Website (paid 2017)	(1'593)	
	Total Assets	92'893	94'891
	Gain/Loss	(1'998)	
Income:	Annual Dues:	27'896	18'044
	...for 2014	480	
	...for 2015	6'811	
	...for 2016	20'446	
	...for 2017	160	
	Donations	3'706	
	Speakers fees of Committee members	-	
	In Memoriam Werner Bolliger	1'950	
	Members	1'756	
	Annual Convention payments by participants	19'786	18'521
	Cash income	-	87
	Total Income:	51'389	39'713
Expenditure	Annual Convention	22'825	21'922
	Annual Convention 2017 pre-excursion	1'240	
	Student Sponsoring	2'040	-
	Bulletin (share SASEG)	16'140	17'734
	Website SASEG	5'891	4'826
	Taxes	900	384
	Lectures Geneva and Bern	3'515	-
	Liability insurance	210	
	Admin. Costs	167	427
	Committee (meeting) expenses	460	1'042
	Total Expenditure	53'387	46'334
	Gain/Loss	(1'998)	(6'622)
JB15	Unpaid Membership Fees 2015: 53		3'740
JB16	Unpaid Membership Fees 2016: 52	3'480	
Student Sponsoring 2016	Contributions 2016	3'706	3'060
	Expenditure	2'040	1'592
	Balance	1'666	1'468
Student Sponsoring Account	Balance 31.12.2015		7'276
	Additions 2016	1'666	
	Balance 31.12.2016	8'942	

Tab.1: Balance sheet on 31 December 2016; profit and loss account 2016.

7 Verabschiedung von drei Vorstandsmitgliedern / Farewell to three management committee members

Präsident B. Gunzenhauser würdigt die drei Vorstandsmitglieder, die per heute aus dem Vorstand austreten:

- Peter Heitzmann leistete wertvolle Arbeit im Vorstand während nicht weniger als 27 Jahren, zuerst 10 Jahre lang als Vereinigungssekretär und dann 17 Jahre lang als Bulletin-Kassier.
- Daniel Bollinger war Bulletin-Redaktor in den letzten 11 Jahren und hat in dieser Zeit 19 Bulletin-Hefte (worunter 3 Themahefte) mit total 2400 Seiten redigiert und vier Editorials verfasst.
- Stefan Schmid war 10 Jahre lang nicht nur ein kritisches, hinterfragendes Vorstandsmitglied, sondern hat auch an 4 Jahrestagungen Referate gehalten und Exkursionen geleitet.

Unter grossem Applaus überreicht B. Gunzenhauser den anwesenden D. Bollinger und S. Schmid je einen durch Beat Imhof (Geowissenschaftliches Atelier Gebrüder Imhof, Trimbach) präparierten und montierten *Macrocephalus*.

8 Wiederwahl des verbleibenden Vorstandes / Re-election of sitting members of the management committee

Die verbleibenden Vorstandsmitglieder Heinz Bürgisser, René Graf, Roger Heinz, Andrea Moscariello, Brigitte Schwendener, Ueli Seemann, Michael Suana und Roland Wyss stellen sich zur Wiederwahl für zwei weitere Jahre. Die Wiederwahl erfolgt global, mit Handmehr ohne Gegenstimme.

F. Stumm führt darauf die Präsidentenwahl durch. Der bisherige Präsident Bernhard Gunzenhauser wird wiedergewählt.

9 Wahl von neuen Vorstandsmitgliedern / Election of new management committee members

Bernhard Gunzenhauser freut sich, dass zwei jüngere Mitglieder dem Vorstand beitreten wollen: Werner Leu (Jg. 1956, Eigentümer und Geschäftsführer von Geoform Ltd.) und Christian Minnig (Jg. 1976, Koordinator Georessourcen bei Swisstopo). Ihre CVs sind zu Beginn der GV verteilt worden. Ohne weitere Wortmeldung von GV-Teilnehmern werden die beiden mit Handmehr ohne Gegenstimme gewählt, mit anschliessendem Applaus.

10 Tagung 2018, 16.-18. Juni, Chur / Annual Convention 2018, 16-18 June, Chur

Vize-Präsident Roland Wyss, der Initiator dieser Tagung, stellt kurz die Exkursionsleiter vor (neben ihm Prof. em. Adrian Pfiffner und Andreas von Poschinger). Das Detailprogramm steht noch nicht fest; wahrscheinlich werden die Ablagerungen des Flimser Bergsturzes besucht und vielleicht die Traverse Ilanz-Vals gemacht (die Geologischen Atlasblätter 1:25'000 Ilanz und Vals wurden unter Federführung von R. Wyss in 2011 bzw. 2007 publiziert).

11 Tagung 2019 / Annual Convention 2019

Tagungsstadt wird Genf und das Hauptthema das Pilotprojekt GEothermie 2020 des Kantons sein (siehe www.geothermie2020.ch), das durch Services Industriels de Genève (SIG) ausgeführt wird. Die Ziele der Exkursionen sind noch nicht festgelegt.

12 Varia / A.O.B.

Vorstandsmitglied U. Seemann orientiert über eine im November 2017 geplante energiebezogene SASEG-Exkursion: einen Besuch des Atomkraftwerks Mühleberg (BE), das sich im Anfangsstadium der Stilllegungsphase befindet. Die Exkursion, mit beschränkter Teilnehmerzahl, wird den Mitgliedern via E-Mail bekanntgegeben und die Plätze nach dem Prinzip «first come, first served» vergeben werden.

Keine weiteren Beiträge zum Traktandum Varia, sodass B. Gunzenhauser die Generalversammlung um 14.40 Uhr schliesst.

II Scientific Presentations

These were attended by about 60 participants and followed the General Assembly straight away, with a 30-minutes break after the second presentation. Whereas the first talk was on a Swiss energy theme (hydropower related to climate change), the second and third presentations related to the topics of Sunday's and Monday's excursion, respectively.

- Giovanni Kappenberger (ex Federal Office of Meteorology and Climatology, Meteo-Swiss): *Disappearing Ticino glaciers! Disappearing hydropower?*

The presentation started with a variety of snippets of information on Italian legends on climate, on the very occasional very heavy rainfall in Canton Ticino (though in the last 12 months rainfall in Locarno was only 75% of the long-time average), on the short duration of the time interval of significant fossil fuel use vs. Earth's history, and a quote from the late Prof. R. Trümpy: «Dass so etwas Edles wie Erdöl einfach verbrannt wird, ist verantwortungslos gegenüber der Gesellschaft».

The talk centred on the Basodino glacier

at the head of Val Maggia, the valley just to the west of Val Verzasca, the destination of Monday afternoon's excursion. This largest glacier of Canton Ticino has lost close to 10 m of its 30 m average thickness in the last 10 years, a very short time span even when compared with the time elapsed since the end of the «Little Ice Age». With this trend the glacier will cease to exist in about 20 years; already now it has no crevasses any more. However, the hydropower installations will not really be affected because the meltwater from Basodino glacier constitutes only 0.4% of the Maggia runoff captured for hydropower.

G. Kappenberger added to this positive note that in Canton Ticino solar energy potential is huge and has hardly been tapped at all. On the negative side, there are not many opportunities for viable wind energy projects in the canton, and the Azienda Elettrica Ticinese, a company owned by Canton Ticino which produces green electricity in the canton (mainly hydro) and trades electricity in Switzerland and in neighbouring countries, has been operating at a loss since 2015.

The thought-provoking presentation ended with the author's personal experience of climate change effects in the Canadian Arctic and in Nepal.

- Prof. Dr. Daniel Bernoulli (Prof. em. ETH Zürich, SASEG member): *Late Triassic to Jurassic-Cretaceous evolution of the western Southern Alps: Rifting, post-rift subsidence and paleoceanographic change – an introduction to the Sunday excursion.*

The tectono-sedimentary evolution of the Southern Alps of Ticino was shown by means of W-E cross-sections: (1) Early Permian crustal extension, magmatic underplating and anatexis melting in the upper crust (Baveno granite, Lugano «porphyries»). (2) Triassic: Subsiding carbonate

platforms and basins, locally euxinic with deposition of source rocks generating oil and condensate below the Po Plain (Malossa and Villafortuna fields). (3) Late Triassic–Liassic rifting preceding and leading to the opening of the Alpine Tethys: Formation of asymmetric half-grabens with turbiditic and mass-flow deposition, and submarine highs with condensed sedimentation. (4) Middle Liassic to Early Cretaceous: Post-rift thermal subsidence of the continental margin; pelagic sediments reflect increasing water depth and global palaeoceanographic changes (calcite compensation depth, anoxic events). (5) «Middle» to Late Cretaceous: Increasing terrigenous influx from early Alpine orogeny and initiation of flysch sedimentation (Cenomanian/Turonian–Campanian). (6) Major South-Alpine deformation and formation of Oligo-Miocene deep-sea fans (Gonfolite Lombarda; «South-Alpine molasse»). (7) Unconformable post-orogenic formations: Coarse torrential deposits (Pontegana Conglomerate) reflecting the Messinian base-level lowering during the Mediterranean salinity crisis, and Pliocene clays filling the rias carved during the Messinian.

During the Q&A session, D. Bernoulli's view was asked about the interest in gas drilling in the Mendrisio area about 10 years ago. He replied that the above-mentioned Triassic source rocks are immature in the Monte S. Giorgio area; however, they passed the oil window already in Jurassic time in the Generoso Basin. Thermogenic gas derived from deeper tectonic units occurs at Stabio; however, the potential area is probably too small for drilling for gas.

The Explanatory Notes to the 1:25,000 Geological Atlas of Switzerland, Sheet Mendrisio/Como, scheduled to be published later this year (Bernoulli et al., in press), will contain additional details of the author's presentation.

- Prof. Dr. Stefan M. Schmid (Prof. em. Univ. Basel, SASEG committee member until 2017): *On the «root zone» of the Alpine nappes in the Ticino area (Ivrea Zone, Insubric line and gneisses of the Southern Steep Belt): Geometry and kinematics (topic of the Monday excursion).*

For the contents of this enthusiastically delivered third talk please see the paper published in this Bulletin (Schmid 2017).

- Dr. Roland Wyss (SASEG Vice-President): Itinerary and logistics of the excursions.

The meeting closed at 6:05 p.m.

III Partners' Programme: Guided tour of Monte Verità

Whilst members convened for the General Assembly, thirteen partners of members explored with a guide some highlights of the Monte Verità site. First of all, a spot emitting special forces through strong magnetism, then several houses built by members of the vegetarian colony in the early 20th century. This included the building that houses the unique 25 m long circular painting by Elisar von Kupffer, *The Clear World of the Blessed*. The group tour ended with a cup of tea in Villa Semiramis, situated adjacent to the tea plantation and built in Art Nouveau style in 1909. Afterwards, several partners visited the Monte Verità museum at Casa Anatta that was re-opened only four weeks prior to the Convention.

IV Evening

At 7 p.m. the cocktail reception, graciously sponsored by Tipografia Poncioni SA, Losone, who prints the Swiss Bulletin for Applied Geology, started on the terrace of the Monte Verità restaurant (Fig. 2/1). President Bernhard Gunzenhauser welcomed all; he sho-

wed his satisfaction about the wonderful weather experienced so far and also predicted for the coming excursion days in the southern part of Switzerland. He expressed his gratitude to all persons involved in planning, organising and executing the convention. At the subsequent association dinner, the Convention's main social event, about 70 people enjoyed the spectacular views on Lago Maggiore and surrounding mountains from the dinner tables, and there were many cheerful moments (Fig. 2/2).

Excursions

The themes of Sunday's and Monday's excursions were very different: A sedimentary succession on Sunday, gneisses and Alpine deformation history on Monday. For both days, excursion leaders prepared richly illustrated field guides (a 39-page write-up with 28 illustrations for the Sunday trip, a 19-page write-up with 19 illustrations for the Monday trip) that were printed free of charge by Dr. Roland Wyss GmbH Geologische Beratungen, Frauenfeld. In the following, technical data are from these field guides, supplemented by notes made by the author during explanations in the field.

Sunday 18 June: Coach excursion: Southern Alps, Breggia Gorge and Arzo Field guides: Prof. Dr. Daniel Bernoulli, Dr. Rudolf Stockar

At 8 a.m. 69 participants boarded two coaches for a 65-minute drive to the *Breggia Gorge*, the site of Switzerland's first Geopark (2001). To avoid crowding on the trail and the riverside outcrops, the coaches stopped at Morbio Superiore and at the former Saccaba cement factory at the lower end of the gorge, respectively. The group starting at Morbio Superiore (Fig. 2/3) walked the entire gorge from the top down; its leader was Dr. Rudolf Stockar, curator geology/paleon-

tology of Ticino's Cantonal Natural History Museum in Lugano who wrote the geological guide of the Breggia Geopark (Stockar 2003). The second group, led by Prof. Dr. Daniel Bernoulli (Fig. 2/4) who has published a string of articles on the sediments of the southern Alps since his Ph.D. thesis (Bernoulli 1964), walked from the skeleton buildings of the former cement factory upwards (stratigraphically downwards) to the Morbio Formation and returned the same way.

In this lower part of the Breggia valley, a continuous section from the Lower Liassic to the Upper Cretaceous is exposed, revealing the (hemi)pelagic sedimentation history of the Generoso Basin. The sequence dips uniformly southwestward in the northern part of the gorge; in the southwest, tight south-vergent folds are developed in the youngest (middle to upper Cretaceous) part of the sequence. Only about 25 years ago, NFP 20, the Swiss National crustal seismic experiment, revealed the nappe structure of the area. Highlights of the excursion included the following:

- Moltrasio Formation (Lower Liassic – syn-rift): Signs of deposition by gravity flows and slumping in the well-bedded calcilitites and calcisiltites with bands and nodules of early diagenetic replacement chert, testifying to contemporaneous down-faulting along the Lugano fault. The uppermost (Molino) member contains many ammonite moulds in light grey hemipelagic limestones.
- Morbio Formation and Rosso Ammonitico Lombardo (Middle Liassic–Aalenian – post-rift): red nodular marly limestones and marls rich in ammonite moulds, passing up-section into limestones with pelagic bivalves but without ammonites (Aalenian–Bajocian). The disappearance of ammonites indicates sinking of the sea-floor below the aragonite compensation depth. Spectacular submarine slumping.
- Radiolarite Group (Bajocian–middle

Tithonian): Parallel-bedded and nodular radiolarian cherts and limestones with chert, deposited below and near the calcite compensation depth.

- Sharp boundary between Rosso ad Aptici (red argillaceous limestones with chert nodules and aptychi, deposited below the aragonite compensation depth) and white coccolith limestones of the Maiolica Lombarda Formation (uppermost Tithonian to Barremian) (see Fig. 2/4). This facies is known all along the Tethyan belt, from the Himalayas across Oman, the entire Alpine-Mediterranean area to the central Atlantic (Deep Sea Drilling Project) and Cuba.

At 12:30 p.m. the coaches headed for Mendrisio's Grotto Antico Ticino. For the majority of us the lunch choice was Risotto with a Lughanighetta sausage, the latter alluding to the ammonites in the Jurassic deep-marine sequence of the Breggia Gorge (Fig. 2/5)!

In the afternoon our first stop was along the road from Seseglio to Pedrinete, where, in the welcome shade of large trees, Daniel Bernoulli and his former Ph.D. student and current SASEG President Bernhard Gunzenhauser introduced the Oligocene-Miocene Gonfolite Lombarda Group that includes several internal erosive unconformities (Gunzenhauser 1985) (Fig. 2/6). The Gonfolite was backthrust to the north onto the Mesozoic formations in late Miocene times. D. Bernoulli proudly showed his working copy of the 1:25,000 Geological Atlas of Switzerland, Sheet Mendrisio/Como, scheduled to be published later this year (Bernoulli et al. in press).

We walked a few hundred metres down the road to see outcrops of conglomerates and sandstones of the 1½ km thick Como Formation, which are deep-marine mass-flow deposits of Chattian (Late Oligocene) age. We observed clasts up to 40 cm across (boulder size). Many clasts are granodiorites and

tonalites of the Bregaglia intrusion (32 Ma ago). They testify to the erosion of the intrusive rocks and the transport and redeposition of the eroded material within 6 to 8 million years only.

Our last stop of the day was at the disused «marble» quarries north of Arzo village, where D. Bernoulli explained first the geological setting, again using his new map. In the latest Triassic and early to middle Liassic, a thin and incomplete stratigraphic sequence was deposited on the foot-wall block of the Lugano fault. Intertidal to subtidal dolomites of Norian age are unconformably overlain by Rhaetian limestones, dolomites and marls, with thicknesses varying from one fault block to another (0-70 m). Lower Liassic limestones of the Broccatello facies (non-stratified and highly fossiliferous, interpreted as mud mounds developing at subphotic depth) overlie these fault blocks unconformably. In turn, the Broccatello is overlain, with a sharp contact, by a few meters of red, massive, condensed pelagic limestone of Pliensbachian age. The first three units were cut shortly after deposition by faults and crevices that were filled by submarine cements, sediments and complex polyphase breccias.

Subsequently we explored the different facies, on the rock faces and also at a demonstration setup on rock sawing that allowed a quarried block to be wetted, revealing superbly the polyphase origin of the cements and internal sediments of the decorative rock (Fig. 2/7).

We left Arzo at 5.15 p.m., and, with one coach dropping off few participants at Cadenazzo railway station to catch a train home, arrived at the hotel at 6:30 p.m.

Monday 19 June: Hike (morning) and coach excursion (afternoon): Insubric Line and Southern Steep Belt of the Penninic nappes

Field guides: Prof. Dr. Stefan Schmid, Diego Pozzorini

At 8 a.m. the 53 participants started the excursion on the *roof terrace of the Monte Verità* hotel, where Prof. Dr. Stefan Schmid explained the tectonic units along the Insubric «Line» (Fig. 3/8), in fact a mylonite belt of about 1 km width. His knowledge was based on his research of the area since the late 1980's, resulting in numerous publications up to today (e.g. Schmid et al. 1987, Schmid et al. 2017a, Schmid et al. 2017b). Sense of shear criteria within the Insubric mylonite belt indicate (1) dextral shearing in the southern part (strike-slip movements in the order of 60-100 km) and (2) backthrusting in the northern part, where the lineations plunge approximately downdip.

Afterwards the participants gathered again at the Losone road for hearing details about the hike. Also, S. Schmid introduced Diego Pozzorini, who did fieldwork in this area for his Dipl. Geol. ETH degree (Pozzorini 1989) and currently works at Dr. Baumer SA engineering-geological consultancy located in Monte Verità road, Ascona.

We continued our hike along *Strada Gottardo Madonna*, inspecting the two predominant lithologies of the Ivrea Zone in this area: (1) amphibolites, mostly derived from mafic intrusions and with occasional retrogressed garnets, and (2) paragneisses bearing sillimanite and garnet (locally known as Kinzigites). Such rocks of the Ivrea Zone are well-visited also by geophysicists because they represent the lower part of the crust; even synthetic seismograms have been made! Their amphibolite-grade metamorphism originated during the Variscan orogeny. - D. Pozzorini pointed out the post-glacial decompression joints in these lithologies,

aligned parallel to the valley side: long joints with large volumes in the amphibolites, short joints in the paragneisses.

Afterwards, one group continued along the road and reached, after a relatively short ascent, a viewpoint with spectacular outcrops of Ivrea Zone amphibolites with pre-Alpine structures. D. Pozzorini led the other group steeply up *Balladrüm hill*, for showing pegmatites with garnets and coarse-grained crystalline amphibolites in the core of the Ivrea Zone, for a superb view of Lago Maggiore and Maggia Valley from the top of the hill (Fig. 3/9) as well as for pre-Alpine tight folds just below the hilltop.

Both groups rejoined at the bottom of the hill and continued the hike. Near the *Arcegno-Ronco road* we inspected an outcrop at the southern rim of the ductilely deformed Insubric mylonites. The fault rocks contain melt pockets and even small dykes that intruded opening fractures (pseudotachylites). Along a forest path we inspected first mylonites produced by the intense deformation of granitic basement of the Sesia Zone, then mylonitized Canavese sediments, which connected to the excursion of the previous day because they formed from Moltrasio Formation siliceous limestones that we saw in the Breggia Gorge (Fig. 3/10).

At noon we reached Arcegno's Grotto Zelin-do with its welcome shade, where soon everyone dug into the frugal meal of minestrone, salad and cheese (Fig. 3/11). Here President B. Gunzenhauser thanked the excursion leaders and Convention organizers for making this Convention a success.

However, there were still two stops in the Verzasca valley on the programme, which we reached by coach from Arcegno: First we stopped at the *Contra dam*, commonly known as Verzasca dam. This arch dam was completed in 1965, is the fourth-tallest in Switzerland (220 m) and supports the 105

MW Verzasca hydroelectric power station. We crossed the dam and admired the spectacular tight folds in thin-banded gneisses and marbles of the Bellinzona Dascio Zone, the part of the Southern Steep Belt (formerly referred to as «root zone») interpreted by Schmid et al. (2004) as basement of the Valaisan paleogeographical domain.

At 3.30 p.m. we reached the world-famous riverbed outcrops north of the village of Lavertezzo, where we were not the only visitors on this sunny day, but the only ones who studied the various scales of folds in banded, partly migmatitic gneisses within the Simano nappe (Fig. 3/12). S. Schmid strongly advocated that the Simano nappe had formed the basement of most of the Helvetic nappes prior to their transport northwards and before the heat affected the basement rocks; his main argument was the width of the Helvetic zone, which is too large for being the cover of the Tavetsch and Gotthard massifs alone.

After having admired a youngster jumping from the iconic bridge 14 m deep into the Verzasca river, we boarded the coaches, which returned, with a short stop at Tenero railway station to let train travelers disembark, to Monte Verità shortly after 5 p.m., well before the scheduled arrival time.

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Fig. 2. Selected photographs of the 2017 SASEG Convention. 1]-2] 17 June, Monte Verità Restaurant, Ascona. 1] Cocktail reception (Photo: H.M. Bürgisser); 2] Dinner (Photo: B. Gunzenhauser). 3]-7] 18 June, excursion Breggia Gorge and Arzo. 3] Rudolf Stockkar explains the Breggia Gorge geology to one group ... (Photo: P. Reichetseder) 4] ... and Daniel Bernoulli, at the boundary Rosso ad Aptici (right) and Maiolica Lombarda, to the other (Photo: H.M. Bürgisser); 5] Enjoying risotto with Lughanighetta at Grotto Antico Ticino, Mendrisio (Photo: H.M. Bürgisser); 6] D. Bernoulli explains the Gonfolite Lombarda Group (Photo: U. Seemann); 7] Arzo quarries: Demonstration setup on sawing reveals the polyphase origin of the decorative rock (Photo: P. Reichetseder).



Fig. 3: Selected photographs of the 2017 SASEG Convention. 8]-12] 19 June, excursion to Insubric Line and Southern Steep Belt of the Penninic nappes. 8] From the rooftop terrace of the Monte Verità hotel, S. Schmid points out the tectonic units along the Insubric Line; 9] On Ivrea Zone rocks on the top of Balladrüm hill; 10] S. Schmid interprets outcrops of mylonitized Canavese sediments as representing Moltrasio Formation siliceous limestone that we saw on the previous day in the Breggia Gorge; 11] Enjoying the frugal lunch at Grotto Zelindo, Arcegnò; 12] At the riverbed outcrops near Lavertezzo (in the background), S. Schmid elucidates on features in the banded, partly migmatitic gneisses within the Simano nappe (all photos: H.M. Bürgisser).

