



Lettre au Rédacteur en Chef du Nuncius Sidereus

MON CHER AMI,

Sur la foi du Président qui affirme que j'écris plus de 3.300 lettres par an pour le seul service de l'UAI, ou peut-être en raison des contributions passées aux journaux des Assemblées Générales, par exemple à ce Kosmos (Moscou, 1958), où, avec mon vieux complice Schatzman, nous avons émis des idées définitives (qu'en reste-t-il?) sur la structure de l'UAI, vous me demandez...

... Sonnerie de téléphone. Excusez cette lettre interrompue: c'était un astronome cannois qui avait vu hier soir un objet céleste; et est-ce que je pourrais lui dire si? et est-ce que je ne pensais pas que peut-être? des extra-terrestres? et... d'ailleurs il a vu des hublots très distinctement!...

... vous me demandez donc quelques mots pour le Nuncius Sidereus, pour y parler des droits et des devoirs d'un Secrétaire Général... Beau sujet, s'il en est. La grandeur de...

... Excusez cette nouvelle interruption. On frappe à la porte. Il faut signer le courrier du jour. «With all good wishes». «With all good wishes, sincerely yours». «With all good wishes, sincerely yours». ... Ah non, pas à celui-là! Il n'est pas assez gentil avec moi. On mettra «sincerely yours», simplement. Bien. A demain, Christiane (voir figure n° 1). Et reprenons ma lettre interrompue.

Je disais donc l'exaltation du Secrétaire Général, lorsqu'il considère, avec le suprême détachement auquel il peut prétendre, au-dessus de la mêlée, les développements excitants de notre si belle science. Ce ne sont que Quasars, ce ne sont que couronnes... Et le fer ionisé, quatorze fois souvent, se laisse diffuser au gré de tous les vents (solaires, évidemment)... Rien n'égale le lyrisme d'un astronome en forme!...

... On frappe encore à la porte. Excusez cette nouvelle interruption. Ah, c'est vous, Arnošt? Quoi encore, le courrier d'aujourd'hui? Mais je l'ai signé! Ah, celui qui est arrivé? Bien... Quoi donc? Comment, ni Mademoiselle Müller, ni Monsieur Delhaye n'ont reçu le volume XII C? C'est scandaleux. Vous adresserez de ma part une lettre agressive au distributeur. ... Quoi? Sept pays n'ont pas encore payé leur contribution pour 1966? Eh bien, tant pis pour eux, ils ne voteront pas (voir les statuts)... Ah oui, mais l'un d'entre eux est celui d'un membre du Comité Exécutif? Oh! The hell with it... Let us speak about it to-morrow. And what did you say about the accounts of ce-mission 73? There are 2 dollars and 56 cents that do not appear on their



Le Prague astronomique accueille 2900 astronomes du monde entier

En haut quelques tours du Prague aux cent tours. Au premier plan deux tours du KLEMENTINUM, ancien collège jésuite qui, après le Château de Prague, était le plus grand complexe architectural de Prague (construit de 1650 à 1750). La tour de droite est celle d'un OBSERVATOIRE (1721 à 1723) avec la statue d'Atlas. A mesure que Prague s'industrialisait, les possibilités astronomiques étaient de plus en plus rares. Après la suppression de l'ordre des jésuites (en 1773), le Klementinum échut à l'université. A partir de 1777 s'y trouve une bibliothèque qui fut ouverte au public après 110 ans d'existence; elle totalise aujourd'hui deux millions de livres et presque cinq mille manuscrits.

A droite de la tour de l'observatoire, au fond, une partie de L'ÉGLISE DE NOTRE-DAME-DE-TYN où est enterré Tycho Brahé. Plus à droite la tour de L'HOTEL DE VILLE DE LA VIEILLE-VILLE avec une ancienne horloge astronomique. La photo est prise de la tour du pont Charles du côté de la Vieille-Ville (XIV^e siècle), par laquelle on accède sur le pont Charles fondé en 1357.

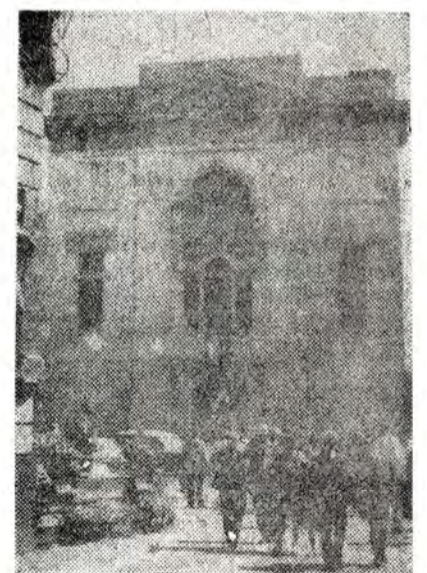
SALLE BAROQUE DE LA BIBLIOTHEQUE DU KLEMENTINUM avec des globes et des fresques représentant les cultures humaines dans la voûte.

TOMBE DE TYCHO BRAHÉ derrière le quatrième pilier du côté vms le maître-autel de l'église de Notre-Dame-de-Tyn. Il est venu mourir à Prague (en 1601); trois siècles plus tard (en 1901) on ouvrit son tombeau sous le carrelage de l'église pour vérifier si les catholiques y avaient laissé le protestant Tycho et on le referma.

LA MAISON D'EXPOSITION „U HYBERNŮ“ vous ouvrira ses portes dès le dimanche 20 août. Nous vous invitons au vernissage solennel de l'exposition des instruments astronomi-

ques à 15 heures — et encore une fois pour le 23, 24 et 25 août où l'exposition ne sera ouverte que pour vous.

A l'origine c'était un couvent des bénédictins de Lombardie, remplacés par les frères mineurs de l'Observance et ceux-ci à leur tour par des franciscains enfuis d'Irlande (en latin Hybernia) qui y cultivaient dans un

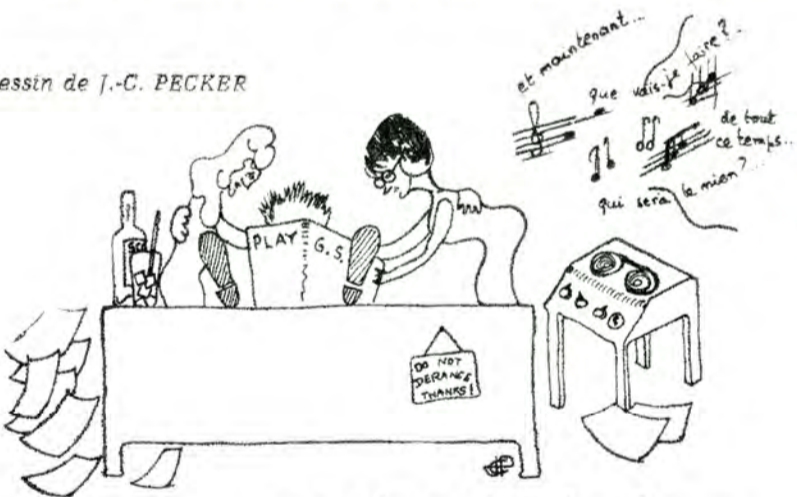


grand jardin les premières pommes de terre en Bohême. Aux moines succéda pour cinq ans le Théâtre tchèque patriotique, puis le bâtiment fut occupé par la Douane et un dépôt de tabac. Spécimen d'un style assez rare à Prague, l'Empire. En haut de la façade sur le pignon on voit l'aigle impérial des Habsbourg avec le lion de Bohême sur la poitrine.

A droite derrière le bâtiment commence la rue Hybernská. Le no. 5 est l'ancien hôtel Swerts-Spork (celui du propriétaire du théâtre U Hybernů), un palais Louis XVI construit par Ignace Palliardi. Si vous vous mettez de l'autre côté de la chaussée, vous

(suite page 2)

Dessin de J.-C. PECKER



de Secrétaire Général de l'Union
Astronomique Internationale, ... tel
qu'il pense être vu par les autres!

accounts, but that are on our books? Let me see the books. I shall look at that to-night... Pourquoi je me mets à parler anglais? Oui, d'accord, on est en France. But you know quite well I speak English when I am furious! And I am really furious! ... Think that the deadline for the reply from the Presidents of Commissions is now over since... since... at least four weeks. Only three have replied! ... Well. Good bye. I mean au revoir. Je veux dire Na shledanou...

Ouf! Voilà Arnošt parti chez lui. Je suis seul maintenant, et, mon cher ami, vais enfin pouvoir répondre à votre demande si aimable et si flatteuse... La vie du Secrétaire Général? ... Oh, encore le téléphone...

... «Ah, c'est toi? Mais oui, je vais bien... Mais non, je ne suis pas malade. Mais oui, les enfants vont bien. Et toi, tu vas bien? Et Jacques, il va bien? Ah bien! Alors embrasse-le bien de ma part. Oui, j'embrasserai les enfants... c'est ça. Merci. Au revoir... Quoi? Ah, il faut que j'aille arroser le philodendron? C'est entendu. Au revoir. Au revoir...» [C'était ma tante Nathalie.]

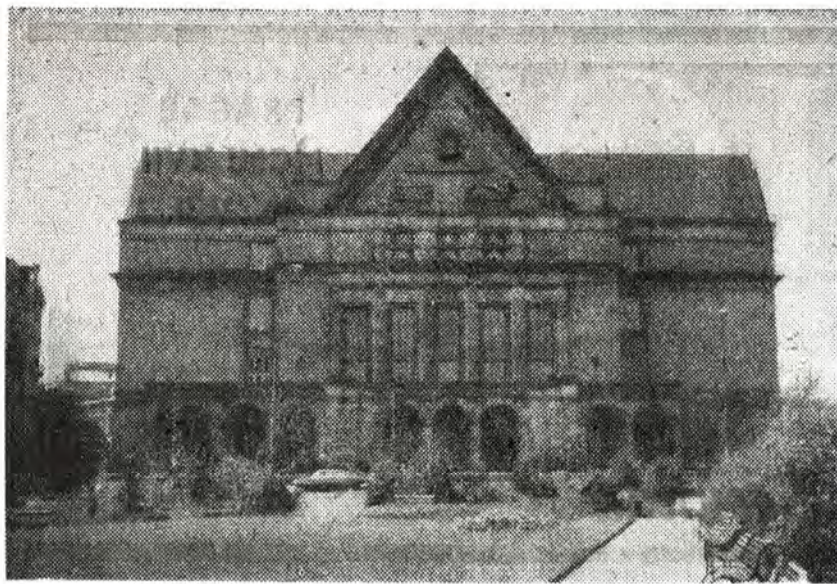
Je reprends. La tâche exaltante du Secrétaire Général, au service de la Collectivité Astronomique Internationale, est une des plus belles qui soient. Permettez-moi de vous en décrire l'essentiel.

Tout d'abord se lever tôt... De mon bureau, vers six heures du matin, et bien que je regarde vers l'ouest, les couleurs rouges et mauves d'un lever de soleil dans la brume mate des lointains de la Côte d'Azur apportent une note d'espoir et de beauté... Et il n'est que d'imaginer...

Toc... Toc... Qu'est-ce encore? Ah quoi? J'avais oublié les problèmes de l'Observatoire! ... Accessoirement, j'ai en effet des responsabilités à l'Observatoire de Nice. Entrez, Gisèle (voir figure n° 1), entrez. [Tous les autres sont partis par le car, mais elle a sa Simca — pour pouvoir discuter les affaires de l'Observatoire, quand on n'est plus dérangé par celles de l'UAI, et elle ne repartira que quand toute la pile de dossiers sera épuisée!] Bon, il y a eu la livraison de la Peugeot... Hein quoi? Elle est verte? Je n'en veux pas. J'ai dit «bleu Observatoire», nom d'un chien... rien d'autre. Ils veulent fourguer leurs vieux cocous aux Domalnes. Mais ça ne se passera pas comme ça! Next? Ah quoi, les harkis ont fait du feu dans la remise près des dépôts de meubles? Bon, ce ne sera pas le premier incendie! Dites à Mottes de faire une distribution de cigarettes après le travail — pas avant. Next? Quoi? les factures pour l'ampli de Milet ont été refusées? Parce que le fournisseur avait marqué sur la facture «Service d'Astrologie»? Passez-moi la facture. Il saura ce que j'en pense, l'animal. Next? Ah, vous avez raison; il faut écrire une lettre au Recteur pour Madame Endignoux: ce ne sera jamais que la septième. Et l'eau n'arrive plus chez Madame Colin? J'écrirai une fois de plus qu'il me faut 80 millions pour l'eau; c'est entendu. Je ne les aurai pas... mais j'aurai

(suite page 2)





A FACULTÉ DE DROIT de l'Université Charles (1928-1929), du 12 au 31 août siège de l'Union Astronomique Internationale. C'est là que vous vous inscrirez, que vous trouverez les principaux fonctionnaires de l'Union, que se tiendront certains symposiums, etc.

[suite de la 1]

fait mon devoir. Ah, il faut que je sois samedi à la réunion du CNES? Ecrivez de ma part à Lebeau — mais poliment, hein! — qu'il me casse les pieds. Next? Quoi encore? Couteau a commandé six mètres de fils à micromètre de 17 mm, et son crédit «équipement» était épuisé? ... Je mettrai ordre à cela... (17 minutes de conversation variée) ... eh bien au revoir, eh bien au revoir, eh bien au revoir...

Pardonnez-moi, mon cher ami, ces interruptions. Croyez qu'elles n'affectent en rien ma profonde satisfaction de cette tâche que je commençais seulement à vous décrire...

(Coup de téléphone à ce stade. Voix féminine. Censured.)

... que je commençais à vous décrire. Donc, un matin calme, sur l'horizon brillant de la Méditerranée, où se jouent les rayons déjà éblouis du soleil levant. C'est pour moi l'heure du courrier... Dans le calme paisible, troublé seulement par le chant des cigales, et la brise qui agite les genêts d'or du Mont-Gros, je dicte calmement mon courrier, les 17 lettres (dont si peu d'importantes!) de l'UAI, les 19 (si agréables à dicter!) de l'Observatoire, et quelques autres rapports de moindre grandeur... Besogne aisée donc... (figure n° 2?)...

Nom d'un chien de nom d'un chien de nom d'un chien [je connais des équivalents tchèques et slovaques plus vigoureux encore... Arnošt Jappel ne m'a rien laissé ignorer...]. Il faut que j'abrège cette lettre. Il est déjà onze heures du soir. J'ai oublié de dîner, et je n'ai fait que commencer à préparer mon importante conférence à la Faculté des Sciences sur «l'effet de rugosité optique dans ses rapports avec le 'fishbone' effect; historique, logique, logistiqué, et prospective du problème»... Mais ce sera vite fait, à vrai dire.

Besogne aisée, dis-je. Et ma journée est terminée... Car mes lettres dictées (au dictaphone), il est neuf heures du matin. Le car de l'Observatoire arrive, bourré de charmantes secrétaires, d'actifs techniciens, d'astronomes (solaires — les autres dorment)... Il ne me reste plus (voir figure n° 1... la même, mois ou!) qu'à vivre sur la Riviera cette vie de rêve qu'est celle du Secrétaire Général qui a fini de dicter son courrier. Tout au plus doit-il rechercher de temps en temps un dossier égaré, vider un ou deux verres de whisky (ou de slivovitz — en vue de se préparer à l'Assemblée Générale de Prague)... Quelque fournisseur importun, quelque astronome inquiet... Cela n'est rien... Et comme l'heure du courrier, à cinq heures du soir est vite arrivée!... Trop vite! Mes accortes secrétaires parties, je reste dans l'Observatoire vidé... J'ouvre les volets, et cette fois, jaunes et pourpres les nuages lointains encadrent les montagnes grises, où la tâche, plus très éclatante du soleil se noie lentement, lentement, lentement...

Je vous prie d'agréer l'expression de mes sentiments les plus distingués
with all good wishes yours sincerely
with all good wishes yours sincerely
faithfully yours

Dessin de J.-C. PECKER



Le Secrétaire général de l'Union Astronomique Internationale, ... tel qu'il a tendance à se voir lui-même!

C'est le moment de vous écrire... Et cette lettre est maintenant finie... Comme je regretterai cette vie charmante, faite d'instantanés si nombreux de paix, de détente, et la douce quiétude, bientôt terminée, de l'existence d'un Secrétaire Général... Merci de m'avoir donné l'occasion de vous le dire...

Très sincèrement,

Votre ami,
 JEAN-CLAUDE PECKER

P.S. — Depuis quelques mois, je dois prendre des «optimisants». Or, aujourd'hui, par erreur, je n'ava.s pris qu'une partie des pilules prescrites. Excusez-moi. Mais où est donc la vérité? D'où les deux dessins ci-joints, qui représentent chacun l'entière vérité bien entendue.

Car il ne saurait y avoir qu'une seule vérité...! Est-ce celle de la figure n° 1? Est-ce celle de la figure n° 2?

THE CONGRESS MEETS

LES MEMBRES DE L'UAI sont priés de bien vouloir prendre rendez-vous pour information ou pour toute autre matière avec les officiels ou employés suivants de l'UAI:

Le Secrétaire Général: J.-C. PECKER, problèmes concernant la politique générale de l'UAI.

Le Secrétaire Général Adjoint: I. PEREK, problèmes concernant les questions relatives au contenu scientifique de l'Assemblée Générale.

Le Secrétaire Adjoint: A. JAPPEL, questions de finances.

L'Editeur de l'UAI: Mlle G. DROUIN, procès verbal des réunions officielles (Assemblée Générale, Inaugural Ceremony, Joint Discussions, Invited Discourses).

Madame D. BRANDT et Mlle C. CASENEUVE faciliteront avec plaisir les rendez-vous entre Membres et Officiels de l'UAI (Président, Vice-Présidents, Conseillers, Secrétaire Général et Secrétaire Général Adjoint).

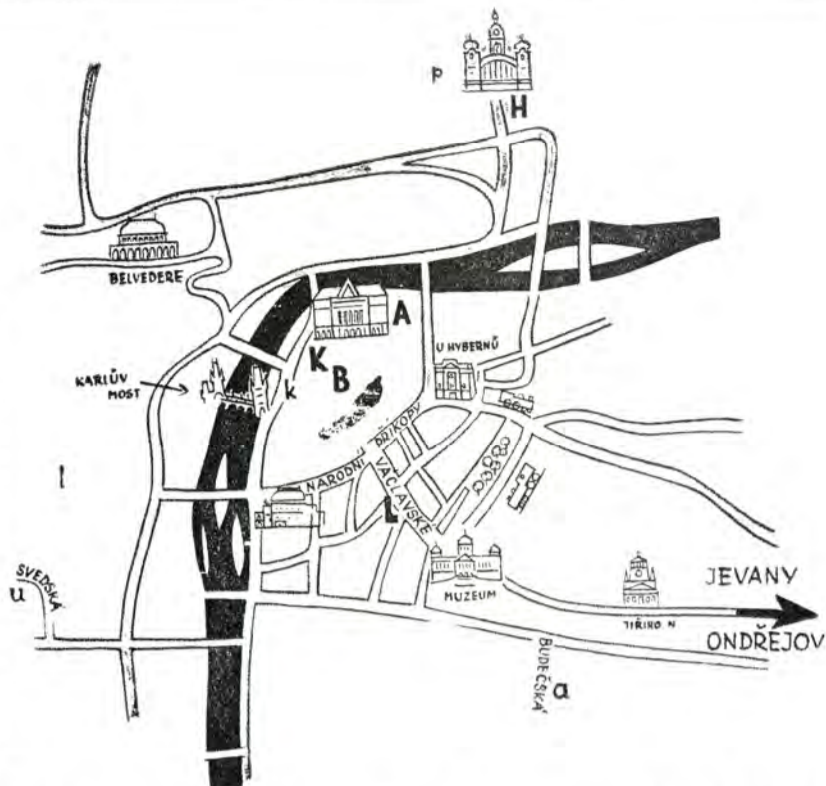
Les Présidents de Commissions sont naturellement priés de ne pas hésiter de prendre contact avec le Secrétaire Général sur n'importe quel problème.

Le Prague astronomique accueille...

[suite de la 1]

verrez un astuce architectural unique. L'architecte pragois Josef Gočár fut chargé de la tâche suivante: gagner un espace pour les nombreux employés d'une grande banque (la Banque anglo-tchécoslovaque) sans altérer l'ancienne coulisse de la rue. Il remplaça le toit du corps de bâtiment antérieur par une terrasse, construisit un nouveau corps de bâtiment de fond avec de nombreuses fenêtres — et cacha les cheminées dans une sorte de guirlandes. Continuez à marcher dans la rue. Le no. 7 est une architecture baroque, l'ancien hôtel Kinský. C'est là que se constitua en 1912 le parti bolchévique de Russie. La conférence historique de Prague fut présidée par V. I. Lénine (la salle a été aménagée dans son état original, à l'hôtel se trouve actuellement le Musée Lénine). En 1920, la maison fut occupée par les sociaux-démocrates de gauche. Ils furent chassés par la police, sur quoi fut proclamée une grève générale dans toute la république — grève qui n'eut point de succès et causa que la Tchécoslovaquie eut pendant vingt-cinq ans un gouvernement bourgeois. Mais des luttes pour cette maison sortit le Parti communiste de Tchécoslovaquie (en 1921). Continuez toujours, traversez la rue. Le no. 13 est LA PLUS ANCIENNE GARE DE LA VILLE, PRAGUE-CENTRE, un édifice Empire de 1845. Le premier train y arriva il y a 122 ans, le 20 août 1845.

Bohumil BÍLEK



Where the Congress Meets

A Faculty of Law
 B Faculty of Philosophy
 H Park of Culture

K House of Artists
 L Lucerna

Places of Astronomic Interest

a Academy — Astronomical Institute
 k Klementinum
 l The People's Observatory

p Planetarium
 x University — Astronomical Institute

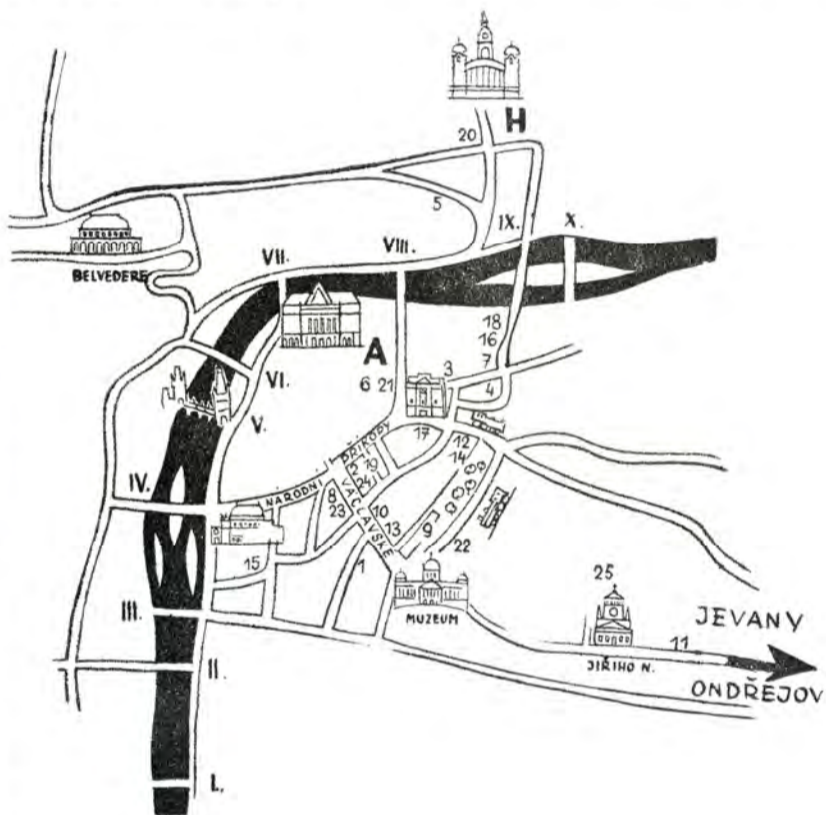
THE EXHIBITION OF ASTRONOMIA NOVA 67

En dehors de l'inscription, la toute première entreprise du Congrès: l'ouverture de l'exposition d'instruments astronomiques modernes, la plus grande qui ait jamais eu lieu en Tchécoslovaquie. CARL ZEISS JENA et trois producteurs du pays représentent le camp socialiste, sur une superficie de 500 et 98 m². FEINTECHNIK WIEN occupe 80 m², trois firmes ouest-allemandes 58 m² (RHODE UND SCHWARZ, MÜNCHEN, SPEZIAL-GLAS GmbH, MAINZ ET ZENTRALWERKSTATT GÖTTINGEN GmbH), trois maisons françaises 32 m² (REOSC PARIS, OPTIQUE-ELECTRONIQUE-MÉCANIQUE DE HAUTE PRÉCISION, TRANSEN-PROVENCE ET COMPAGNIE DES COMPTEURS, MONTROUGE). GRUBB PARSONS de NEWCASTLE UPON TYNE expose sur 25 m² et OWENS-ILLINOIS, TOLEDO/OHIO sur 12 m².

ZEISS expose 25 instruments; le 26ème n'a pas pu entrer par la porte du palais U hybernú. Vous le verrez au nouvel observatoire d'Ondřejov.

ELEKTROČAS, PRAHA, DIOPTRA, Turnov et l'INSTITUT DE RECHERCHES DE GÉODÉSIE, TOPOGRAPHIE ET CARTOGRAPHIE de Prague ont apporté dans l'émulation des instruments qui n'ont été en service que récemment ou même des prototypes mis au point en collaboration avec les instituts de l'Académie tchécoslovaque des Sciences.

Le secrétaire scientifique principal de l'Académie, le professeur Jaroslav PLUHAR inaugurerá l'exposition avec le directeur de l'observatoire du Pic du Midi, le professeur J. RÖSCH et avec le directeur de l'Agence de publicité Rapid, qui a été chargée de la réalisation de l'exposition. **Bi**



Hotels

- Alcron
- Ambassador
- Atlantic
- Axa
- Belvedere
- Central
- Centrum
- Družba
- Esplanade
- Evropa
- Flora

- Hybernia
- Jalta
- Jednota
- Koruna
- Merkur
- Meteor
- Opera
- Palace
- Park hotel
- Paříž
- Slovan
- Tatran
- Zlatá husa
5. květen

Drawings by
 Otakar
 STEMBERA

H Entrée du PARC DE LA CULTURE et du repos Julius Fučík — INAUGURATION DU CONGRÈS mardi le 22 août à 10 h 15. Si vous arrivez plus tôt, arrêtez-vous à droite au DÉPARTEMENT LAPIDAIRE DU MUSÉE NATIONAL — ori-

ginaux et moulages de plastiques monumentales en pierre du début du XI^e à la fin du XIX^e siècle. Si vous en avez le temps, faites un petit saut vers la gauche (au cas où vous vous intéressiez l'instruction publique en astronomie): PLANETARIUM, construit à partir de 1958. Et si le coeur vous en dit de vous promener parmi des fleurs, vous avez là le PARC qui fut pendant des siècles propriété des ROIS de Bohême. Si vous aimez l'architecture baroque, ne manquez pas de voir le CHÂTEAU DE TROJA, avec son escalier monumental, orné de statues de divinités et de géants, avec des fresques à l'intérieur et un jardin baroque à l'extérieur. Et si vous êtes accompagné d'enfants, poussez encore un peu plus loin, au JARDIN ZOOLOGIQUE de Prague avec 2000 animaux (presque 500 espèces).

Photos Jindřich MARCO



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The big instrument on a small picture (by Karel Herman-Otavsky)
The inauguration of the TWO METRE TELESCOPE will take place on Wednesday, August 23rd at 14 o'clock



1901—Josef Jan FRIC, the founder of the observatory

The spectrograph in the Cassegrain focus of the new telescope

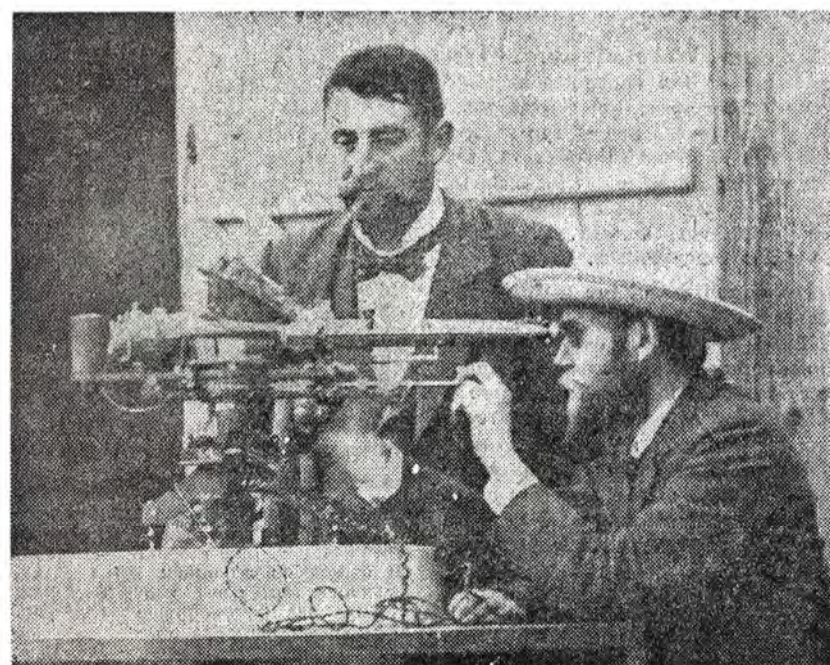


COMBIEN DU TEMPS UN ASTRONOME DOIT-IL RESTER A PRAGUE

pour qu'il se couvre de gloire?

Le seule durée au congrès ne suffit probablement pas, bien que, de toute évidence, le temps nécessaire pour accéder à la gloire devienne historiquement de plus en plus court.

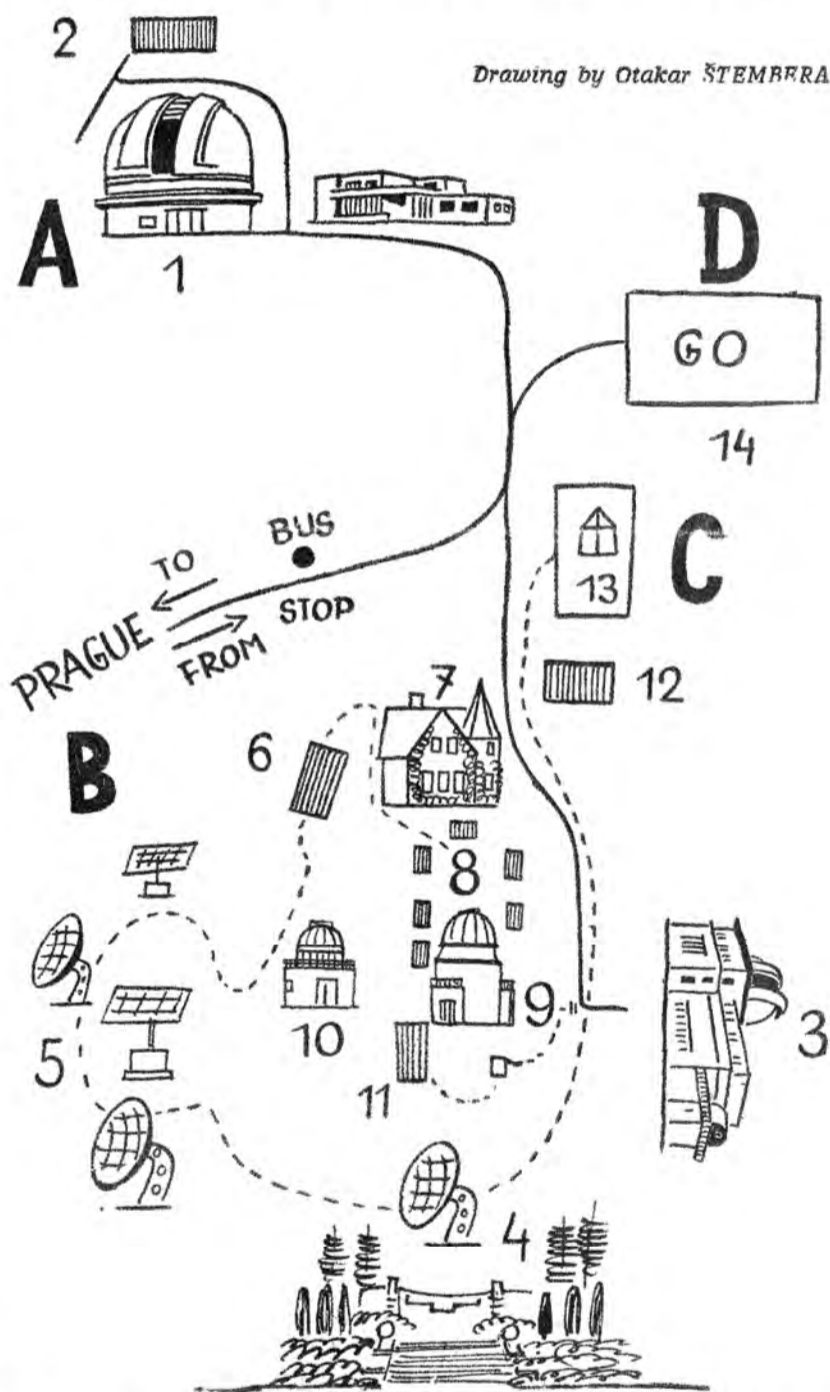
JOHANN KEPLER a séjourné à Prague douze années entières; en ce temps il a produit l'œuvre *Astronomia nova* avec deux lois sur les mouvements des planètes; dans ses expérimentations à Prague il a dûment entamé la troisième loi, il écrivit à Prague sa *Dioptrique*.



1901—The man sitting on the right, with his hat on, is professor NUSL (1867—1951) at the circumzenithal instrument, the then pride of the observatory.

Ondřejov Observatory Welcomes All Members of the IAU/UAJ

TRIPS TO THE ONDŘEJOV OBSERVATORY. The Astronomical Institute of the Czechoslovak Academy of Sciences has the honour to invite Members of the IAU and their Guests to visit the largest observatory in this part of Europe.



Participants are free to join any of the four groups listed below. Each group will have in attendance at least one specialist from each of the various departments of the Institute.

To satisfy interest in a specific field, all scientific staff members of each department will accompany one of the four trips, as indicated.

THURSDAY, August 24th,	8.00 a. m. — 1.00 p. m.	Upper Atmosphere
	1.30 p. m. — 6.30 p. m.	Meteoric Astronomy
FRIDAY, August 25th,	8.00 a. m. — 1.00 p. m.	Solar Physics
	1.30 p. m. — 6.30 p. m.	Astrometry and Geodetic Astronomy

Group one departs from point 7 of the plan, group two from point 8, three from point 3 and four from area D of the plan.

Buildings and instruments of the Ondřejov observatory are pictured in the booklet *ASTRONOMY IN CZECHOSLOVAKIA*. B. ŠTERNBERK, Director

CHRISTIAN DOPPLER a exercé son activité à Prague également pendant douze ans (de 1835 à 1847), mais dès 1742 il publia son *Traité sur la lumière de couleur des étoiles doubles*.

ALBERT EINSTEIN n'a passé à Prague que trois semestres; on dit qu'il y avait médité sur ses thèses fondamentales de la *théorie générale de la relativité*.

Il est donc très difficile d'extrapoler les valeurs données, mais vous pouvez toujours l'essayer!

THE NATIONAL COMMITTEE

František ŠORM, President of the Czechoslovak Academy of Sciences, is a chemist and biochemist who founded and is now heading several scientific schools. In the chemistry of natural substances, especially in the field of terpenes and biologically effective, active plant structures, he developed research programs of the basis of new methods of physical chemistry and indexing, which led to the discovery of two terpenes. He built up a research school on steroid compounds which formed the basis also of their production by Czechoslovak industry; among these are vitally important medicines such as hormones. Equally important, if not more so, is Šorm's Biochemical School, especially in the investigation of high polymer systems, proteins, nucleic acids and, above all, peptides. The results of this research are international successes that followed the discovery of some substances which inhibit cancerous growths.

Born in 1913, he graduated from the Chemical-Technological Engineering Institute in 1935, obtained the title Doctor of Technical Sciences in 1936; research chemist at the Skoda Works in Plzeň, then in chemical and steel production; professor at the Czech Technical University in Prague, 1946, at Charles University, 1950; Director of the Institute of Organic Chemistry and Biochemistry, deputy of the National Assembly, three state prizes, two Orders of Labour, The Fritzsche and a further two foreign gold medals, member of the Soviet Academy of Sciences and seven other academies, Dr. h. c. of two foreign universities; among the first group of academicians named, 1952; in the same year the first Main Scientific Secretary of the Academy of Sciences. Elected its Vice-president in 1957 and re-elected in 1961, became its President in 1962 and as such, he participates in meetings of the Czechoslovak government.

Jiří HÁJEK, Minister of Education, year of birth: 1913; graduate of the Law Faculty of Charles University in Prague; worked in the field of finance and, at the same time, in political and student organizations. Arrested by the GESTAPO in 1939, sentenced to twelve years in prison, held in the Waldheim concentration camp until

May 1945. After liberation, he was an official of the Social Democratic Party, a deputy of the National Assembly and a member of the Central Committee of the Czechoslovak Union of Youth. After February 1948 a deputy of the Social Democratic Party's general secretary, after its merger with the Communist Party its member. In 1948-49 in the cultural-publicity department of the Communist Party's Central Committee, since 1949 uninterruptedly a member of the Communist Party's Central Committee; professor at the Law Faculty in Prague, Doctor of Historical Sciences; since 1954 in the diplomatic service, ambassador in London, deputy-foreign minister, ambassador and head of the permanent Czechoslovak mission to the UN; since 1965 Minister of Education and Culture and also a corresponding member of the Czechoslovak Academy of Sciences.

Matej LÚČAN, Trustee of the Slovak National Council for education and culture since 1963. He became a deputy of this council in 1963. Since 1954 he has been heading a department at the Central Committee of the Communist Party of Slovakia, since 1958 member of the Central Committee. Between 1959 and 1963 he headed its Department for Propaganda, and since 1963 he has been a member of the Ideological Commission of the Central Committee of the Czechoslovak Communist Party in Prague.

Ludvík ČERNÝ, Mayor of Prague since 1964; born in 1920 in Prague. Secondary school, began at the Technical Institute, but all universities were closed down in 1939. Forced laborer under the Nazis at the ČKD Prague enterprise, a firm that has been frequently reorganized, amalgamated and renamed. Ludvík Černý was a worker during the war, then an office employee, he held various economic functions, was economic deputy to the firm's director; while working he took a course in engineering at the Department of Economic Engineering at the Technical University in Prague, elected deputy to the Prague National Committee in 1960 and at the same time appointed deputy-mayor and chairman of the Planning Commission of the City of Prague's National Committee.

Oldřich STARÝ, rector of Charles University by decree issued by the president of the republic on September 15th, 1966, neurologist. His scientific work on the pathogenesis of migraines has become the basis of treatment used until the present. Monograph on diseases of the nerves that arise from slipped spinal discs. He tested the reflex theory for the treatment of spastic paralysis and worked on the problems of the pathophysiology of pains. 50 original scientific papers. Head neurologist at the State Sanatorium in Prague, 1952. Associate professor of neurology at the Faculty of General Medicine in Prague, 1952; its professor in 1963. Doctor of Medical Sciences (DrSc.) and corresponding member of the Academy of Sciences 1960, member of the Central Committee of the Czechoslovak Communist Party, 1966, foreign member of the Soviet Academy of Medical Sciences 1967. Born 1914 in Plzeň.

Alois ZÁTOPEK, chairman of the Academy's Scientific Collegium on Astronomy, Geophysics, Geodetics and Meteorology. This first professor of geophysics at Charles University was elected corresponding member of the Academy in 1953. He educated a whole generation of geophysicists, supervised research work on methods of determining the magnitude of earth tremours, around which research on earthquake activity and the structure of the earth both at home and abroad now revolves. He has been president of the European Seismological Commission in two periods of office, he is being frequently asked to co-operate with UNESCO (Intergovernmental meeting on Seismology in 1964, the reconstruction of Skoplje, the Seismism of Macedonia, 1963-1966, earthquake in Anatolia, 1966, etc.). Year of birth: 1907.

Lubor KRESÁK is the top representative of astronomy, geophysics and meteorology in Slovakia as the chairman of the Collegium of the Slovak Academy for these sciences. In astronomy itself, he is the second highest: he is deputy director of the Astronomical Institute of the Slovak Academy of Sciences. In his own field of specialization — the research of interplanetary matter—he is the leading scientist in Slovakia. In the IAU he is active in two commissions (20—position and paths of planets, comets and satellites, and 22—meteors and meteorites) as well as the Work Commission for the paths of comets. Year of birth: 1927; RNDr. Prague 1951, Candidate of Science 1957, Associate Professor of Astronomy, Bratislava 1961, Dr. of Science 1967. Over 80 papers.

Bohumil ŠTERNBERK, director of the Astronomical Institute of the Czechoslovak Academy of Sciences; president of the Local Organizing Committee. In January of this year he celebrated his 70th birthday. University studies in Prague and Berlin. In the latter city he worked in the Babelsberg observatory under professor Gutnick, specializing in photographic and photoelectric photometry. Served as assistant to professor Heinrich, at Prague University, then to professor Nušl (vice-president IAU 1928-1935, died 1951) at Ondřejov. Director of observatory at Stará Dala (the present Hurbanovo) in Slovakia where, among other things, he obtained the first pictures of Pluto in Europe. With super-human effort he saved the 60 cm Zeiss reflector—which he, at one time, put into operation—as well as a considerable part of the library for Czechoslovakia, so that they did not fall into the hands of Horthy's regime of Hungary, 1939. Research of cosmic radiation in Prague; after the closing of Czechoslovak universities, he built up a time service which today serves as the base for tracing artificial satellites for the socialist countries. He heads the Czechoslovak Astronomical Society at the Academy of Sciences. Vice-president of IAU, 1958-1964. Bi

Why Is Prague Dug Up?

In answer to the many inquiries as to why Prague is so dug up and why the digging spreads day after day, we are glad to be able to give you an exhaustive explanation on the real reason for this work which, until now, has been a carefully guarded secret. The information was given to our reporter by a Very Important Person who does not want to be named, so that he can remain a Very Important Person.

The Prague diggings which are presented to the public eye as work on the improvement of the communication and canalization systems are actually preparations for welcoming Martians or other beings from outer space.—We proceed with the following alternatives:

a) If space beings come with friendly intentions, they will think that the dug up condition of Prague is a kind effort of their hosts, because they will easily see that an attempt has been made to adjust the look of the earth's surface to the appearance of other planets which are untouched by human civilization.

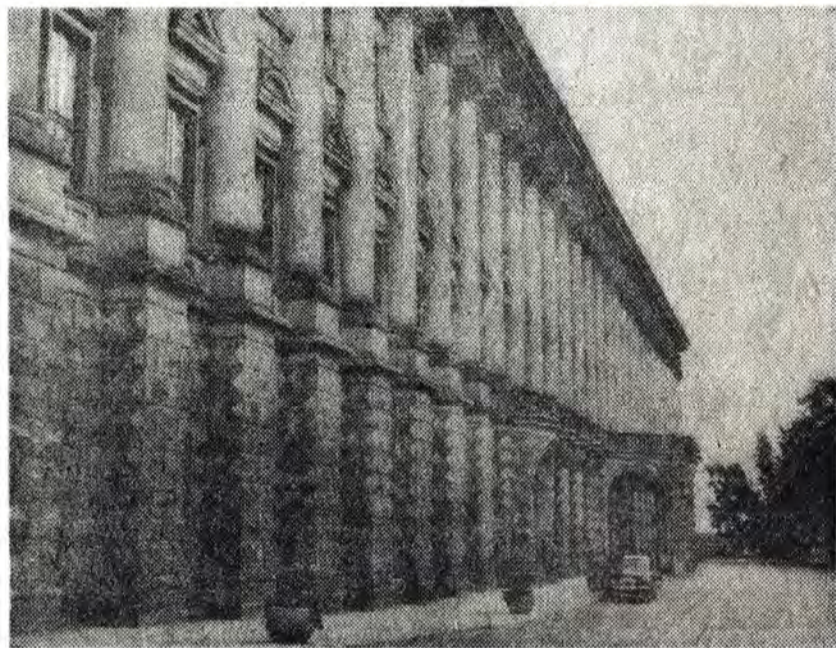
And further, if the Martians come here first, which is most likely considering the distance, dug up Prague will present a good opportunity to start a little cooperation with the

Martian experts on canalization who are known all over the space-world. This will be a good basis for making interplanetary business contacts, and perhaps then with their assistance the Prague communication system could also be solved.

b) On the other hand, if the space beings come to Prague with unfriendly intentions, dug up Prague could be considered a part of the defense system. First, it will serve as camouflage which will disorient the enemy who came under the impression that Prague is a city which was built a long time ago. Secondly, it will give a certain advantage to the natives who are well acquainted with the topography of their own town. Besides, the groups of anti-cosmic defenders are re-trained every 24 hours, in order to be prepared for their difficult defense task. The third, and by no means the smallest advantage is the fact that this terrain annuls the speed superiority which earth vehicles propelled by rockets certainly possess, and then the theoretically negligible speed of Prague trams will have a certain practical value for the defenders.

When our reporter asked how long Prague will be kept in this "digging" stage, in the event that no visitors from outer space appear, he was advised by the Very Important Person to direct his inquiries to the Astronomical Congress since the answer is to be found in the stars.

GABRIEL LAUB



Trente demi-colonnes ornent la façade Renaissance de 150 m de long du PALAIS CERNIN qui s'ouvrira pour vous mardi le 22 AOÛT À 21 HEURES. Le président du Conseil fonctionnant vous accueillera dans le siège actuel du ministère des Affaires étrangères. Remarquez sur la voûte du grand escalier la fresque Lutte des Titans (par le peintre pragois V. V. Reiner de 1718)

FRANTIŠEK KRAJČÍR, officiating prime minister of Czechoslovakia; he

has divided his love between books, trade and politics. Born in 1913 in Vienna. Illegal member of the Revolutionary National Committee in Hořice, chairman of the local National Committee (1945, May-October), regional deputy in Prague in October 1945, member of the Communist Party of Czechoslovakia and deputy at the National Assembly, 1946. Minister of Internal Trade, 1948; Minister of Foreign Trade, 1959, and deputy-premier of Czechoslovakia, 1963.

HIGHLIGHTS FROM ...

... a Hommage of Gratitude to the Organizers and Exhibitors of Astronomia Nova, opened on Sunday, August the 20th

... wholehearted congratulations and thanks to all those, organizers and exhibitors, who have participated in this wonderful undertaking. We are convinced that the Exhibit of Instruments... will render real services to all the astronomers and, particularly, to our young colleagues. The latter will find here inspiration for the construction and acquisition of

the instruments which will help them best in their investigations...

(signed:) P. SWINGS
President of the International Astronomical Union

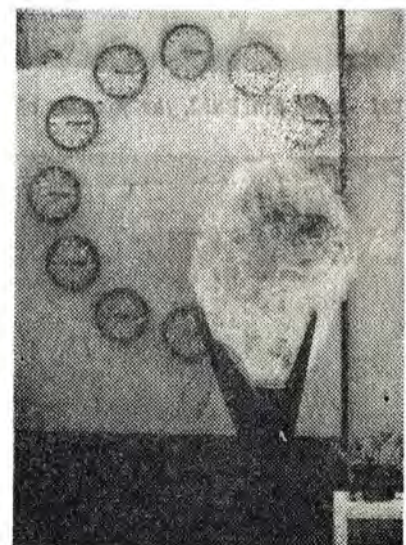
... a speech

The researchers at the astronomical institutes of the Czechoslovak Academy of Sciences, the Slovak Academy of Sciences and at the universities are dignified successors in the famous tradition of Czechoslovak astronomy, which is documented at the exhibition opened in Queen Anne's Summer Palace.

The organizers of the XIIIth General Assembly in Prague have made justified use of this occasion, when the world representatives of astronomers meet in Prague, to arrange a get-together of producers and "consumers" on such a suitable ground and thus to create a possibility for the producers of the apparatuses to come into a closer contact with those who will work with their products.

... The display of these results of man's skill and ingenuity brings a great satisfaction.

J. PLUHAR
Chief Scientific Secretary
Czechoslovak Academy of Sciences



SPECIAL-GLAS Mainz—the maker of lenses at the exhibition U Hybernů

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THE DEVELOPMENT OF ASTRONOMY IN CZECHOSLOVAKIA—exhibition in Queen Anne's Summer Palace—opened Monday, August 21st.

Prof. M. MINNAERT from Utrecht, The Netherlands, with the president of the Local Organizing Committee, B. Šternberk.

A new set of instruments of the Institute of Radio Engineering and Electronics, Czechoslovak Academy of Sciences. Experts of Dr. Šternberk's Time Service department took part in the development of the Institute's astronomical instruments. Standard peaces were put together with a current TV set, so that exact time can be calculated at any place where TV pictures are seen. Our staff photographer Jindřich MARCO brought this snap from the first floor of the exhibition

A plastic by Hugo DEMARTINI: The Exactness of Modern Science





Le Congrès est ouvert - aux sons d'une musique classique

Entre deux morceaux de musique exécutés avec une perfection telle que le piaïlement des moineaux qui en constituait un agréable bruit de fond arrivait à peine à le couvrir, ont été présentés les discours d'ouverture du Congrès.



František KRAJČÍR,
Président fonctionnant du Conseil:

La plus large collaboration internationale n'est possible que dans le conditions de la paix, de la compréhension mutuelle et de la confiance...

František ŠORM,
Président de l'Académie tchécoslovaque des Sciences:

... You will find that within the Czechoslovak Academy of Sciences astronomy has found unprecedentedly favorable conditions for its development. Two big astronomical institutes, at Ondřejov and at Skalnaté Pleso (Rocky Lake), were enlarged considerably and their scientific equipment is now incomparably better than even in recent past. It may suffice to mention only the big solar laboratory at Ondřejov, the coronagraph on Lomnický štít and the telescope of 79 inches (2 meters) in



diameter being completed at Ondřejov. Before World War II there used to be two resident professional astronomers at Ondřejov; now there are almost 30 of them.

Needless to say, we are pleased to hear compliments from our guests on the level of our astronomers' work. We appreciate the results of their research of the sun, meteors, high atmosphere, comets, double stars and stellar systems.

Scientific work in a small country has, however, always its specific problems. In no branch of science can we afford to carry out research in all directions like big powers. The Presidium of the Czechoslovak Academy of Sciences keeps urging astronomers—as well as scientists of other branches—to concentrate their

efforts and means on a small number of fundamental, topical scientific problems. We believe that the situation in Czechoslovak astronomy in this respect is not bad; a few larger working groups with clear and systematic programs have been set up. However, the principle—not to disperse efforts—should be fought for all the time; there is always a certain strain between a rational directive towards concentrated collective work and natural centrifugal tendencies of individuals whose thinking, work enthusiasm and individual interest, in the long run, push scientific progress forward.

... 360 years ago Prague was a real capital of the astronomical world. Now it has become the capital again, at least for a few days...

Pol SWINGS,
Président de l'Union:

Le Professeur Guth nous a rappelé quelques souvenirs de savants éminents ayant trouvé à Prague, l'hospitalité et la quiétude nécessaires à leurs travaux.



Faut-il rappeler que le Professeur Nušl dont on fête, cette année, le centenaire de la naissance, fut le vice-président de l'Union de 1928 à 1935 et premier directeur de l'Observatoire d'Ondřejov; que mon cher et honoré Collègue, le Professeur Sternberk qui, cette année, atteint, comme l'Observatoire d'Ondřejov, son 70-ème anniversaire, remplît une tâche importante comme vice-président de 1958 à 1966; que de nombreux savants tchécoslovaques ont été présidents, vice-présidents au membres de connaissances depuis 1922; que mon ami, le Professeur Luboš Perek œuvre remarquablement depuis trois ans, au sein du Comité Exécutif et qu'il va, sûrement, être amené à remplir la tâche la plus importante et la plus

lourde au cours du prochain triennat; enfin, que la Société Astronomique de Tchécoslovaquie fête cette année son cinquantenaire? Je profite de l'occasion aussi pour rendre hommage à la mémoire de Dr. Bečvář, dont les Atlas rendent tant de services, notamment à nos élèves et à nos jeunes collègues entrant dans la carrière.

Nowadays there is a tendency toward teamwork. This is excellent in many cases. But let us beware: we shall always need the initiative of individualistic thinkers. Let us never discourage a scientist working in his ivory tower. We definitely need large and expansive telescopes, but let us still encourage astronomers belonging to modest institutions and using their brain. The training of young astronomers and the creation of enthusiasm are as honorable tasks as the elaborate research on cosmic bodies.

Bohumil ŠTERNBERK,
Président du Comité Local d'Organisation:

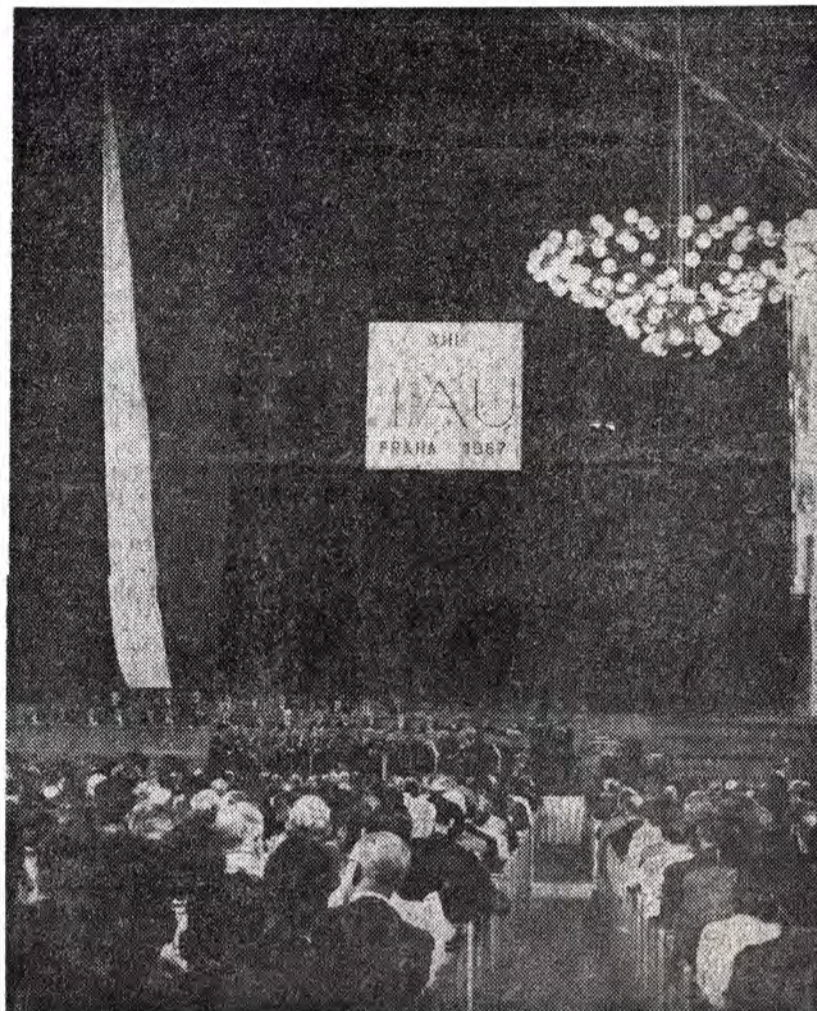
... il y a six ans, nous avons présenté pour la première fois au Comité Exécutif de l'UAI notre projet de choisir Prague pour la session de cette année, nous ne nous doutions pas que la jace de notre capitale serait altérée par la construction du métro, juste en 1967. Heureusement ces travaux n'ont pas encore enahé la Vieille Ville qui vous intéressera sans doute le plus. C'est vrai qu'il est un peu difficile de se frayer le chemin depuis les hôtels à la place Venceslas jusqu'au centre de notre congrès, mais nous espérons que les astronomes qui connaissent bien les voies des corps célestes sauront également trouver leur chemin à travers les nombreux passages qui remplacent le carrefour de la place Venceslas.

... Depuis des siècles déjà, notre pays partage l'idée qui constitue la raison d'être de notre Union, à savoir de la coopération internationale dans l'astronomie. L'astronome tchèque Tadeáš Hájek de Hájek a été le prédécesseur de notre collègue très estimé, le président de la 30e commission de l'UAI pour l'échange d'astronomes, le professeur Minnaert, car ce fut Hájek qui organisa le stage de Tycho Brahe à Prague, pour utiliser des termes actuels. Ce stage a mené à la collaboration avec un autre hôte étranger de notre pays, Johannes Kepler et, comme on l'a déjà mentionné, a donné lieu à la fondation d'une méthode scientifique moderne en astronomie, fondée sur les observations complétées par la théorie et vice versa.

... Il y a 50 ans, je commençais ma carrière d'astronome en qualité de chargé de cours de l'Université Charles. L'astrophysique était encore incapable de répondre à la question de savoir ce qu'étaient les nébuleuses spirales, si elles jaisaient out ou non partie de notre Voie Lactée. On commençait alors à se douter que l'astronomie se tenait au seuil d'une grande découverte qui devait par la suite extrêmement élargir les horizons de l'humanité. Je pense, et avec moi le pensent aussi d'autres collègues, que la situation est un peu analogue aujourd'hui et nous espérons qu'au congrès nous en serons amplement informés par les personnes les plus compétentes...



FACULTÉ DE LETTRES de l'Université Charles (1927-28). Là également se tient le Congrès



IAU MEMBERS ARE REQUESTED to approach the following IAU Officials and staff members for information or action:

The General Secretary: J. C. PECKER, on problems of IAU general policy (right).
The Assistant General Secretary: L. PEREK, on problems of sciences organization and planning (left).



Drawings by Otakar ŠTEMBERA

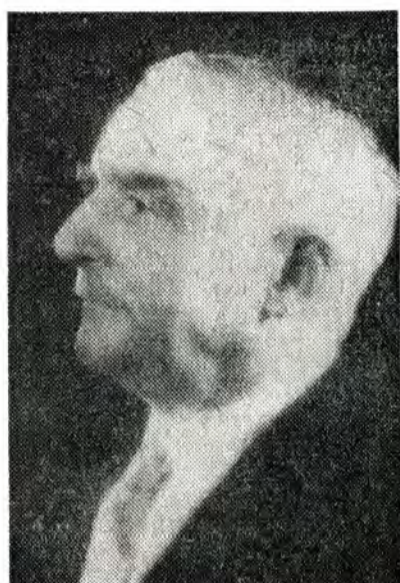
The Assistant Secretary: A. JAPPÉL, on questions of finances (middle).
The IAU Editor: Mile G. DROUIN, in matters related to taking records of proceedings.

Mrs. D. BRANDT and Miss C. CASENEUVE will be glad to arrange for meetings between IAU Members and IAU Officials (President, Vice-Presidents, Counsellors, General Secretary and Assistant General Secretary).

Presidents of Commissions should naturally not hesitate to take up any problem they may have with the General Secretary.

A. Danjon

World astronomy has lost one of its important representatives when André Danjon, the former President of the IAU (1955—1958) died this year. He was born in Caen, Normandy, in 1890 and studied at the Ecole Normale Supérieure in Paris. The first world war threatened to interrupt his brilliant career: Danjon was wounded and lost one eye. But he did not give up astronomy. After the war he started his work at the Strasbourg observatory where he spent twenty years of fruitful activity, making a number of valuable observations and building a number of astronomic instruments mainly for photometry but also for meridional astronomy. His pioneering work made a lasting contribution to improving stellar and planetary photometry and to the exactness of meridional measurements. Danjon's main innovation which has become an inseparable part of the equipment of modern positional astronomy is his famous "astrolabe à prisme" which yields excellent results in measuring time and latitudes. The success of his astrolabium made Danjon concentrate on the study of the Earth's rotation; he played a decisive



part in preparing the conception of the Ephemeride Time as the universal time standard for modern purposes.

French astronomy owes to Danjon's great organisational talent the Haute Provence Observatory and the post-war restoration of the Paris Observatory. Danjon was a very successful teacher too; in Strasbourg his pupils included A. Couder, A. Lallemand, C. Fehrenbach and P. Müller. Later, as Professor at the Sorbonne, he more or less himself educated the present young generation of French astronomers. Danjon had the lion's share in the modernisation and development of the Meudon Observatory and played an important part in the design and construction of the radio-astronomic laboratory at Nancy. As a representative of various specialised national agencies for astronomic research Danjon brought a positive influence to bear on the development of all the other astronomical institutes in France. His all round activities of a research worker and an organiser brought him honours at home and abroad: besides his presidency of the IAU, mentioned above, he was awarded a gold medal of the Royal Astronomical Society in 1958, was made member of the American Astronomical Society in 1953, etc. Work in positional astronomy and the rebirth of French astronomy remain as a lasting monument to the life and work of Professor André Danjon.

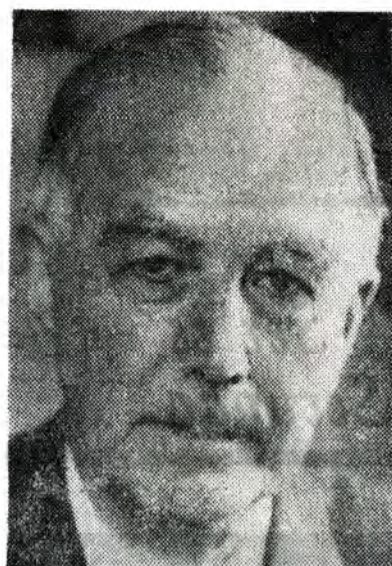
B. Lindblad

Bertil Lindblad died in 1965 at the age of 69.

Throughout his scientific career he made fundamental contributions to widely varied branches of astronomy.

His first extensive publication from the Uppsala Observatory in 1918 was devoted to the problem of a two dimensional spectral classification of faint stars, a domain which always attracted his interest. He was able to introduce new important methods, such as the cyanogen criterion, explored by him in California from 1920 to 1922. These methods were later applied by him and his collaborators in extensive spectrophotometric research at the Uppsala, Stockholm and

Lund Observatories. When Lindblad was appointed director of the Stockholm Observatory in 1927 he was entrusted with the task of erecting



the new observatory in Saltsjöbaden. One of its main programmes was the study of the space distribution of stars by means of his spectrophotometric methods for determining the absolute magnitudes. This meant a great impulse to this branch of astronomy.

He was also familiar with theoretical astrophysics. He gave important contributions to the theoretical

R. M. Petrie

ROBERT METHVEN PETRIE was appointed Director of the Dominion Astrophysical Observatory in 1951 and was given the title Dominion Astronomer in 1964. His principal interest was in the analysis of stellar spectra.

The study of the galaxy from the analysis of these B-type spectra involves both their motions and their luminosities, and hence their distances. Therefore Petrie instituted two long-range programs: first to derive accurate wave-lengths of B-type absorption lines used in radial-velocity determinations for the dispersions employed at Victoria; and second to derive absolute magnitudes of the B stars. This work was essentially completed and most of the calculations made for derivation of the galactic rotation parameters when Dr. Petrie died suddenly on April 8, 1966; the final results have been prepared for publication by Mrs. Petrie.

Dr. Petrie not only made a very significant contribution to astronomy through his researches, but he advanced the science through his enthusiasm, his intellectual capability and sound judgement in his contacts with his friends and colleagues, students and young astronomers, and through national and international organizations. He supported strongly the work of the International Astronomical Union from the time he became a member in 1938. At the time of his death he was President of Commission 30 (Radial Velocities); he had completed all preliminary arrangements for I.A.U. Symposium 30 on Radial Velocities, held in Toronto, Canada in June 1966 which as a result of his efforts, was an outstanding success. Petrie considered that his election as a Vice-President of the Union in 1958 was the greatest honour he received during his career; he did his utmost to further the aims

treatment of the limb darkening of the sun, studied the intensity gradient at the solar limb, discovered theoretical study of the luminosity effect of the cyanogen bands, found the asymmetry of the 4227 line in late type stars, suggested a process for the formation of particles in space and measured and discussed the light scattering in galaxies.

Since 1925 stellar dynamics became his main field of research. He was the first to seriously consider the idea that the galactic system is rotating around a distant centre. His interesting hypothesis was soon afterwards confirmed by Oort in his discovery of effects of differential rotation in the radial velocities of stars. In a long series of papers Lindblad studied the dynamics of spiral systems. Particularly important was his discovery of the semipermanent "dispersion orbits". These concepts have recently been further developed by Lin.

Bertil Lindblad was one of the great astronomers of his time. He was twice elected President of the Royal Swedish Academy of Sciences, for many years chairman of the Swedish National Science Research Council and in 1965 Chairman of the Nobel Foundation. He was President of the International Astronomical Union (1948—1952) and of the International Council of Scientific Unions. Because of his wide scientific and cultural interests combined with a deep regard for the essential values in life he was greatly respected by his colleagues and friends.

INGVE ÖHMAN

of the Union and to help to adapt its policies to modern trends in international organizations.

R. M. Petrie was certainly one of the foremost Canadian astronomers. His vision was instrumental in his Government's decision to keep Cana-



dian astronomy in the vanguard by building the 156-inch (3.96 m) Queen Elizabeth II Telescope on Mount Kobau, B. C. His personality as well as his works will continue to be an inspiration to those who knew him.

K. O. WRIGHT,
Dominion Astrophysical Observatory
Victoria, B. C.

CHANGES IN PROGRAMME OF COMMISSION 34

1. Business
Interstellar Gas R. Sunyaev
2. Magnetic fields in Arms; R. D. Davies
Dynamics of Gas Clouds G. B. Field
3. Interstellar Grains T. Stecher
I. M. Greenberg
PIKELNER

THE EXHIBITION of new astronomical instruments at the Hybernian Palace is mainly for experts. A layman will get nothing out of it, but laymen will come here to be entranced and to gaze in abandon at the strange flicking of numbers; will come as they would to a church of a god of the cosmic distances—a god that people have not thought up yet because without instruments of this kind their imagination simply did not reach that far. They will come for the sheer pleasure of looking at perfect instruments that do not serve war.

THE EXHIBITION at the Summer Palace of Queen Anne is mainly for laymen purporting to show the history of astronomy in very cleverly shows its poetry. Astronomers will come there for the pleasure of seeing the youth of their science—and of their own. I am pretty sure that most of them were not first attracted to astronomy by the charms of spectral analysis, but the sheer magic of the calculations of ancient Chaldean priests or Phoenician sailors.

The Queen's Summer Palace is fittingly occupied by astronomy. Not only because of the fact that Tycho Brahe's observatory must have been in the very place where the palace is; which other science is as aristocratic as astronomy? A true aristocrat

of the mind, astronomy is very close to art. Fittingly, it is adorned at the exhibition with ancient books—as a queen would be with ancient jewels; sextants, quadrants and astrolabiums which are centuries old differ from modern abstract sculptures only in the meticulous realism of their tiny parts; the modern sculptures to be found at the exhibition differ from the ancient instruments only in the complexity of the mathematical formulae they represent in space. A layman must read the informative table to find that what he had thought was simply a pretty decoration was in fact a model of the trajectories of comets and a meteorite. The Hybernian Palace is a church of cosmic distances—the Summer Palace is a Chapel of eternity.

Astronomy is like love—people have studied it since they learned to think—and yet they have plenty to study for megayears to come. Although—astronomy has, of course, achieved certain practical results. INAUGURAL CEREMONIES of all congresses in the world are so alike that one may say the only difference lies in who sits in the hall. For newsmen the occasion affords a field of observation, since journalists—like astronomers—must know how to observe and draw conclusions.

Le Nuncius Sidereus paraît à l'horizon

Les plus brillantes étoiles de l'astronomie se sont groupées à Prague. Seulement, en ce moment, la ville s'enjouit plutôt dans le sol que de s'élever vers les astres. Et pourtant Prague peut se vanter d'une glorieuse histoire de l'astronomie. A une certaine époque, elle a été à la tête des efforts portant vers les nébuleuses célestes l'éclat de la connaissance. Par exemple sous Rodolphe II (1583—1612). La cour impériale de Prague réunissait alors les plus brillants représentants de la science et des arts. Que l'astronomie y ait trouvé son compte, c'est surtout le mérite—d'un médecin. Le médecin de la cour impériale et principal médecin du royaume Tadeáš Hájek z Hájku (Hagecius, 1525—1600) poursuivait des recherches sur le microcosme humain et était le célèbre auteur de l'écrit *Dialexis*, traitant de l'étoile nouvelle. L'Italien Riccioli baptisa l'un des cratères de la Lune du nom de Hájek et Tycho Brahé (1546—1601) éleva à Hájek un monument plus durable que l'airain dans son traité *Astronomiae instauratae progymnasmatia*.

Hájek connaissait le Danois Tycho et c'est lui qui a le plus grand mérite que Tycho soit venu à Prague Tycho mourut en Bohême et son trépas eut lieu sous une heureuse constellation: il décéda après un festin chez le célèbre grand seigneur tchèque Petr Vok de Rožmberk.

Prague frayait le chemin à une nouvelle cosmologie et Johannes Kepler (1571—1630) y vint rejoindre Tycho Brahé pour un certain temps.

Mais les temps modernes se sont inscrits à Prague d'une manière pleine d'effets. Par exemple, par l'effet Doppler (plaque commémorative) sur la place Charles, par où a mené d'ailleurs au début l'écliptique de la

vie d'Albert Einstein vers la rue Vlácká.

Toutefois les rapports du peuple tchèque avec l'univers stellaire remontent à une époque encore plus reculée. La famille des seigneurs de Hvězda (de l'Etoile), plus tard appelés Sternberk, est l'une des plus anciennes noblesses de Bohême. Le nom des Sternberk s'est brillamment inscrit dans l'histoire de nos sciences naturelles. Jaroslav de Sternberk a, paraît-il, sauvé au XIII^e siècle la culture occidentale en arrêtant l'invasion des Tatars dans la bataille d'Olomouc. Si certains historiens, à la différence du brave soldat Chvéik, ont quelques doutes au sujet de la bataille d'Olomouc livrée par Sternberk, il n'en reste pas moins vrai que les astronomes tchécoslovaques ont de nouveau un Sternberk pour chef, Bohumil de prénom.

Il est également typique pour Prague que le poète tchèque le plus national et le plus pragois, Jan Neruda, ait écrit les Chants cosmiques et que la maison qu'il a habitée à Prague s'appelle d'après une vieille enseigne „Aux deux soleils”.

Les légendes et chansons du peuple pragois foisonnent d'étoiles. On chante

Les étoiles dansaient au-dessus de Prague

La Lune souriait au ciel...

Sur un panneau d'affichage à l'hôpital de Bulovka, un interne annonçait son mariage et le plasticien orna le faire-part de petites étoiles dont il parsema surtout le nom de la fiancée. Quelqu'un y ajouta bientôt la remarque spirituelle: „Astra sunt—mensēs desunt”.

Enfin nous devons informer nos lecteurs d'une anomalie astronomique de Prague. Au-dessus de Veleslavín s'élève le pavillon royal nommé l'Etoile (Hvězda). Il a été érigé au voisinage du champ de bataille de la Montagne blanche comme l'expression d'une époque que nous dénomons Les Ténébres. Vous avez donc devant vous une Etoile qui, de son temps, rayonnait des ténébres.

L. KHAS

Special Session on the Moon

At the request of the President of the Union, Professor MENZEL has kindly prepared the following short note on the special session of Commission 17 on the Moon which will take place on Saturday morning, August 26th, beginning at 8.45 a.m. in Room K of the House of Artists. Here is Dr. Menzel's brief text.

The National Aeronautics and Space Agency (NASA) of the United States of America has had an outstanding program of photographing the surface of the moon from five different orbiter space-craft. These moon probes have successfully relayed to earth several thousand photographs of both the near and far sides of the moon.

The photographs cover more than 99 per cent of the near side of the moon, with resolution about ten times greater than that obtainable under most favorable conditions with terrestrial telescopes. The first three orbiters recorded about 60 per cent of the far side of the moon, with resolution somewhat better than that of photographs from earth of the moon's near side. Orbiters 4 and 5 have greatly extended the coverage, including that of the lunar north and south poles. Orbiter 5 is still in operation.

NASA has also successfully soft-landed two surveyor craft on the surface of the moon. These have recorded the nature of lunar rocks and soil, as revealed by a flexible

arm and shovel, controlled from earth. This shovel actually dug a trench into the soil, which appears strong enough to support man and machines for actual manned exploration of the moon. The surveyor also photographed the total lunar eclipse of last April.

Many of you have seen NASA photographs in the exhibit room.

On August 26th at the special session Dr. William BRUNK and other NASA scientists will present

lantern slides from selected photographs taken by the Orbiter and Surveyor Probes. Interested members of other commissions and their guests are invited to attend this special session.

On this occasion, a limited number of maps of the far side of the moon, prepared specially for the IAU from the NASA photographs, will be given to astronomers attending the session.

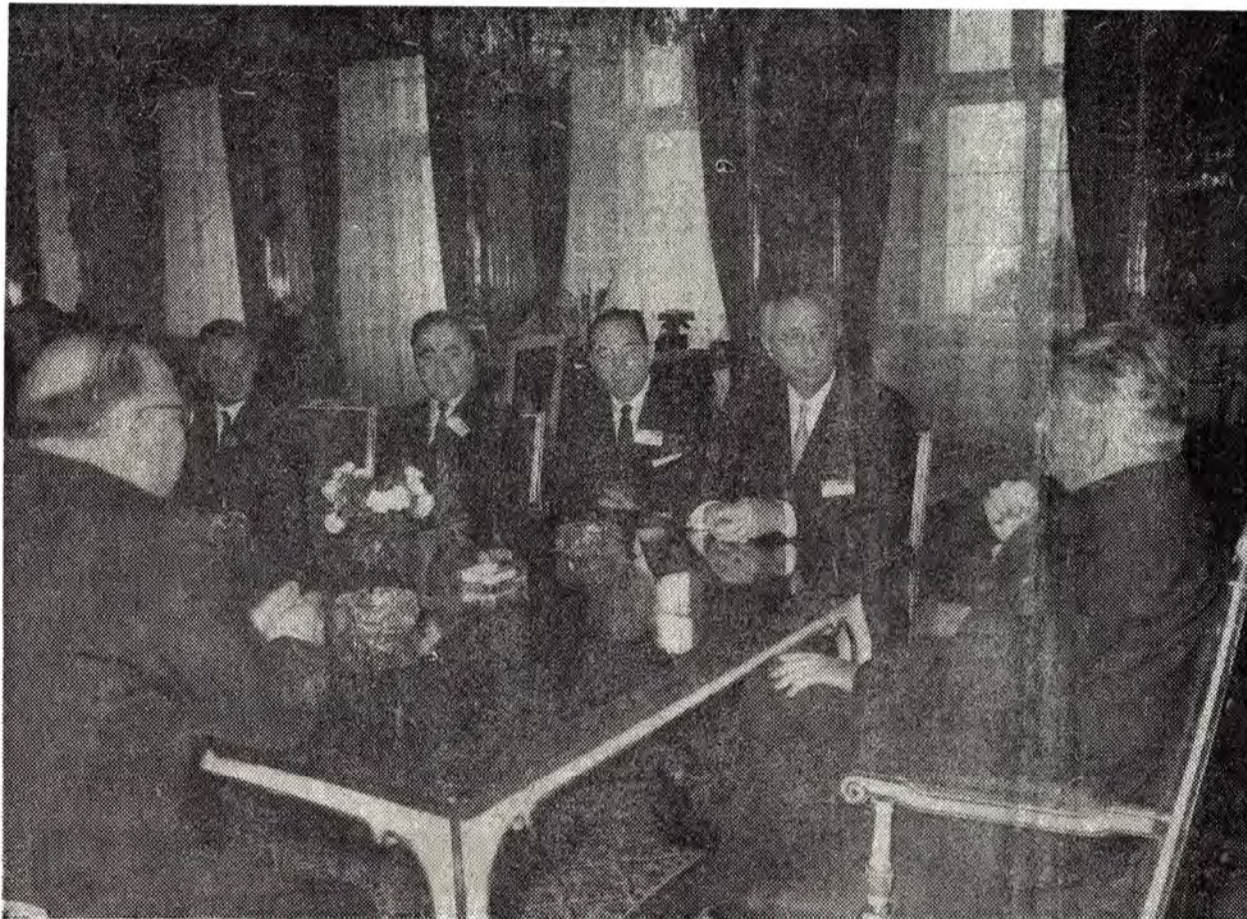
will be successful, the more so that this is the thirteenth assembly, which to be strictly scientific should be a lucky sign.

LE MOUVEMENT BROWN. Evidemment, c'est plutôt un astronome qui devrait décrire la réception au palais Cernin. Personnellement, je n'en ai pas appris plus long au lycée que le mouvement Brown, tandis que les orbites à la réception étaient bien plus compliquées. Seulement ils étaient produits par des forces tout aussi éternelles que la gravitation—l'attraction exercée par un bon coup de main, par des femmes rissantes, par une musique entraînante et par une table bien garnie.

L'astronome serait d'ailleurs bien mieux placé pour déterminer la grandeur des étoiles présentes. Le reporter n'a remarqué que les plus jeunes—celles qui brillaient le plus.

Un nombre très important d'astronomes ont honoré la réception de leur présence—je pense donc qu'il est inutile de leur raconter ce qu'ils connaissent mieux que moi. Il ne me reste donc plus qu'à leur souhaiter que les sessions du congrès offrent un choix tout aussi varié de plaisirs pour tous les goûts.

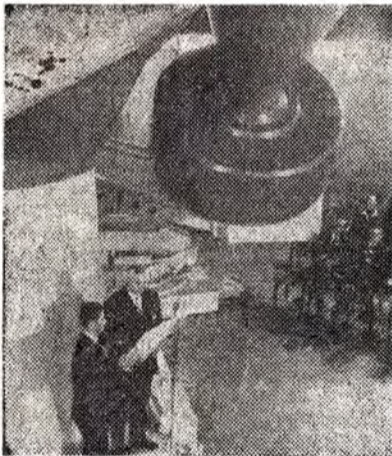
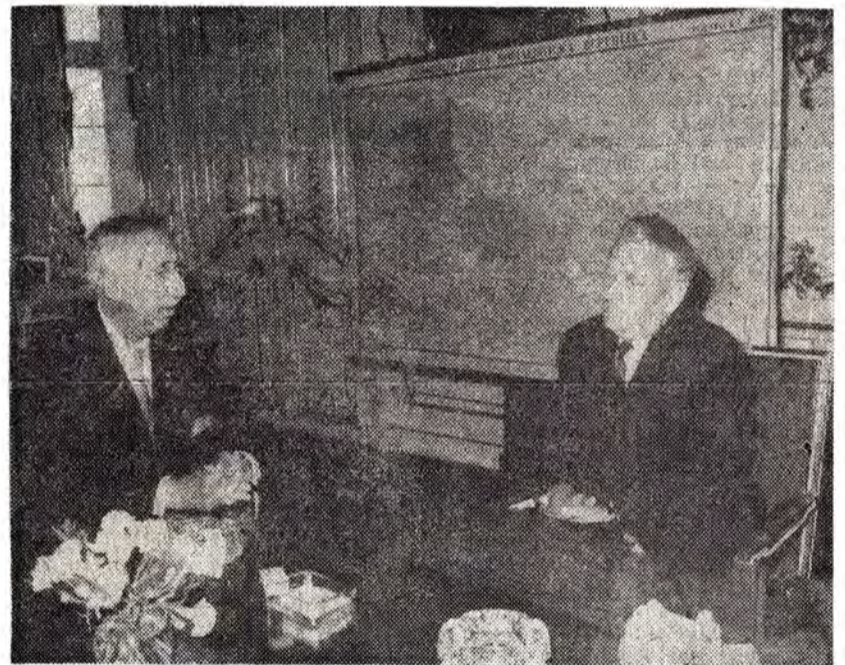
Gabriel LAUB



Le président préside la table à sa droite le Professeur SWINGS, le Professeur agrégé PEREK, l'Académicien AMBARTSOUMIAN et le Professeur FRICKE; à sa gauche le Professeur ŠORM

Le président de la République en compagnie des astronomes

Les deux présidents délibèrent. De quoi — nous n'en savons rien. Derrière M. NOVOTNY, la carte politique de la République socialiste tchécoslovaque; derrière M. SWINGS, une fenêtre donnant sur toutes les étoiles de l'univers



EVEN THE HIGHEST OVERLORD in the IAU does not look too big under the new telescope. Prof. Pol SWINGS of Belgium speaks French and English

Le sommet — trois présidents

Premier plan: à g., le président de la République socialiste tchécoslovaque; à dr., le président de la Société astronomique tchécoslovaque

Deuxième plan: l'Académicien Pol Swings, le président de l'Union Astronomique Internationale sortant

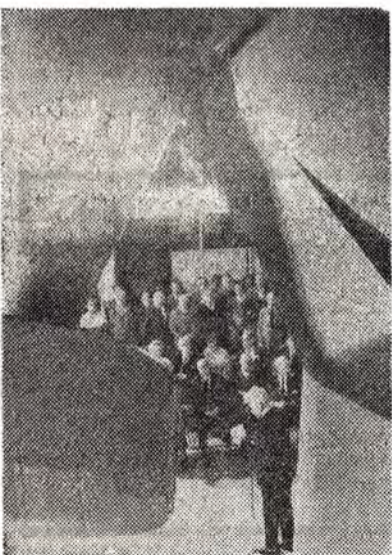
L'arrière-plan symbolise l'entrée de la Vierge à la place cédée par les vieux Lions: le Professeur agrégé Luboš PEREK

Photos ČTK

ONDŘEJOV 78" OPENED

Wednesday afternoon. The otherwise quiet road leading to the two meter Ondřejov telescope was lined on both sides with parked cars and busses. Some 200 persons gathered under the dome. Academician F. ŠORM expressed the wish for Czechoslovak astronomers to achieve remarkable results with this instrument. P. SWINGS said he hoped that the achievement gained with the telescope will be worthy of the fine tradition of the Czechoslovak school of astronomy. The chairman of the local government, F. ČERVINKA, emphasized the importance of the

technology of fine instruments for the scientific revolution. Professor GÖRLICH, the representative of CARL ZEISS, JENA, the prime contractor of the telescope, spoke about the conception of the two meter telescopes which have been produced in Jena in recent years. At 3 p. m. academician Šorm put the telescope into operation. After that Chief Designer A. JENSCH presented an elaborate technical explanation of the instrument which was supplemented by the chief of the Stellar Department of the Academy's Astronomical Institute, L. PEREK.



DR. STERNBERK of Prague welcomes the guests in English, French, Russian, German, Italian, Spanish, Latin and even in Czech. This hill, he says of the little Ondřejov peak, has a genius loci. Let us hope the young ones will add a locus genii Pictures by J. MARCO

OPENINGS are perhaps the most widespread human activity. Yes, I would say that without even having the proper statistics on hand. For sure many more things are opened than closed. Be that as it may, throughout my long experience I have never been at the start of operations of a telescope, not to mention a two meter affair.

For the whole hour's trip to Ondřejov I thought about the thing they are going to break a bottle of champagne over — as the owner of some Zeiss gadgets, although somewhat smaller since by largest camera lens has a focus of 135 mm, the only thing that was clear to me was that they wouldn't bang that bottle against the

mirror. Luckily at Ondřejov they put the champagne to much better use — they simply let the participants of the opening have a sip of it. These really deserved it — listening so nicely to the speeches for three hours. (Those who behaved less well and left the hall early didn't get a drop from the waiters; I confirmed this personally.)

NINE SPEECHES there were — according to the program — and thanks to the good organization all nine were said.

As a true child of the Meetings Era, my organism is completely immune to official addresses. Yet, even I understood this much: it's a good thing we're going to have a two-

meter telescope. This after all makes sense — an astronomer that doesn't have a proper telescope is like a man who is trying to solve a crossword puzzle over somebody's shoulder. Here in this way they put together their own puzzles very nicely from their own material, and in a pinch they can even lend it to someone for a solution.

I THINK IT'S QUITE CORRECT that for this they built a special observatory because if they stuck this gim-mick into someone's flat, he wouldn't even have room for a good shave, and his neighbors would mess up his floor how they would come to take a peep at it. By the way director Sternberk said it so nicely, that is

King Charles the Fourth from whose founding charter of Charles University he cited that the Czechs have to get everything that is needed for science. In other words if the Zeiss people had manufactured a two-meter telescope back in the fourteenth century, then good old king Charley would have bought it long ago, and the government could have saved us a nice chunk of money.

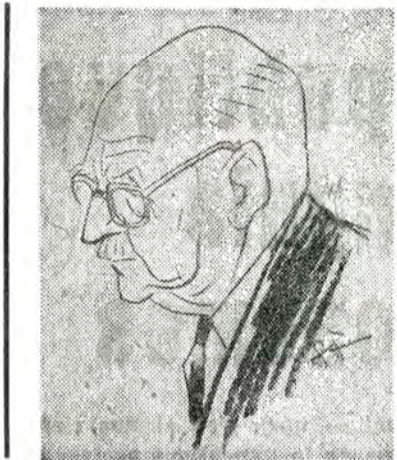
THE TELESCOPE ITSELF is such a great big tube, below it has sort of an immense rubber stamp. Perhaps there they have some kind of a weight so you can maneuver with the thing. Then again it's also possible that with this immense stamp they will confirm page 2

Exploring the Moon

PROFESSOR A. A. MIHAJLOV

Beginning from the end of last century photography was applied to this task with great success. The beautiful atlas of the Paris observatory prepared by Loewy and Puiseux must be mentioned. The observatories of Lick, Yerkes, Mount Wilson, Pic du Midi and even the 200 inch reflector of Mount Palomar contributed large series of photographs, some of which were used by Kuiper in his lunar atlases. On the base of photography a chart of the visible side of the Moon is prepared by United States Air Force on the scale 1:1000000 with a successful attempt of drawing contour lines and interval of 300 m.

Invited Discourse of Wednesday, August 23 (shortened)



Alexander Alexandrowitch MIHAJLOV as caught by Otakar ŠTEMBERA after lunch this Wednesday

This is our knowledge of the topography of the visible side of the moon. Its reverse side, comprising 41 % of its total surface has never been seen by a human eye. The more interesting and important are the first photographs transmitted to us by Luna 3 in 1959.

In one important instance the reverse side differed from the visible one—in the nearly total absence of the so called maria i. e. extensive dark depressions which occupy an area of about 40 % of the visible side. On the far side only one conspicuous rather small round sea was discovered—the sea of Moscow. In this connection I recall a most remarkable prediction made by Professor Franz of the Breslau observatory in his admirable booklet "Der Mond" published in 1906: "Auf der Rückseite des Mondes hinter seinem Nordstrand ein ausgedehntes, helles, kraterreiches Hochland ohne Meere jenseits des Nordrandes des Gürtels der Meere liegt," or in English: "On the reverse side of the moon behind the north-eastern limb lies an extended, bright, crater-rich highland without seas beyond the northern rim of the belt of seas."

The excellent photograph taken in 1965 by Sond 3 filled up the remaining part of the reverse side and confirmed the absence of extended maria.

The latest photographs transmitted by the American Orbiters showing many minute details also contain many crater chains and no maria. Instead they show depressions called thalassoids, differing from maria in being not dark, but strewn with many bright craters in this respect resembling the so called continents.

We come now to the problem of origin of the lunar relief.

We could expect some indication from a statistical study of lunar craters. If, as seems probable to me, a part of chiefly large craters, more irregularly distributed, are of volcanic origin, whereas most of the smaller craters were caused by the fall of meteorites, we could expect some difference in distribution or in some other instance of these two kinds of craters. However the recent statistical evaluation by Cross of the distribution of craters as counted on Ranger pictures has shown the absence of any difference in distribution between the vast range of sizes from 1 metre to 70 kilometres, that, according to the author proves their meteoritic origin.

On the other hand Fielder and Marcus found a very pronounced clustering of craters and also formations of crater chains, that can be explained only by an internal volcanic origin. This is confirmed by the chains revealed by Sond 3 and the Orbiters, which can be explained by the existence of rifts or fissures in the lunar crust through which gases or molten lava were erupted. The well known observation of the Pulkovo astronomer N. Kózyrev who obtained a spectrogram showing the escape of gases containing carbon from the central peak of Alphonsus

proves that volcanism is not yet dead.

It is impossible to discard the idea of volcanism when inspecting some of the pictures of the reverse side of the moon. On the map drawn from the photographs of Luna 3 the crater Ciolkovskij is clearly seen. On the image transmitted by Orbiter 1 this crater has a level dark floor with a composite central elevation. It looks very like a caldera on Java, where the central mountain is surrounded by a lake of dark solidified lava and the inner wall has a complex structure.

On the other hand there are many superimposed craters, when for instance a smaller crater is located on the rim of a larger one or a crater interrupts a regular mountain ridge, giving the impression of an external influence. Therefore it seems very likely that both factors played a substantial role in the formation of the moon's macrorelief, although we are yet unable to assign to which factor is due every individual feature. It is possible and even probable that in some cases a meteoric impact acted as a trigger eakening the moon's crust and facilitating at the particular place the eruption of lava. It was assumed that the moon was covered with a deep layer of dust formed in bygone ages through innumerable meteoric impacts. This was emphasized by the belief that the very strong monthly variations of temperature activated the disruption of rocks on the surface. A dust layer explained

We have every reason to look forward full of optimism and not follow the French philosopher Auguste Comte, who proclaimed in 1830 in his Cours de philosophie positive about the heavenly bodies that "nous ne saurions jamais étudier par aucun moyen leur composition chimique ou leur structure minéralogique..."

Well, the first — the chemical composition is being investigated well-nigh for a century, after the invention of spectral analysis. The second, the mineralogical composition of the Moon we are on the threshold of investigating in our earthly laboratories when we will receive samples of rocks from the Moon or in lunar laboratories, first automatic ones and subsequently by human investigators transported by spacecraft to the Moon.



WHEN THE NOBLE DOME started to turn, all eyes turned as well
Picture by Jindřich MARCO

From page one
the authenticity of or evaluation of the individual stars; we all know that today nothing is valid without a rubber stamp.
THE PRESIDENT OF THE ACADEMY of Sciences himself let her run. He pressed some kind of a button and that tube began to move from one side to the other like a grizzly bear jumping from one bar to another in the display window of a toy shop. Mr. president looked so happy and content until he was red in the face. MY WIFE says it so well: all men are just big boys and they always just want to play.
Then they still showed us that this

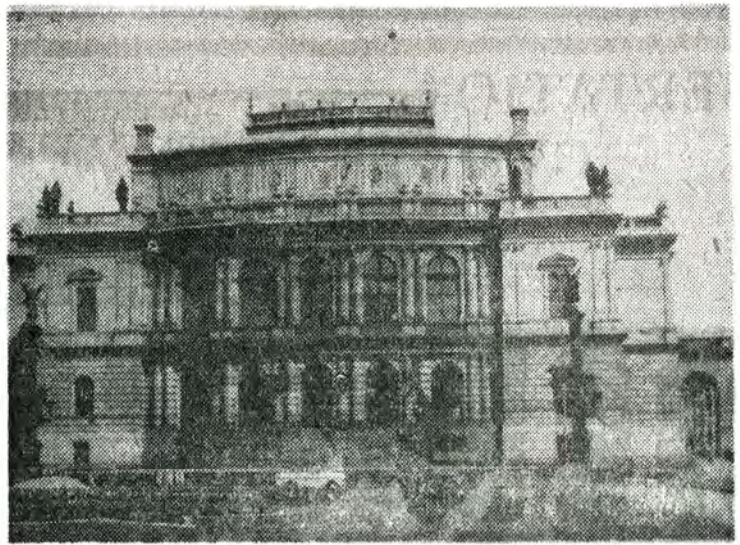
also the exceedingly small thermal conductivity and heat capacity of the outer stratum as revealed by the very rapid cooling of the surface during lunar eclipses.

However it was soon found that fine dust in a high vacuum especially exposed to great temperature fluctuations would coagulate forming grains of millimetre size without losing its low conductivity. Such a grainy surface is capable to bear a pressure of about 0.5—1 kilogram pro 1 cm² in conditions of lunar gravity, still having a small density owing to its porosity. Photometric and polarimetric observations are in accord with such a structure.

Volcanic tuff or porous lava are good approximations to such material, that by its dark colour corresponds to the small albedo of the moon. As radioastronomical observations had shown below this light and thermo-insulating layer lies a more dense rocky substance which undergoes during a lunation a much smaller variation of temperature. In many separate places were discovered "hot spots" that remain much longer warm during eclipses or at the beginning of night. Many of them coincide with the floors of craters. The explanation seems to be, that at these places the insulating layer is much thinner or even is absent so that we receive the radiation from the deeper, warmer and slower cooling stratum. However such a simple explanation is not sufficient to account for all observed peculiarities connected with the origin and subsequent history of these hot spots.

We have now touched some problems which have obtained a spectacular development owing to the astounding achievements of modern cosmonautics, especially of the soft landing of automatic stations on the moon, which transmitted to us close panoramic images of the lunar surface. This was first accomplished by Luna 9 on 3 February 1966. After this followed the American Surveyor 1 and the Russian Luna 13.

The panoramas obtained confirmed the absence of dust, the grainy or porous structure of the outer surface, sufficiently resistant to bear the weight of the station itself and, in future, to enable a cosmonaut to walk on the moon without crushing the surface or sinking into the dust.



K MAISON DES ARTISTES communément toujours encore appelée Rudolfinum (architecture néo-Renaissance exécutée par les créateurs du Théâtre national, Josef Zitek et Josef Schulz). Construite de 1876 à 1884 pour abriter une galerie des beaux-arts et un conserva-

toire de musique. Ensuite pendant vingt ans siège du Parlement, puis de nouveau remise aux artistes. Aujourd'hui on y trouve l'Orchestre philharmonique tchèque, le Conservatoire de musique d'Etat et l'Académie des Arts. La Salle Dvůřák est mise à la disposition du Congrès

British-Australian 150-inch reflector

In April of this year the Australian and British Governments agreed to cooperate in building and operating a 150-inch telescope to be erected at Siding Spring Mountain, Coonabarabran New South Wales, Australia. The design of the telescope will follow closely that of the instruments being built at the Kitt Peak Observatory. A Joint Policy Committee consisting of three Australian and three British representatives will supervise the construction. The Australian representatives are Dr. E. G. Bowen, Chief of the Division of Radiophysics, C.S.I.R.O., Professor O. J. Eggen, Director of Mount Stromlo and Siding Spring Observatories and Mr. K. N. Jones of the Department of Education and Science and the British representatives are Professor H. Bondi, Chairman of the Science Research Council Policy and Grants Committee, Sir Richard Woolley, Astronomer

Royal and Mr. J. F. Hosie of the Science Research Council.

It is expected that the order for the mirror blank will be placed late in 1967 and on site preparation for the construction of the dome will begin in 1968.

Siding Spring Mountain is a station of the Mount Stromlo Observatory, Australian National University and already contains 4 telescopes, including a 40-inch reflector.

A telescope subcommittee, consisting of Professor R. Redman, Cambridge, Professor S. C. B. Gascoigne, Mount Stromlo, Mr. H. Wehner, Mount Stromlo and Mr. J. Pope, Royal Greenwich Observatory, has been active since April 1967 in preparing recommendations on design features with the help of the Kitt Peak astronomers.

O. J. OGGEN,
Mount Stromlo Observatory
Canberra, Australia

FAITS DIVERS *

COMMISSION 44

August 23, morning; 44. Dr. Teske of Michigan University reported on some interesting results obtained in measuring x-radiation by the satellite OSO. Especially remarkable is the finding of X-emissions from all, even the smallest, flares which shows the common essence of these sources.

In this connection, we would like to say that it is unfortunate that detailed results from similar measurements by artificial satellites are not made public systematically, or that, at least, they are not placed at the disposal of all observatories that are interested in the processing of similar measurements. It is clear that the measuring system Real-Time-Telemetry cannot replace detailed records obtained from an uninterrupted record procured by satellites. In this sense, discussions on the mutual cooperation between commissions 10 and 44, which are on the agenda of the Congress in the next few days, should continue. The utilization of all similar satellites (not only OSO but also, for example, the Kosmos series) for similar research would undoubtedly enrich world science in a short time. VA

COMMISSION 7

The restricted problem of three bodies has been the main topic at the session of commission 7 (celestial mechanics) on 23. Aug. This problem, although very well discussed by the classics of celestial mechanics of the past is of still growing interest. The lectures of GIACAGLIA, DEPRIT and KOZAI showed that the problems of periodic orbits in the several commensurability cases and the questions of their stability are important for

the study of the motion of natural as well as artificial bodies in the solar system. S

COMMISSION 42 — ETOILES DOUBLES PHOTOMETRIQUES. Mercredi matin s'est réunie pour la première fois la commission présidée par J.-E. MERRILL. La discussion concernait surtout les affaires propres et les questions d'organisation de la collaboration à la base de l'expérience acquise pendant la période précédente. Le rapport sur l'activité du comité d'organisation a été présenté par son président M. PLAVEC et le rapport sur l'activité du Joint working group avec la commission 30 par A. BATTEN. En vue d'une étude complexe des étoiles doubles photométriques il est nécessaire d'approfondir la coopération dans le domaine de la spectroscopie et photométrie. K. KORDYLEWSKI a informé sur l'édition augmentée des éphémérides des étoiles binaires à éclipse, une publication très utile pour les observateurs qui paraît à Cracovie. V. P. CESEVIC a mentionné la publication du nouveau Catalogue des étoiles variables. T

RADIO PRAGUE [638 kilocycles, 470 m] broadcasts on weekdays the program Welcome to Czechoslovakia, [news, weather forecast and information of special interest to the foreign tourists] on alternate days in English and Russian or German and French. (8:45—8:55 A.M.)

TWO FILMS will be projected in room A 158 on Monday, August 28, at 17.30. Dr. T. Gehrels will present a 20-minute documentary film of the Polariscopes Balloon Program, and Dr. R. Musson-Génon promised to show a film on Un observatoire à 40 km de la terre.

TEAM OF ALL THE STARS

SIR RICHARD WOOLLEY, the Astronomer Royal, will in future be involved with spheres nearer to earth. He has been elected president of the village football club near the Royal Observatory at Herstmonceux (population: 1,922), in Sussex.

The 61-year-old astronomer, a lifelong Portsmouth supporter, also plays cricket for the Observatory team. "But I have never played Association football," he said. "The Herstmonceux team are surprisingly good for a small village."



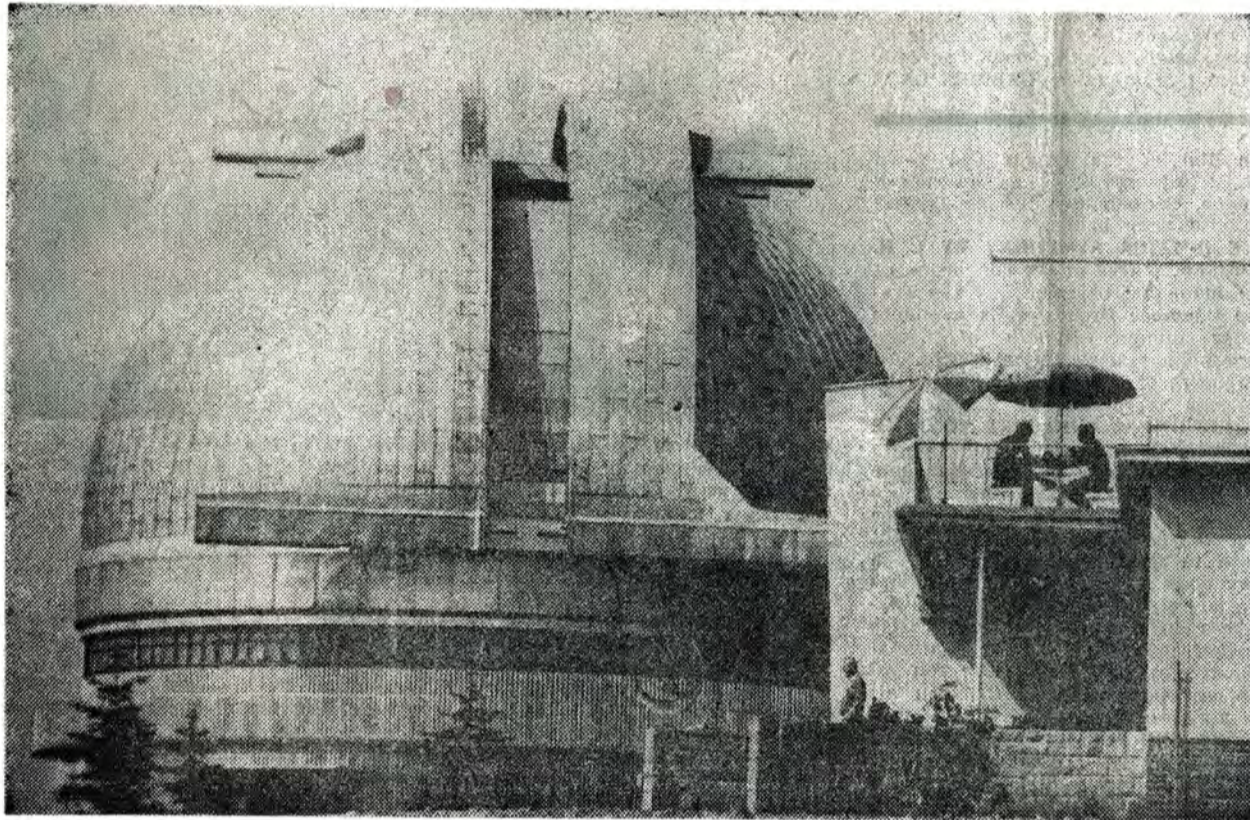
DEEP-SKY WONDERS

PROFESSOR AND MRS. ZDENĚK KOPAL take pleasure to announce the marriage of their daughter ZDENKA ALENA to DEAN FRANCIS SMITH, of Stanford University, on September 1st, 1967, 11. a. m., at the main altar of the Saint Vitus Cathedral, Prague castle.

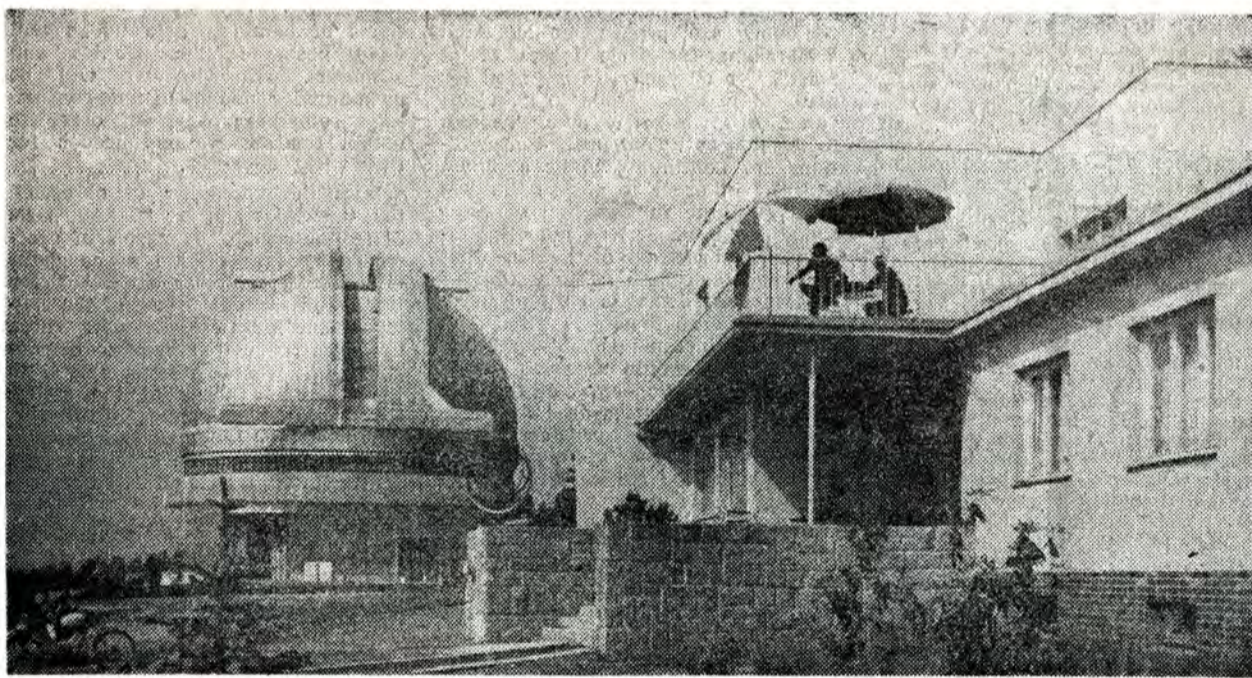
PRAHA 5, U Pernikářky 7, Czechoslovakia Greenfield, Parkway, WILMSLOW, Cheshire, England

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Gabriel LAUB



PHOTOGRAPHY NEVER TELLS LIES — but what is the distance between the dome and the staff building? (Correct answer: about 100 metres)



IT'S A REAL PLEASURE for me to give you a minilesson on the most indispensable Czech words and expressions, although I am convinced that with the aid of a mathematical model, a bit of Latin, possibly a few simple sketches, the scientist will always be able to make himself understood, even though the problem might involve the purchase of a pair of Frankfurters (párek) with a double portion of mustard (hořčice); the latter word is for the foreigner without prolonged preliminary practice by the Demosthenes method just impossible.

WORDS AND EXPRESSIONS:

Hello — Dobrý den (dóbrí děn) for teenagers Ahoj (áhói) like ship ahoj, the original greeting of the sailors, and hence very common in landlocked Czechoslovakia.

Goodbye — Sbohem (sbóhem) which is a literal translation, but which we use only when we don't wish to see the particular person any more. Otherwise we use Na shledanou (náshledanou) the exact equivalent of the German Auf Wiedersehen — I'll be seeing you.

Please — prosím

Thank you — Děkuji (something like dyekooyi)

Excuse me — just say: "pardon", but with the accent over the "O"

as well; everyone will understand it

The expression "I Don't Speak Czech", we'd advise you to say in the original, otherwise you'd logically get to a contradictio in adjecto and practically into a situation in which you'd have to explain how it is that you don't, when you do—and in Czech you'd have a hard time doing that.

How do you say—jak se řekne, or the word that's easier to say: jak se jmenuje (yak se menuje). More practical still is to point to the object and have a questioning look.

Yes — Ano

No — Ne

I don't understand — Nerozumím (nérothoomeem). Of course, it's sufficient to shrug your shoulders and shake your head. (Guests from Bulgaria and Turkey please note: If a girl nods her head, it doesn't mean "no".)

How much does it cost? — Kolik to stojí (kólik to stóyi).

Numbers: jeden (yeden) — one; dva (dva) — two; tři (approx. tshi) three; čtyři (something like shtiri) — four; pět (pyet) — five; šest (shest) — six; sedm (sedm) — seven; osm (osm) — eight; devět (děvyet) — nine; deset (děset) ten, dvacet (dvá-tset) — twenty; to je moc ("o-je mots) — that's too much.

A LITTLE RESTAURANT TALK:

Mohl bych dostat kávu s mlékem? (Mol bikh dóstat kávoa s mlékem?) — Could I have coffee with milk?

Ne. — No

A čaj s mlékem (a tchay s mlékem?) — And tee with milk?

Ne.

Proč? (protch) — Why?

Mléko prosím není. (Mléko prósim něni) — There's no milk, please.

If you want to carry on a more complicated conversation with the waiter, we'd advise you to go to a restaurant of a higher category where the waiter can tell you the same thing in English. Of course, you won't get any milk because the vast majority of Czech men are convinced that since beer (pivo) brewing was discovered (the word pivo you already know, I am sure) that milk can be left for the children.

In conclusion of today's lesson, just a sample of a SCIENTIFIC CONVERSATION.

Slečno, nechcete se se mnou podívat na hvězdy? (Slětchno, nekhtsete se semnou pódivat náhvyezdi?) Young lady, wouldn't you like to gaze at the stars with me?

If you are interested in more lessons, please write to: Nuncius Sidereus.

GABRIEL LAUB

The Koperniks visit Ondřejov

When the visiting astronomers were returning to Prague, the local bus conductor said: "Oh, the Koperniks are going back!" The English-speaking people would certainly prefer the form Copernicus, but please tell us how to form the plural — should it be Copernici?

HIGHLIGHT from Dr. Šternberk's Speech at the New Ondřejov Telescope

Our astronomers have been working at observatories throughout the world—with the support of the International Astronomical Union, UNESCO or by special agreement with academies—from Japan and Australia passed Europe all the way to California.

Of course, this was not a situation which could permanently characterize our contribution to world astronomy. In this branch too goals must be attained

which were already set centuries ago by the great founder of Prague University in its charter:

"...so that the faithful inhabitants of this kingdom ever thirsty for the fruit of good art must not beg for alms abroad, but have a table for pouring it prepared in their own kingdom... so that not only they may not be forced to go to the end of the world in searching for science and beg in foreign nations to realize their aspirations but that they may themselves have the honour to be able to invite others to partake of this pleasant scent and participate in this delight."

Editor,
Nuncius Sidereus:

22 August

The friendly reception we are all offered by the people of Prague makes us wish to greet them in their own language. Would you use your columns to print ten phrases and their equivalents? Perhaps something like these:

Hello, Goodbye
Please, Thank you
Excuse me!
I don't speak Czech!
How do you say...?
and a little restaurant talk.

Numbers.
Yes, No
I don't understand.
How much does it cost?

8367

Sincerely
P. H. Morrison



THE CASSEGRAINIAN SPECTROGRAPH looks on, when the inaugural speech of F. Šorm, the President of the Czechoslovak Academy of Sciences, is being translated into English

NOUS VOUS FERONS VOLONTIERS un petit cours de tchèque, bien que nous soyons persuadés qu'un savant arrive toujours à se faire comprendre au moyen de formules mathématiques, d'un peu de latin, le cas échéant d'un petit croquis schématisé sur deux à trois feuilles, même s'il devait s'agir de l'achat d'une saucisse (parek) avec double moutarde (harch-tchitsé). D'ailleurs ce mot, sans une préparation préalable par la méthode de Démosthène, n'est pas dans les moyens d'un étranger.

VOCABULAIRE

Bon jour — Dobry dène (pour les teenagers Ahoi, ce qui à l'origine est une salutation de marins, donc utilisée dans un pays continental tel que la Tchécoslovaquie) Dieu — Sbohème, ce qui est une traduction mot à mot, mais nous ne l'utilisons qu'au cas où nous ne voulons plus revoir la que personne en question. Dans le cas contraire il faut dire Nashleda-noou
S'il vous plaît — Prosim
Merci — Diekouï
Pardon — dites tranquillement Pa-

don, tout le monde vous comprendra

Quant à la tournure «je ne parle pas tchèque», il vaut mieux la dire dans votre langue, autrement cela donnerait lieu à des quiproquos, car on ne comprendrait pas que vous ne parlez pas tchèque puisque vous parlez tchèque...

Comment dit-on...lak sé rjek-né... Evidemment, il est plus commode de désigner l'objet du doigt et de demander T o? (Mais avec l'intonation d'une question!)

Où — Ano

Non — Né

Je ne comprend pas — Nerozu-mim. Bie sûr, il suffit de hausser les épaules et de hocher la tête.

Combien? — Kolik to stoi?

Numéros cardinaux: iéden, dva, tři, chtirji, piet, chest... deset, dvatsét, — mots (trop), to ié drahé (c'est trop cher)

PETIT ENTRETIEN AU RESTAURANT:

Mohl bikh dostat kavou s mlékem? — Pourrai-je avoir un café au lait?
Ne. — Non.

A tchaj s mlékem? — Et un thé avec du lait? — Ne.

Protch? — Pourquoi?

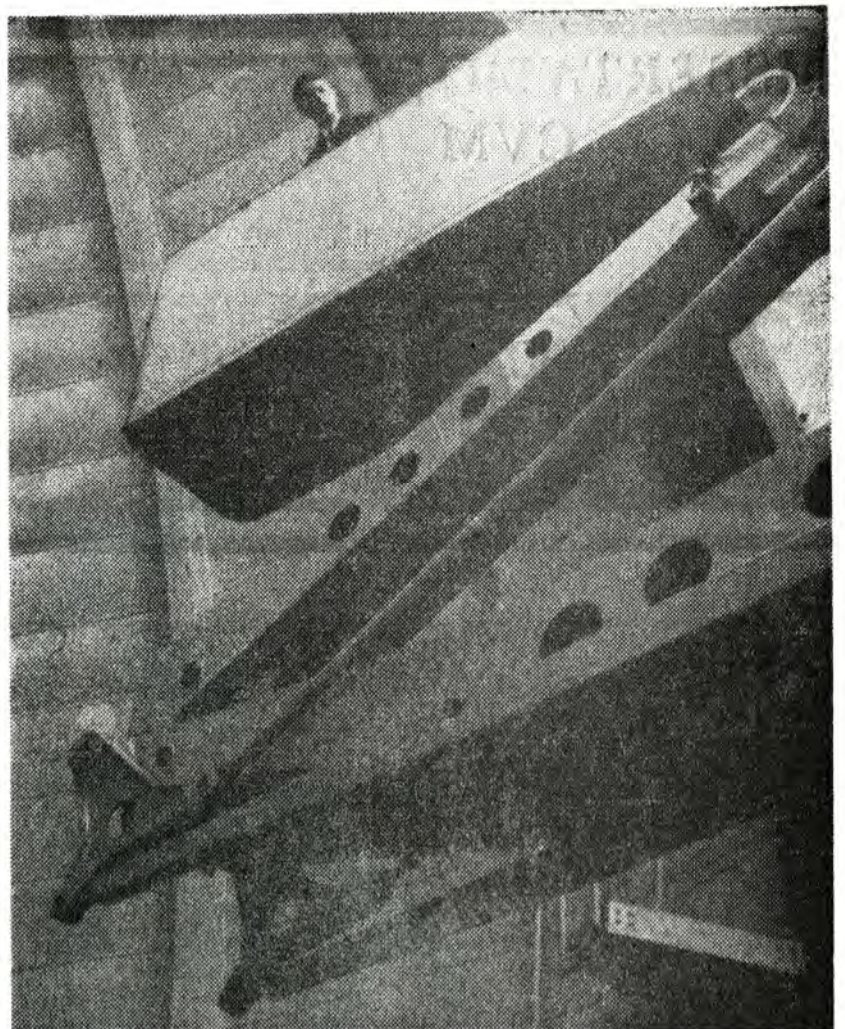
Mléko prosim není. — Il n'y a pas de lait.

Si vous voulez vous entretenir plus amplement avec les garçons, allez plutôt dans un restaurant chic où les maîtres et garçons pourront vous dire le même chose en anglais ou en français. De toute façon, le lait vous ne l'aurez pas, car la majorité écrasante des Tchèques sont convaincus que depuis le jour où a été inventée la bière (pivo — vous connaissez certainement ce mot), on peut tranquillement laisser le lait aux enfants.

Pour conclure noire leçon d'aujourd'hui, voici un exemple de DIALOGUE SPÉCIALISÉ:

Slechno, nekhtielá bisté sé dnéssé sé mnaou podvat na hvězdi? (Mademoiselle, vous ne voudriez pas cette nuit aller — avec moi — regarder les étoiles?)

Si vous vous intéressez à la suite du cours, veuillez l'annoncer à l'adresse: Nuncius Sidereus. GABRIEL LAUB



THE GIRAFFE of the platform for observations in the primary focus of the Ondřejov telescope is the most attractive object in the dome. Unfortunately, only two astronomers at a time can enjoy floating 13 metres above its floor.

The Old and the New

At this time when the General Assembly of the IAU is being held in the old city of Prague in order to discuss the newest findings and needs in all the fields of astronomy and astrophysics, one's thoughts naturally go to the role which is played in astronomy and astrophysics by the intermixing of old and new observations, of old and new observing techniques and reduction methods, of old and new theoretical discussions. In rightful enthusiasm about new observing possibilities from rockets and satellites and new powerful means of computing or recording observed data of various sorts automatically, one is inclined to pass by the older methods of observing and the older types of observing program as well as many of the older theoretical studies with a considerate, but inattentive eye. However, to do so is not to serve our science in the very best way.

The two fields of observational astronomy which one thinks of immediately when one considers the old and the new are proper motions and visual binaries. Time lapses of at least 25 to 50 years are required for material in these fields to gain full value. Are we really doing enough to see that sufficient precise observations are continuing to be obtained skillfully in order to ensure that we shall gain the fundamental observational data about the masses, distances and motions of the stars that we know can be obtained? One of the rigorous demands on long term observing programs is that no changes in method should be introduced which would result in undefinable systematic errors of the size of the hoped for measured displacements. The second problem which should be, and most certainly is, receiving attention is how to introduce automatic measuring and reduction techniques so as to alleviate the burden of turning good raw observations into good measured facts. That some fine steps in the desired direction have been taken can be seen by reading the Draft Reports.

A slightly younger field of study, the analysis of stellar spectra, is another field in which one must consider seriously the relationship between the new possibilities for observing and the old. The new needs for theoretical studies and the old, the new demands for practical physical knowledge about the interaction between radiation and atoms, ions and molecules. Great steps forward in the design and construction of fast, high-resolution spectrographs have been made in the last 10 years. One can now begin to obtain spectra of a quality adequate for analysis by the best theories of stellar spectra. Line profiles as well as equivalent widths can and must be used as input data to the theories. These possibilities exist, but what real use has been made of them so far?

High-dispersion stellar spectroscopy requires long hours of telescope time, but the available time per astronomer with the great spectroscopic telescopes has become less and less. We are not in so good a position as some 25 years ago, even though the spectrograms obtained are generally much more suited to the needs for theoretical interpretation. Furthermore, it is evident that many of the most interesting stars from a physical point of view are variable. It is a serious problem how to ensure that adequate coverage in time be obtained.

On the practical side of obtaining line profiles and equivalent widths from the spectrograms some progress

in automation has been made. Much more is within our grasp. It is essential to develop rapid digital methods of handling data which will yield observed line profiles and strengths. Otherwise we will be buried under mounds of time-consuming preliminary work in order to obtain the observations needed for theoretical advances.

Does the possibility of observing the ultraviolet and far infrared parts of stellar spectra by means of spectrographs carried into space make unnecessary further study of the long-known standard part of the stellar spectrum? Certainly not. These observations will serve to demonstrate physical conditions chiefly in the outermost parts of the stellar atmosphere. They cannot be fully exploited without understanding obtained from study of the spectral range available with ground-based equipment.

In the case of stellar spectra, the availability of new means of observation puts even more pressure upon obtaining adequate observations from the ground. The new needs demand a new appraisal of the old in stellar spectroscopy.

In theoretical studies the old furnishes the apex of an ever widening cone of new comprehension and understanding. In the case of the theory of stellar spectra, to take only one example, during the last 10 to 15 years a great blossoming of results based upon the idea that the interactions between radiation and atoms, ions and molecules may be handled as if the radiation and matter were in local thermodynamic equilibrium has taken place. Comparison of the results for the continuous spectrum with observation has resulted in some great successes; comparison of theoretical results for lines with observed data has had less success. In fact, it is becoming increasingly clear that to understand the line spectra of stars we must go back to the old discussions of the first part of this century and attempt to develop theories not based on consideration of thermodynamic equilibrium. Then by using the newest techniques in physical and mathematical theory we shall surge forward.

These remarks by no means exhaust the subject of the old and the new in astronomy and astrophysics. They will have played their part if they alert us, each in his particular field, to the age-old truth that the new has greatest value when coupled with the finest of the old.

ANNE B. UNDERHILL
Sonnenborgh Observatory, Utrecht

Cosmics

EVERYWHERE AND NOWHERE

[our apology to THE OBSERVATORY]

"Spinrad and E. H. Richardson (Dominion Astrophysical Observatory) have spent an upper limit to the amount of molecular oxygen in the visible atmosphere of Venus."

(Observatory Reports, The Astronomical Journal, 69, 1964, 674)

Astronomers should be strictly prohibited to spend anything from the atmosphere of Venus, and if, they could perhaps be satisfied with the lower limit.

DEEP SKIES WONDER

[with apologies to the SKY AND TELESCOPE]

The following advertisement appeared recently in the Czechoslovak astronomical monthly THE REALM OF STARS: Exchange a 10" astronomical refractor for a new car Skoda MB 1000. (Liquidation of the observatory.)

Evidently a car is easier to liquidate than an observatory. Incidentally, shall we get a new Rolls Royce for our new 78"?

WORKING KNOWLEDGE OF CZECH

A group of our charming lady guests discussed the troubles with languages. They agreed that it would be useful to know at least a few sentences in Czech, but that it was too difficult to learn it. "Why", said a young lady, "I do know one sentence in Czech. I have remembered it all the time since the Czech soldiers were in England during the World War Two. Only I do not know what it means."

And she said with a wonderful accent: "Miluji te, broučku". Which means: "I love you, my little beetle."

We hope you enjoy our Final Programme to the full. Please look up page 18, paragraph 2, Festival Concert. Quote: "Any tickets are needed."

Did you take the tram tickets with you?

"Everyone can take place where he like."

We hope you did occur somewhere, but inside the concert garden.

What will not be in the Proceedings of the General Assembly

"... Our Standing Committee was very active. It would be more so, if I'd write more letters, and still more, if all members of the committee would reply to those letters which I did write..."
from A. Batten's report

"... when we met in Hamburg, we elected the chairman of the group but neglected to elect the members..."
from M. Plavec's report

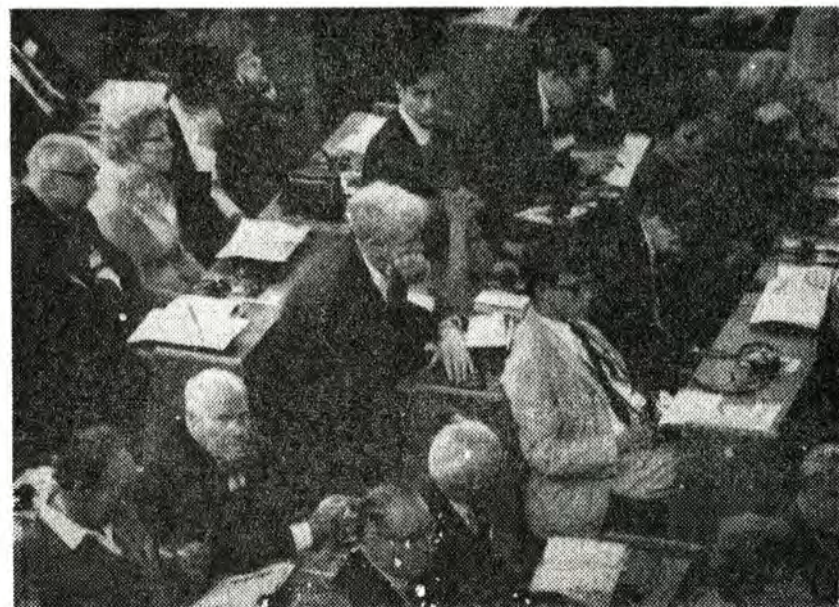
These statements have not received general authorization. They are edited by LSD — the LOCAL SOCIETY FOR DESTRUCTION, INC.

FAITS DIVERS

Nuncius Sidereus Recommends

STAMP COLLECTORS should not miss visiting the specialized shop serving philatelists called POFIS at Pfkopy 13 (near the lower part of St. Wenceslaus Square). Besides a wide selection of stamps, you can also purchase there the First Day Cover issued by Czechoslovakia to mark the

Opening of the IAU General Assembly in Prague. The stamp, which has a denomination of 60 hellers, depicts the dome of the Ondřejov 78" telescope with a cross section of the telescope itself and symbolizes the exploration of the universe. The First Day Cover depicts



Quicquid nitet notandum — Prof. MARTYNOV observed this motto even at the General Assembly (and what was glittering was only the lens of the camera, not the flash light!) Photo by Jindřich Marco who hates to flash

the dial of the Prague Old Town Clock. At POFIS you can speak French, German and Russian as well as with your hands.

THE D-MAJOR SYMPHONY BY J. H. VORIŠEK, played at the conclusion of the Inaugural Ceremony by the Prague Chamber Orchestra, is available under number DV5879 of Czech Supraphon records. Price 36 Kčs. All Prague record shops can be found by the sign Supraphon.

ASTRONOMERS WHO LIKE TO TAKE SNAPSHOTS and who would like to create their own pictorial souvenir of Hradčany (Prague Castle) are warned by our staff photographer that the Vltava embankment right close to the Law Faculty is not a very good spot for a nice view. You are advised to walk several hundred meters in the direction of Charles Bridge, possibly to the National Theatre, because from there you get the best view of Prague Castle in all its majestic beauty.

BOOKS AND PUBLICATIONS in major world languages are sold by the special shop called "Cizojazyčná literatura". The address Pfkopy 31 Ask for Anichen or the Big Boss — he speaks 42 (forty two) European languages.

SOUTHERN HEMISPHERE. There will be a meeting of Southern Hemisphere Astronomers and others interested in the Southern Hemisphere Bulletin in Room A94 on Saturday, August 26th at 11.30 hours. J. SAHADE, R. H. STOY

COMMISSION 7 — An informal meeting about grazing occultations of stars by the Moon will be held today, 17:30 to 18:30 in room A134. Slides showing the U.S. Naval Observatory's special equipment for making these observations will be shown. DWD

COMMISSION 16 — In the afternoon session A. DOLPUS projected a photo of the new tenth moon of Saturn. The new satellite is very close to the ring, and its existence had been theoretically predicted on the basis of the distribution of gaps in the Saturn ring. The gaps correspond to orbital periods which are commensurable with the orbital period of some satellites similar to the gaps in the distribution of orbits of asteroids with respect to the planets. Q

COMMISSION 27 — An informal meeting of astronomers interested in FLARE STARS will be held on August 25th at 17.00 hours in room A134. VO

COMMISSIONS 33 AND 34 (Structure and Dynamics of the Galactic System, Interstellar Matter and Planetary Nebulae) on Thursday, August 24th in the morning took up the central theme—spiral structure of galaxies. Extensive papers on Observed Features of Some External Galaxies (S. ROBERTS) and Observational Data on Spiral Structure in the Galaxy (A. BLAAUW) were followed by shorter contributions, of which Galactic Structure As Shown by A New Type of Stellar Aggregates (J. ISSERSTEDT, T. SCHMIDT-KALER) attracted special attention. J. Isserstedt discovered on the Palomar Sky Survey—prints, in the course of a joint investigation on dark clouds, a new type of stellar aggregates different from clusters and associations. The stellar rings appear as regular elliptical aggregates of stars with the ratio of the axes mostly between 1 and 1.7. The thickness of a ring is usually 1/25 of the minor diameter, the star density on the average four times higher than that of the surrounding field. A complete survey yielded a total of 1002 stellar rings. It appears that the discovery of Stellar rings which ties on to the Ambarcumjan Star Chains could be a major contribution towards a clarification of the highly topical question of the origin of stars.

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Mass-loss from Stars

We know that completely degenerate configurations are not stable if their mass exceeds the Chandrasekhar limit of about 1.4 solar masses. Let us assume that no loss of mass occurs during the life of the massive stars. We know that the core endures a series of contractions and heating each time a different nuclear fuel is exhausted. In the end, endothermic reactions with transmutation of iron to helium would occur, accompanied by gravitational collapse and enormous heating of the part of the star still containing nuclear fuel capable of freeing nuclear energy. This process would cause a sudden liberation of energy much greater than that which the star can dissipate from its surface. Hence we believe that this sequence of events will end in a supernova explosion with a mass-loss sufficiently great to reduce the star to a point below the Chandrasekhar limit. But we estimate that deaths of stars of mass equal or greater than 1.5 solar masses are about 100 times more frequent than supernova explosion. Hence the problem arises how and when stars of mass higher than 1.5 solar masses lose their excess material before becoming white dwarfs.

Spectroscopic observations show us that several classes of stars pre-

than the escape velocity. However she suggested that a great mass-loss can take place if we alter "the distance from the stellar surface at which the material has motion, and the size of the motions themselves".

In support of this suggestion she observed that in the spectra of the Wolf-Rayet star HD 192103 "strong absorption only occurs for spectral lines which are strengthened when the material is far from the stellar surface, and that these lines show velocities of expansion of the order of 1200 km/sec. So the picture is that the Wolf-Rayet stars are composed of an inner atmosphere which forms the emission spectra chiefly, and an outer region at quite a distance from the star, which usually doesn't possess enough material to produce certain absorption lines".

We have extensively quoted the statement by Miss Underhill because recent spectrographic observations of early-type supergiants in the far ultraviolet made from rockets have strongly supported her idea. These rocket observations are interpreted by D. C. Morton who finds that the resonance absorption lines of Si IV and C IV in the spectra of three early-type supergiants and one giant show expansion velocities ranging from -1400 to -3800 km/sec, indicating a mass-loss from the outer atmosphere.

Rocket spectra of the B dwarfs show that these stars do not have such a high velocity mass-loss. Stationary emission lines of C IV and Si IV are also present in these UV spectra permitting us to explain these stars with a model similar to that proposed by Miss Underhill for the Wolf-Rayet stars.

Another recent observation of a mass-loss phenomenon, one of explosive type, the discovery of changes occurring in the spectrum of CH Cygni (M6), has been announced by Armin Deutsch. Photoelectric color determinations of this star, made by Bruno Cester of the Trieste Observatory, have shown that the color in the violet is comparable to that of a G star, and in the ultraviolet to that of a B star.

We are planning to organize a second astrophysical colloquium in Trieste in July or September of 1968 with a preliminary list of subjects for discussion as follows:

OBSERVATIONAL EVIDENCE OF MASS-LOSS: Spectroscopic observations of early-type giants and supergiants, Of, Be, P Cygni stars, late-type giants and supergiants. Mass-loss from T Tauri stars. Mass-loss from Wolf-Rayet stars. Mass-loss from planetary nebulae. Mass-loss from novae and supernovae. Mass-loss and explosive events in late-type variables. Steady mass-loss from main sequence stars. Stellar and solar winds. Loss and exchange of mass in close binary systems. Ultraviolet observations from rockets and satellites. Correlations between mass-loss and luminosity, luminosity and rotation + macroturbulence, macroturbulence and microturbulence.

THEORIES ON MASS-LOSS AND STELLAR EVOLUTION: Mechanism of steady flow and eruptive mass-loss. Influence of rotation, macro and microturbulence, magnetic fields on mass-loss. Mass-loss during the evolutionary path of stars. Influence of mass-loss over chemical composition of advanced stars. The case of hydrogen-poor stars.

All those who are interested in this colloquium can contact me here in Prague or write to me in Trieste. Any suggestions concerning the topics to be discussed at this colloquium will be most welcome. A more definite program and date will be announced in a circular which will be sent before the end of the year to astronomers working in this field and to all others who express an interest in the Trieste colloquium.

Prof. MARGHERITA HACK,
Director, Astronomical Observatory
of Trieste



A Photographer Among the Stars

It was like a meteorite shower in August — the way stars fell on Prague. That is, stars of the astronomical heavens. A photographer moves among these celestial bodies like a tadpole among crocodiles, and when sometimes somehow a rift opens in the crowd, he actually spends a few seconds taking pictures. Then, weaving through the traffic and the torn up streets of Prague, he makes his way to the photographic darkroom so magnanimously placed at his disposal in the Law Faculty building. The so-called "darkroom" is indeed a room, and it is indeed dark — especially at night — but otherwise its facilities recall the darkest dungeons of the Dark Ages.

The way films are developed in these premises scarcely differs from the procedure, as Arago described to the French Academy, by which Daguerre processed his amazing invention — photography. Thus, pictures are dried on the Law Faculty windows, with their splendid view of Hradčany

Nor is this the only amazing physical phenomenon. The kind lady who screwed an ordinary household light bulb into the magnifier certainly didn't suspect that the trademark "Osram" would be projected onto my prints, thus enriching the otherwise meagre photographic composition. As

THE CONGRESS MEETS

Castle. The darkroom's elaborate technical equipment lacks an ordinary funnel, so solutions must be poured with the help of cupped hands — and don't dare to sneeze, because trousers and developer don't mix! The electric glossing iron offers useful exercise for indolent bodies. Mine had to crawl on the floor chasing prints playing hide-and-seek on and off the chromium glossing plates.

for the tank full of exposed film, it is necessary to creep up on it like an Indian warrior, over all kinds of natural barriers — such as floorboards and cleverly deployed chairs — while groping for the tank in the dark. This feat calls for special caution because the walls are lined with unmapped light switches, and no one knows what they would illuminate if

page 2



MAMZELKA 1967 — erratic star of first magnitude

sent evidence of extended envelopes where the kinetic temperature of the gas is high enough to permit a continuous flow of matter into outer space. Examples of these objects are the Of stars, the Be stars, particularly the P Cygni stars, practically all the very luminous supergiant stars, and so forth. Moreover, several stars also present evidence of violent explosion of matter at different epochs.

There are the spectacular cases of mass loss during nova or supernova explosions, and, on a smaller scale, in Wolf-Rayet and planetary nebulae. There are the complicated phenomena of exchange of mass and mass loss from close binaries, which alter their luminosities and change their evolutionary path. On the other hand we know of the existence of the relatively quiet and almost negligible mass loss of nonevolved stars, which certainly emit a continuous stellar wind.

However, when we consider the phenomenon in a quantitative way, we find that stars which leave the main sequence after 10^6 to 10^8 years, should lose only a small fraction of their initial mass. To overcome this difficulty, Miss Underhill suggested that probably all values for mass-loss have been greatly underestimated. It is true that the observed flow velocities are usually smaller



Couches extérieures et structure interne des étoiles

PROFESSEUR P. LEDOUX

Prof. Martin SCHWARZSCHILD introducing the second invited Discourse asked all of us to be good boys and to do nothing else than to listen carefully to Professor Ledoux. Now and then in the past there were those who missed doing so. It was their mistake.



Initially, as the mass of the very external layers is only a small fraction of the total mass of a star, it was generally thought that their influence was negligible and that precise boundary conditions did not matter much and that it was good enough, for instance, to set the surface temperature equal to zero. In some ways, MILNE was the first to challenge this and, although his criticisms were exaggerated, some of the investigations that he instigated yielded some results which have proven significant later.

An English Summary of the Invited Discourse of Friday, August 25

A very important result was obtained by UNSÖLD in 1930 when he showed that the ionization of hydrogen led to the development of convection in the subphotospheric layers of the sun, and that this convection was likely to be related to many of the activities at the solar surface. Later work, especially by BIEMANN, showed that this convection zone should extend much deeper than initially foreseen and could, in this way, affect seriously the internal structure of the sun or of any star with an effective temperature lower than some 10,000° K.

radiative core was that no models could ever fall, in the Hertzsprung-Russell diagram, to the right of a nearly vertical line corresponding to an effective temperature of the order of 3,000° K. Any star momentarily in that region would move very rapidly towards that critical line and evolve down it later, remaining completely convective until very close to the main sequence when the nuclear reactions start. In particular this implied a drastic revision of our ideas on the initial gravitational contraction of the stars, and this has many consequences for the interpretation of young clusters and the amount of some of the light metals like lithium and beryllium subsisting when the stars reach the main sequence.

In fact, it was recognized later, mainly due to the work of OSTERBROCK, that in stars less massive than the sun, this convection would extend even deeper. Now we believe that stars with masses smaller than 0.27 M₀ must be entirely convective and this implies also that these stars are likely to be vibrationally unstable. One may then expect that all the stars of the main sequence up to the early F spectral types and perhaps the late A types should present a surface activity somewhat similar to that of the sun.

Hayashi's work also implies that no real star should be found to the right of the critical line and this provides a crucial test of the theory. Although the agreement with the red giant branches of the clusters is on the whole very good, we know already of stars which seem to have surface temperatures lower than the extreme lower limit of about 2,500° K allowed by the theory if one takes into account the molecular opacity. In particular, if the recently discovered infrared stars have surface temperatures as low as has been suggested they might require some important revision or improvement of the theory.

However, it is in the theory of stellar evolution and the interpretation of the red giant branches of clusters that the importance of the boundary conditions at the surface and the structure of the ionization zone of hydrogen received its most spectacular confirmation. The structure of the giants remained mysterious for some time after the identification of the main nuclear reactions by BETHE and VON WEISZÄCKER, round 1939, had led to an explanation, at least in a first approximation, of the main sequence stars. An important step was taken by SCHWARZSCHILD and SANDAGE when they showed that after the helium core resulting from the burning of hydrogen had reached some 10% of the mass, the evolution of the star would consist in a contraction of the core and an expansion of the envelope. In that case, the representative point in the HERTZSPRUNG-RUSSELL diagram moves to the right towards the red giant branch. However it failed to go up along this giant branch. But by taking into account more realistic boundary conditions with a finite surface temperature and the effect of the hydrogen convection zone, HOYLE and SCHWARZSCHILD were the first to show that the representative point tended to move up the giant branch.

The existence of the external ionization zone has also had very important consequences for the interpretation of a large class of intrinsic variable stars: cepheids, RR Lyrae etc. EDDINGTON was the first to attract the attention to the possible importance of the hydrogen ionization zone for this problem. Later, it appeared that the actual mechanism proposed by Eddington was insufficient to explain the excitation of the pulsations. But, in the meantime, ZHEVAKIN had pointed out the im-

portance in this respect of the second helium ionization zone and of the opacity effects. This has been confirmed by the detailed work of BAKER and KIPPENHAHN and of J. P. COX while the direct attack of the non-linear problem by R. F. CHRISTY, by A. N. COX and J. P. COX and by ALYASHIN has shown that the effect of the external layer can indeed lead to finite pulsations with amplitudes and unharmonics in reasonable agreement with the observations.

The remaining weakness in all this work is the lack of a completely satisfactory theory of convection, especially in nonstationary conditions as occur, for instance, during the pulsation. However, it is not likely that a better treatment of convection would invalidate the general qualitative results that we have recalled although it might make some quantitative differences.

Many problems are also raised by the question of the effect on the most external atmospheric layers of the convection below. Apart from the many more or less direct inferences concerning the granulation and the general activity at the surface of the sun, a new interest has arisen in discussion of the various possible modes of oscillation of the external layer including the superadiabatic region at the top of the convection zone. Also, problems like that of the solar or stellar winds will probably find their proper perspective in a further study of these external layers.

We may conclude that many important results on fundamental questions have already been reached thanks to a proper treatment of the external layers. One may hope that the pursuit of these studies will lead in the end to a global view of a star, including its interaction with the interstellar medium in which it is embedded.

FAITS DIVERS

LITHIUM PROBLEM — The corrected program of the joint Discussion reads: DISCUSSION CHAIRMAN: PROF. W. A. FOWLER
G. H. HERBIG: The Occurrence of Lithium in Stars — like E. A. Spiegel [20 minutes, all others 10 minutes].
M. W. FEAST: Evidence for Li Destruction and Synthesis in Main-Sequence and Subgiant Stars of Solar Mass
MRS. A. M. BOESGAARD: Observations of Beryllium in Stars
MISS E. A. MÜLLER: Lithium Observations in the Sun
DUBOV, PROKOJEV AND SEVERNYI: On the Possible Difference of the Lithium Content in Sunspots and the Photosphere
E. GRADSTJAIN: Experimental and Calculated Cross-Sections for the Production of Li, Be, B Isotopes in C, N, O by High Energy Protons
E. SCHATZMAN: Barrière de diffusion dans les atmosphères stellaires
H. REEVES: Destruction Rates of Lithium and Beryllium in Stellar Surfaces. a Comparison with Observations
E. A. SPIEGEL: Mixing Processes in Stars

COMMISSION 9 (Astronomical Instruments — met in two sessions presided over by Prof. J. Rösch and Prof. J. McGee on Thursday afternoon. The technical portion of the meetings was devoted to the latest results in applying electronic photography to astronomy. Prof. A. Lallemand informed the participants of the superiority of electronic photography for photometry of very faint objects, where the linearity of the electronic camera is a particularly advantageous characteristic. G. Wierick of Meudon described the technique of photometry of flat objects with the help of electronic photography, and presented the results thus far obtained in studying the planets, notably Jupiter. A detailed comparison of conventional photographic methods and electronic photography was presented by M. Walker, who showed on planetary nebulae that electronic photographs represent a substantial step forward in studying the morphology and chemical composition of these objects.

COMMISSION on Meteors and Meteorites: Chairman: Z. Cepiecha, Czechoslovakia; Vice-Chairman: R. E. McCrosky, USA; Organization Committee: P. B. Babadjanov, USSR; W. G. Elford, Australia; C. L. Hemenway, USA; P. M. Millman, Canada; A. A. Yavnel, USSR.
COMMITTEE on Meteorites: Chairman: A. A. Yavnel, USSR; Vice-Chairman: E. Anders, USA.

The International Symposium on Meteorites will take place from August 7 to 13, 1968 in Vienna.

L'exposition ASTRONOMIA NOVA 1967 est ouverte tous les jours (y compris le dimanche) de 9 à 5 heures.

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COMMISSION 22, proposed list of officers nominated today by the Commission and as submitted to IAU:



Men — and Women — on the Moon

Ground Floor, Faculty of Law, Room 16

Results of the American Moon Probes

to be presented at Session of Commission 17 on Saturday, August 26 in the House of Artists.

Following on the footsteps of the Ranger program, the Surveyor program with two successful flights and the Lunar Orbiter program with four successful flights have given scientists a new perspective of the Moon. Photographs obtained with the Lunar Orbiter program vary in their coverage of the Moon from almost the entire Moon photographed from many different directions to lunar surface areas covering a few hundred square meters and showing features as small as one meter across.

The most complete coverage of the Moon was obtained by Lunar Orbiter IV which photographed 99 percent of the front side of the Moon with a resolution of 70 meters or better. A total of 60 percent of the lunar far side has been photographed during the four missions. Using the far side photographs from Lunar Orbiter plus material from the USSR Zond III photographs, a chart of the lunar far side has been prepared. Copies of this chart will be available for distribution at the presentation.

be obtained. Examples are shown in the accompanying illustrations.

The Lunar Surveyor's high resolution photography permitted detailed study of two limited areas of the lunar surface throughout most of the lunar day. Details as small as 0.5 millimeters across can be detected on some of the photographs. A maneuverable scoop on Surveyor III permitted trenches to be dug in the near-by lunar surface, thus testing some of the properties of the lunar surface material near the spacecraft.

WILLIAM E. BRUNK
Planetary Astronomy Chief
Lunar and Planetary Programs, Office of Space Science and Applications

From page one touched. This the photographer learned to his sorrow the evening he left the Foreign Office reception early to hasten at cosmic velocity to the aforesaid darkroom in order to process his pictures of the event at supersonic speed for the impatient morning newspapers. A volunteer assistant switched on the light at the very moment he held the spool of exposed film in his hand... The only thing that saved him from dropping dead of heart failure was being able to get a good night's sleep that night instead of working!

Thanks to the good offices of those kind feminine souls who care for the welfare of the participants at the congress, the photographer too was armed with a name badge on his lapel. This led all too often to his being asked all sorts of insubstantial questions in all sorts of languages by said participants — such as, why does the number 17 tram circulate from one faculty to another (no doubt, in honor of the astronomers, to simulate a satellite) or whether the foundation of a future tobaccoist's stall is the excavation for one of Prague's underground stations. It got to a point where I was conjuring languages with camera exposures, falling over my own feet, and forgetting who's who on the photos.

However, the photographer cannot forget one participant at the congress — an invisible one, but extremely active. He pictures this gremlin as a very mischievous dwarf who springs his tricks at the worst and least expected moments. It was certainly he who, during the ceremony inaugurating the Ondřejov telescope — and just as I was photographing the main speaker — suddenly joggled a steel plate on the telescope platform, with a noise like kingdom come. It was he who drank the tank of our car dry when we were most pressed for time. He alone who saw to it that eager diggers in the street before my house cut my telephone cable, and he who inspired my editor to accuse me of doing the deed myself!

A photographer is a phenomenon occurring only in clusters like galaxies. This type of clusters is always found where it should not be, always orbiting in the same system as newsreel, television and radio reporters. We are

aware of this redundancy on our part, but unaware of its remedy. Therefore our apologies in advance if we sometimes tread on your corns, pass you on the stairs or thrust our unblinking glass eyes under your nose. We are as necessary an evil as Prague's torn-up streets, as inevitable as death and taxes.

We are told to go photograph the Congress. Then the printers curse us for missing press deadlines, the janitors curse us for making them open the door so late at night, the editors imprecate that we haven't snapped the action shot of so-and-so, a Very Important Personage at the Congress, standing on his hands.

Yet nevertheless and notwithstanding, Nuncius Siderius manages to come out every day. Which is a daily miracle that those of us who help bring it into the world cannot comprehend.

Even a photographer has a home, though no one believes it, since he is always circulating somewhere else with his camera. Once home, his legs still tremble, his right eye is black and blue and bloodshot. His limbs collapse on the bed as if rigor mortis had already set in. His last conscious awareness of the astronomical congress is a constellation of polychrome stars buzzing furiously around his head, like a halo.

Long live the Congress!
HENDRICH MARCO



Cosmics

Pictorial Supplement to the Draft Reports

COMMISSION 35: Caughlan has studied in detail the CNO bi-cycle.
© by LSD-Local Society for Distraction, Ltd.

Drawings by Otakar ŠTEMBERA



IN HOC SIGNO

HOUSE SIGNS are a remarkable feature of Prague. You can find an abundance of them especially in the Lesser Town (Little Quarter) section of the city, which has been preserved as a sort of reservation of the 17th and 18th centuries. Already then the Sun apparently had many fans in Bohemia since he is often repeated.

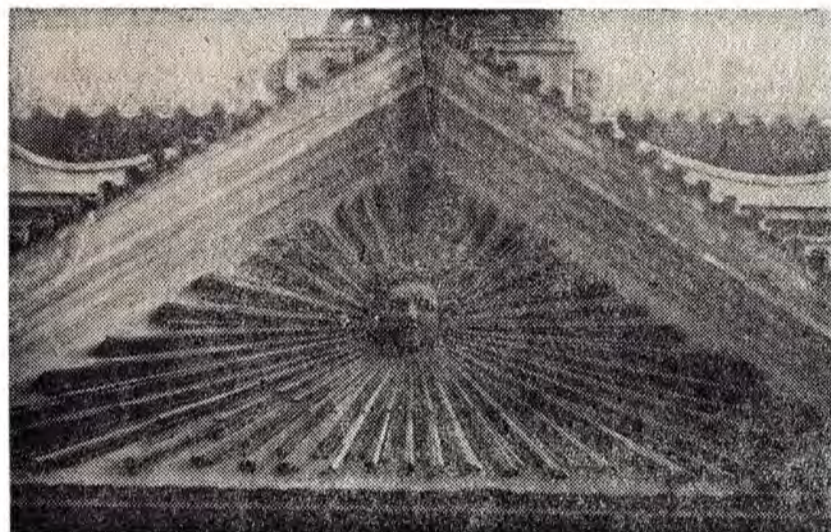
The **GOLDEN SUN** — *Zlaté slunce* — is the oldest, dating to the beginning of the 17th century.
At **TWO SUNS** — *U dvou sluncu* — the poet Jan Neruda author of *Cosmic Songs* spent his youth; you naturally find it on his street.



Valdštejnská Street No 181/20

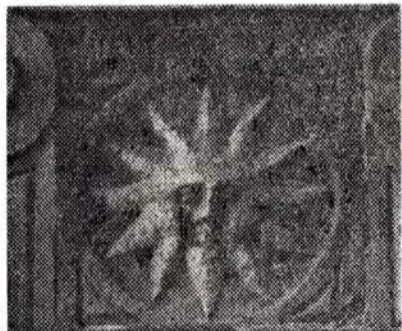


Neruda Street No 233/47



GOLDEN SUN — *Zlaté slunce*
Praha 1, Na poříčí 1045/22

BLACK SUN — *Černé slunce*
THREE LITTLE VIOLINS — *U tří housliček* — In the Lesser Town.



Praha 1, Čeletná Street No 8



Nerudova Street 243/27

At **TWO BEARS** — *U dvou medvědů* — renaissance portal on the corner of the Melantrichova and Kožná Streets, birthplace of Egon Erwin Kisch, famous Prague "furious reporter" of the interwar period.



Praha 1, Kožná Street 475/1

HOW HOUSES ARE NUMBERED IN PRAGUE

The first number is the building's serial number in the quarter, the second is the house number of the particular street.
On each street in Prague's house number 1 begins either at the South end or the end nearest to the Vltava — and is on the left; number 2 is on the right. In Prague, all even numbers are on the left side of the street; odd numbers, oddly enough, on the right.



If you want to trace the great fan of astronomy King Václav IV (the son of good old king Charley) go to the inn, that he is said to have frequented.

AT THE GREEN FROG — *U zelené žáby* — Praha 1, U radnice 8

This is almost within the area of the Congress. ZH

United Kingdom Wins Ball Game

At 18h 12m on the evening of Friday 25 August D. H. Sadler, the representative of the United Kingdom, emerged victorious in the billiards match regularly played with the representative of the United States at all General Assemblies of the IAU since 1928. The loser, who chooses to remain anonymous until a more favourable outcome can be reported, managed to suppress his chagrin and finish his second glass (giant size) of beer without any obvious difficulty.

America still retains the Gold Cup so persistently pursued by Sir Thomas Lipton, but the United Kingdom hat the most "English" on the bale!

The original contenders in this historic contest were F. Schlesinger (for U. S. A.) and F. J. M. Stratton (for U. K.); Stratton invited me to succeed him in 1955. Billiards is a favourite game amongst astronomers (and also amongst firemen who similarly may have periods of waiting between duties) and billiard tables were, and still are, a feature of many observatories (for example, Mount Wilson and Palomar, Yale, Royal Greenwich Observatory, Nice, Pulkovo).

Our game was to have been organized by the most efficient Mr. V. Rajský, but the two contenders decided to play at short notice after a casual meeting. We therefore entered (after some difficulty in locating it) the games room — herna — where we were courteously, but perhaps a little curiously, received; the establishment is devoted to billiards and chess, and the 20 or 30 tables were all occupied, while some 30 or 40 chess games were in progress. But a table (without pockets) was soon made available for us, and we (both meet out of practice) were soon engaged on generating sequences of cannons.

The Americans, for reasons at which I can only guess, refer to the side, or spin about a vertical axis that is imparted to the cue-ball by striking it off-centre, as "English".

D. H. SADLER

Le NUNCIUS SIDEREUS est à l'adresse suivante: Faculté de Droit, salle No. 144, téléphone No. 2674-41, poste No. 247. Les communications sont reçues à cette adresse. En cas d'absence vous pouvez vous adresser à la salle No. 142-143. Si tout le monde a déserté, vous pouvez déposer vos communications dans la boîte située à côté de la porte de la salle No. 144. Ainsi, nous sommes à votre disposition jour et nuit.

Longest-Published Periodical Discovered

Namely, the newspaper you hold in your hands. Our *Dissertatio cum Nuncio Sidereo* is the periodical with the longest publishing history in the world. The proof? The following excerpt from page 132 of the book *Poznávání vesmíru* (Knowing the Universe) by the Czech authors Z. Horský and M. Plavec, published by Orbis, Prague, 1962: Galileo described most of his discoveries in a document he entitled 'Nuncius sidereus', (Stellar Messenger, 1610 A. D.) These papers made a great stir in the world. Kepler in

particular reacted vigorously, and without hesitation replied to Galileo in a document he called, 'Dissertatio cum Nuncio Sidereo' (Dialogue with the Stellar Messenger — Prague, 1610 A. D.)

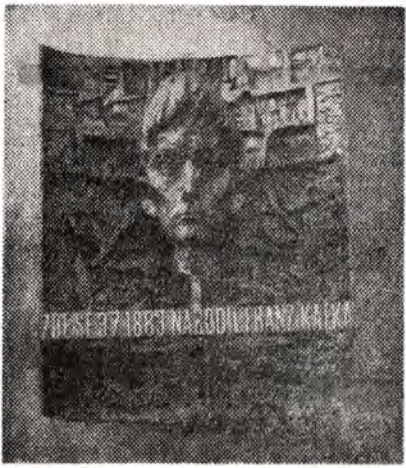
At this moment we cannot say with certainty whether the periodicity of the intervening 357 years is constant or not. More numerous observations of the *Dissertatio*... appearance are urgently needed. Another series of observations should be established circa 2324 A. D.

js



THE CONGRESS MEETS

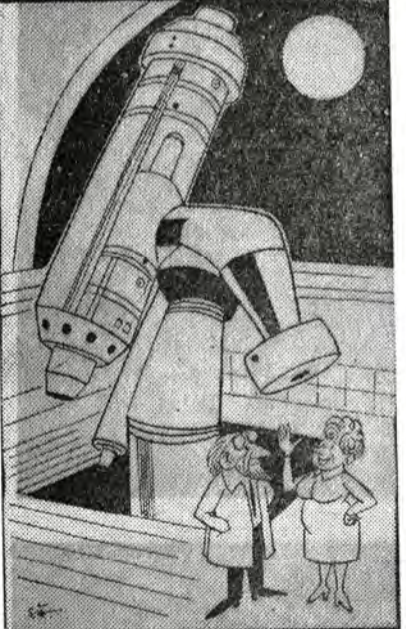




Plaque on the house where Franz Kafka was born

FRANZ KAFKA AND PRAGUE is the title of an exhibit of paintings by J. Mařanová in the Spanish Synagogue, corner of Dušň and Věžeňská streets, open daily except Saturdays from 9 A. M. to 5 P. M.

HORS CONGRÈS



LUNAR NOMENCLATURE
 Visitor at the telescope:
 Now I understand how you determine the height of mountains on the moon, how you measure the moon's temperature and all those other things, but will you explain to me how you discovered the names of all those maria and craters?

© and published by the Local Organizing Committee of the 13th General Assembly of the International Astronomical Union. Chairman of the Editorial Board: JIH GRYGAR. Editor in Chief: Bohumil BILEK. Layout: Milan ALBICH. Editorial Office: Law Faculty of Charles University, Room 144, Nám. Curieových, No. 7, Praha 1. Printed by MIR, n. p., Establishment 1, Václavské nám. 15, Praha 1.

Nuncius Sidereus recommends

THEATRE — DIVADLO NA ZÁBRADLÍ ("Theatre on the Balustrades"), Prague 1, Anenská Square 5, is famous for its pantomime troupe, directed by the youngest laureate of the Czechoslovak State Prize in the arts, Ladislav Fialka. Since the performance may be fully enjoyed without the slightest knowledge of the Czech language, don't hesitate to get your tickets — either at the theatre box-office (open daily from 1 P. M., telephone 24-81-31) or at the Congress booking agency in the Central Hall (AB) of the Law Faculty. Performances August 26 and 28 — 31; curtain at 8:30 P. M. The repertoire includes happenings entitled "Roads", "Etudes", "Madmen", and "Pantomime on the Balustrades".

MUSIC — ST. JAMES CHURCH, Prague 1, Malá Štupartská street (number 25 on your map of Prague) on Tuesday August 29 at 5 P. M. presents the St. James Chorus and Orchestra playing compositions by old Czech masters (Černoborský, Zelenka, Brixl, Škroup) and J. Haydn for organ, chorus and orchestra.

NÁRODNÍ PAMÁTIK (National Monument) on Vítkov Hill, Prague 3, Vítkov street 1900, Sunday, August 27 at 1 P. M., organ recital.

PRAGUE PLANETARIUM — The program "ASTROLOGERS AND THE TWELVE APOSTLES" will be presented today at 5 P. M. This is an astronomical retrospective tour of Gothic and Renaissance Prague.

ASTRONOMY AND PRAGUE INNS, Restaurants and Wine Cellars...

Astronomical ideas have for ages been playing an important role in the life of the people of Prague.

Let's start with **ALPHA** — even though this is a term that is scientifically not precise, for it hasn't been stated what constellation we are dealing with. On the other hand, there is the distinct advantage that the café Alpha is located on Saint Wenceslav Square — and has night clubs Beta and Gamma.

GLOBES there are two in Prague. One is an ordinary restaurant, in the other you can find guests of all three sexes. But what, after all, is a globe, when on Petřín Hill they've opened a place that has been dubbed **KOSMOS**?

As to **STELLAR** names, they might appear to the specialist a bit unspecific or vague. There is **ASTRA**, **ORION** and then the **THE BLUE STAR**—*Modrá hvězda*, restaurant and **AT THE BLUE STAR** inn—*U modré hvězdy*.

The **SUN**—*U slunce* quite naturally is a favorite. Two restaurants have been concentrated to it: **AT THE SUN**—*U slunce* and **AT THE GOLDEN SUN**—*U zlatého slunce*. A world-renowned Prague expert on Comparative Saloonology maintains that here we find reflected residues of the ancient pagan cult; similarly with

AT THE TREE—*U stromu*, **AT THE GREEN TREE**—*U zeleného stromu*,

AT THE HILL—*Na kopci*, **THE LITTLE HILL**—*Na kopečku*, etc. I am, however, of the opinion that these names testify to the mass development of amateur astronomy with the old Czechs. What could the old Czechs observe; given the lack of proper instruments, since the two-meter telescope at Ondřejov did not yet exist? Only the Sun, the closest star. And just from where should they have observed him? Of course, from a hill and little hill. They may possibly have had to climb on a green tree. Besides, the Sun has "pull" with gastronomic activists through his son-wine. (Viz. the French inscription on the glass door on the first floor of the Weinstube **AT THE PATRON**—*U patrona* in the Lesser Town of Prague: "Wine is the son of the Sun".)

Of the **PLANETS**—if we leave out of consideration the somewhat vague term **WORLD**—*Svět*, only **MERCURY**—*Merkur* has asserted himself, and twice at that. Here we have absolute proof that the origin of all names is of an astronomical and not a mythological nature. After all, we could hardly assume that the innkeepers would so readily opt for the god of thieves.

METEOR is a name that appears unsuitable to me. This is a restaurant where you can be quite "gemütlich", so I don't really see why all this hurry in the name. If it is meant to refer to the service, then it's a deliberate deception of the public.

LUNIK — well, well, on London street will surely be of interest to the Moon Commission; the Mathematical Commission wouldn't want to miss **AT NUMBER 1**—*U čísla 1*, and **AT THE MILLIONS**—*U milionů*. The Commission on the History of Astronomy will find the **MEMPHIS**-bar and **LUXOR** irresistible; the latter's scientific value is, of course, seriously depressed by the fact that it is a café serving only non-alcoholic beverages.

A childrens' program, "AFRICAN FAIRYTALE" (on the constellations of the southern heavens) will be given Sunday morning at 10 A. M. Prague's Planetarium is situated in the Park of Culture and Leisure near the building in which the Inaugural Ceremony took place.

EXHIBITIONS — THE COLLECTIONS OF THE NATIONAL GALLERY are scattered through many parts of Prague; all are open from 10 A. M. to 6 P. M. hours. Old Czech and European art, as well as the modern French collection, are concentrated in Hradčany (Prague Castle), Hradčanské Square 15. Czech modern painters are in the Old Town, Dr. V. Vacka Square 1 (the blue number G2 on your map of Prague). At Zbraslav Castle (28 kms from the center of the city) is a distinguished collection of Czech sculpture, partly installed in the park around the castle.

The **FOLKLORE SECTION OF THE NATIONAL MUSEUM**, Prague 5, Kinský Summer Palace, Petřín Park, is open daily except Mondays from 1000—1800. Its permanent exhibition documents the life and culture of the people of Czechoslovakia from the 18th century to the present day. (Blue number M3 on your map.)

A **PERMANENT SALES EXHIBITION OF PAINTINGS**, prints and plastic art objects, at the Platýž Gallery, Prague 1, Národní Avenue 37, is open weekdays from 1000—1800; Saturdays until 1330.

AT THE FLEKS—*U Fleků* and **AT ST. THOMAS**—*U Tomáše*, the oldest Prague beer pubs deserve special attention since in five hundred years an astronomical number of pints have been emptied there. The same goes for the **Weinstube AT THE VICARAGE**—*U Vikárky*, at Prague Castle, from where—according to reliable testimony by one of the Czech classics Svatopluk Čech—the Prague bourgeois, Matěj Brouček, was launched on his successful trip to the Moon.

I can highly recommend these also for their extra-astronomical qualities. It occurred to me, you see, that someone might be keenly interested not only in names but also in such things as food, drinks, pleasant surroundings, nice views, Prague specialities... Since in Prague we don't have indicators for restaurants which would inform you of their quality by the number of stars, as in France, the chief editor and yours truly undertook a special Nuncius Research expedition. It worked at great sacrifice (you've surely noticed that my column was missing from the last number), and here are the preliminary results. We recommend:

AT THE CHALICE—*U Kalicha*—*Na bojišti 12*, Prague 2: super-renowned "Pilsner" pub where the good soldier Švejk made a date with sapper Vodička for six hours after the war.

AT THE FLEKS—*U Fleků*—*Křemencova 9—11*, Prague 1: The only inn in Prague that still has its own brewery. Beer has been brewed there since the 15th century. Had Columbus known about it, we might have bee) America.

ANIMATED WOOD—*Oživlé dřevno*—*Strahovské nádvoří*, Prague 1: restaurant of noble distinction, the name refers to the original decorations, not the staff.

MONASTERY WEINSTUBE—*Klášteřní vinárna*—*Národní třída 8*, Prague 1: quiet place; fine selection of foods and drinks; specialty; wild life. (The translator means game. I think. Editor of N. S.)

CHINESE RESTAURANT—*Čínská restaurace*—*Vodičkova 19*, Prague 1: despite the political association, the best food in Prague.

PRAHA EXPO 58, *Letenské sady* Prague 6-Letná: medal at the Brussels World's Fair, 1958; but prepared fresh, even à la minute.

SOFIA, St. Wenceslav Square: Bulgarian restaurant with heavily spiced Balkan meals. If you prefer Czech cuisine, you have to go to Vienna, or be invited by a Czech family.

AT THE GOLDEN PITCHER—*U zlaté konvice*—*Melantrchova 12*, Prague 1: a unique old-town wine cellar, gothic-style vaulted ceilings; despite its old style it serves excellent wines—old and young. If you like young women, you better bring them with you.

AT THE GREEN FROG—*U zelené žáby*—*U radnice 8*, Prague 1: ditto, located in a place that used to house Prague's executioners.

AT THE GOLDEN PEAR—*U zlaté hrušky*—*Nový svět*, Prague 1: if you prefer a warm, intimate atmosphere, there you have it.

GOLDEN FOUNTAIN—*Zlatá studna*—*food and drink just average, but magnificent view of Prague, and a very original location.*
P.S. Couldn't the Union set up an international commission which would examine and permit astronomical names only to those inns which serve good food and drink and don't charge astronomical prices? **GABRIEL LAUB**



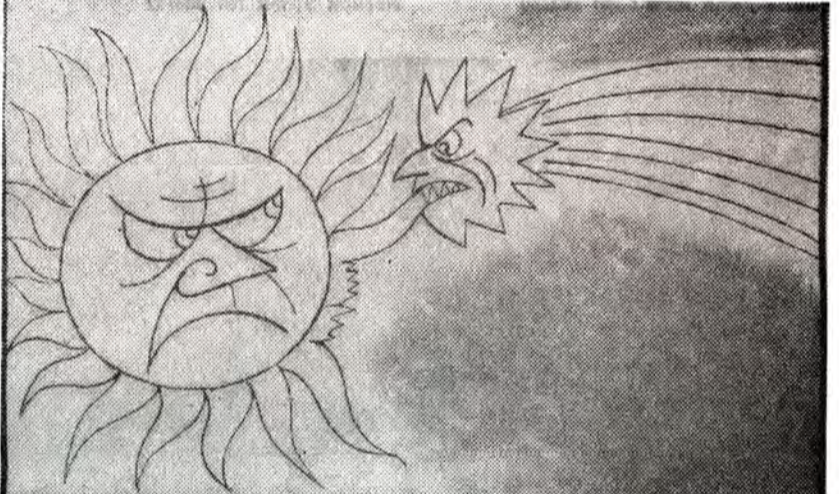
VISITOR TO THE BIG TELESCOPE: Demonstrator: There where with the naked eye you can see nothing at all, the telescope enables you to see a hundred times as many stars

COSMICS



The telescope brings the stars so close that you would be able to see all crawling up the Milky way

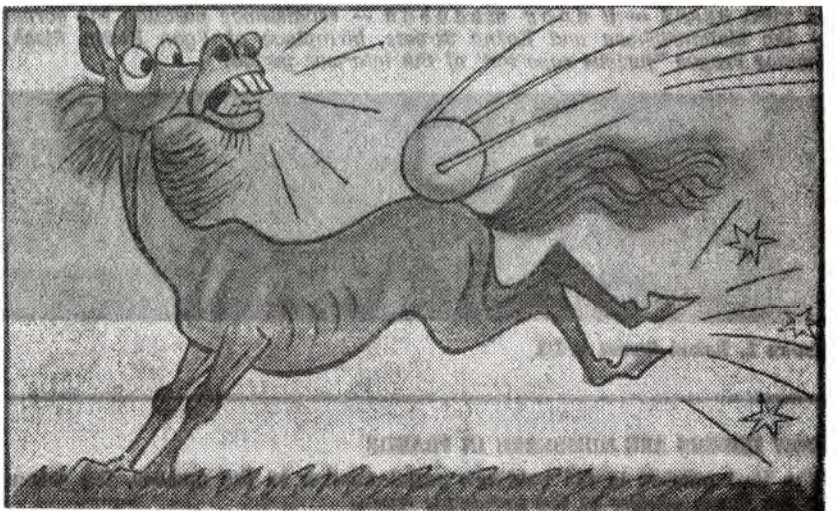
Pictorial Supplement to the Draft Reports



Commission 15 observed a sun-grazing comet (and did not drive it away; does not Commission 10 mind?)



COMMISSION 35: Stothers followed the evolution of a 30 M₀ star until He was exhausted... while She did not mind



Ranger VII impacted a red mare. (Report of Commission 17, page 342.)



The Use of Computers in the Literal Development of the Lunar Theory

The solution of the equations of motion of the Moon with precision equal to or greater than that of the accumulated observations has long been a challenging problem, and it is natural that the automatic computer should be applied to the numerical and analytical operations required in the solution of this problem.

The solution is obtained in the form of harmonic series for the coordinates where the coefficients are polynomials in a number of orbital elements and the arguments are polynomials in the elements and in the time. The solution consists of that of the "main problem", where the Sun, Earth and Moon are treated as point masses and the attraction of the planets are neglected, and of the perturbations.

In the main problem the arguments are linear functions of the time with four fundamental frequencies and the coefficients involve five orbital parameters. Two of the parameters are of the order of 0.1 and the expansions must be carried to approximately the same order in these para-

eters as the number of decimals required in the coordinates. Two of the other parameters are smaller and less troublesome, but the fifth, which we designate as m , is the real source of slow convergence. However, the value of this parameter — which is the ratio of the mean motions of the Sun and Moon — is known with much higher accuracy than the others.

Three developments of the lunar theory made before the days of the computer are of interest here: those of DELAUNAY, of HILL and BROWN, and of AIRY. The first is literal in all five parameters and is a monumental piece of analysis. The second contains the numerical value of m and the literal values of the other four parameters; it has been the international reference orbit for many decades. The third is completely numerical: the best available previous solution is used as a first approximation and corrections are obtained by solving a large set of linear algebraic equations.

The first application of the automatic computer to the development of the lunar theory was the solution of the main problem by AIRY's method. The solution gives, with few exceptions, all terms to ten decimals or better. With this precision there are nearly 10,000 terms.

The modern electronic calculator is capable of effectively manipulating not only numerical series but literal ones as well and there has been great interest in the development of machine programs for this purpose. Programs have been written for the DELAUNAY and for the HILL-BROWN method and the calculations by the former have been carried beyond those of Deleunay. The basic principles of manipulating symbols are not very mysterious but the logistic problems of handling the data in the store are not trivial. For a given accuracy the Hill-Brown method has many more terms than the numerical method since a given argument arises from many combinations of the parameters. Similarly the number in the Delaunay method is much larger than in the Hill-Brown method since the additional parameter m is the one of slow convergence. The individual components of the coefficient for a given period have of course no observational significance.

Motivation for extending the Hill-Brown method to the accuracy of the numerical solution comes not only from the astronomer but from the applied mathematician interested in the reliability of these solutions. The two methods start from the same differential equations, proceed by methods that are completely unrelated, and arrive at 10,000 coefficients that should each agree to ten or more decimals.

W. J. ECKERT

There are Mice on the Moon

The problem posed in the heading is surely one of the cardinal questions not only of contemporary astronomy but also of astrobiology and sociology, possibly even of some other branches. It is thus in the interest of prospering journals (and *Nuncius Sideris* is certainly among them) to carry reports on this topical subject and keep a close watch on the latest advances towards its solution.

The editor thus dispatched a reporter to the Moon. The latter exploited all possibilities provided by the contemporary state of industrial and other techniques, and in the early morning Congress hours (about 10.00 A. M.) he traversed in his socks the surface of the Moon in the gym of the headquarters of the Congress (it is too bad that the gym had to be eliminated, so that our satellite neighbour could be placed there. Otherwise, the delegates could refresh their body there through physical exercises, which would surely be of substantial benefit to them, considering how much time they spend sitting at meetings).

Nuncius' reporter ascertained a whole series of already known facts: there are craters there, seas, mountains. But he also determined one very essential fact that is immediately related to the question raised in the heading: there are undoubtedly mice on the Moon. If we undertake a detailed examination of the regions along the edges of the displayed pictures, then on the northeast — or northwest, indicated are only north and south! — we see quite clearly a rising zig-zag passage of precisely the type of shape that is produced by mice on the meadows or on forest soil.

Of course, we must note that, according to the scale that has been drawn on the floor, at the southern edge, these mice passages must have a diameter of about five kilometers, from which one may conclude that the lunar mice are relatively big; the diameter of their bodies is least one km. This biological abnormality can surely be explained by the small pressure on the lunar atmosphere, so that the bodies of the mice expand and fill up a good part of the passages.

VA

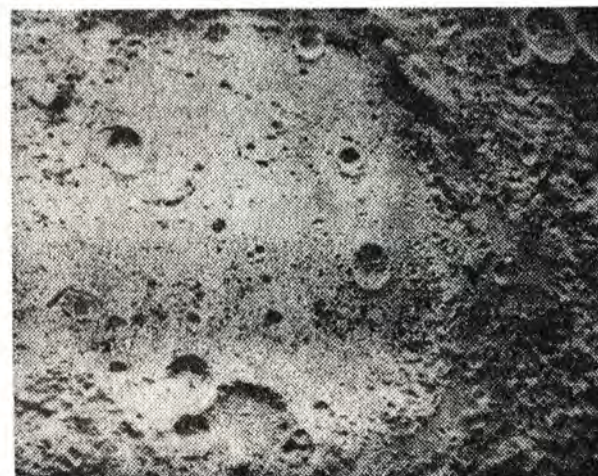
There were Cameras on the Moon - or nearby

Two Soviet and Two American Slides from Academician Mihajlov's Invited Discourse



Reverse side of the Moon in July 1965 — Zond 3

Lunar Orbiter picture of the farside of the Moon — NASA



Another Zond 3 photograph of the farside of the Moon

Surroundings of the South Pole of the Moon taken by high-resolution camera — Lunar Orbiter I



THE MOTORCOACHES DROVE OFF in all directions Sunday morning, full of passengers, and each more or less homogenized linguistically — if one can credit the language placards on each bus windshield. This of course did not prevent stragglers from climbing aboard the nearest vehicle without regard to its posted *lingua franca*. Only the last coaches to depart had some empty seats.

ROUTES WERE VARIED, the buses left at fixed intervals, but often they

met again at the first destination — for example Zbraslav Castle and its gallery of sculptures.

THE PROGRAM WAS SO FULL it wasn't possible to conduct the sight-seeing with astronomical thoroughness. However the delegates did the best they could, such as that Swiss participant, armed with camera, two guidebooks and notebook, with whom at Zbraslav we mutually bemoaned the lack of time. After all, the astronomers have only themselves to blame — for inventing time.

Observing the Sun in Capri

TWO YEARS EXPERIENCE WITH DOMELESS COUDÉ - REFRACTOR

Quite in contrast to the United States (e. g. Mt. Wilson, Kitt Peak National and Sacramento Peak Observatories) the European climate suited for astronomical observation does not coincide with regions of high technical civilisation or with places having large universities. This is especially true for England, France and Germany. The observatories of Central Europe therefore are increasingly engaged to build up and use observing facilities in southern latitudes, as the European Southern Observatory (ESO) in Chile, the Göttingen observatory in southern Switzerland, the Heidelberg observatory in Greece and the Fraunhofer Institute (Freiburg) now for more than 12 years on the island of Capri in southern Italy.

No doubt the Mediterranean is much better suited for solar observation than Central Europe. The number of sunshine hours in southern Italy is more than double than that in 45° or 50° latitude. To become practically independent of season, however, one has to go still further in the southern parts of the Mediterranean, which implies considerable travelling costs as well as a number of additional difficulties and risks.

Besides the amount of sunshine available, the seeing conditions expressed e. g. as a fraction of the total observing hours during which a reasonable angular resolution and steadiness of the solar image is obtained, are of similar importance. Also this fraction increases definitely with every degree southwards. North of the Alps large scale perturbations are passing almost uninterruptedly with short cloudless intervals in between. Within these short clear periods the quality of the air mass above the observatory — polar, maritime or subtropic — changes rather rapidly, polar air bringing high transparency together with very poor seeing. Also here one can say, that the intervals with good seeing become longer and more frequent in latitudes $\leq 40^\circ$ during the summer months June to September. For the winter months one has to go still further south.

Selecting an observatory site one has — practically always and unfortunately — to compromise between

sunshine hours, seeing conditions, living and working conditions and attainability. We went to Capri because of its safe and still supportable summer climate. The observatory is situated on a high plane (180 m a. s. l.) forming the western seaside corner of the island, just above the Grotta Azzurra and close to a steep slope to the north which is not hit by the Sun. For patrol purposes there is quite enough sunshine from May to October. For the rest of the year 80% to 90% of the days have still some sunshine, from half an hour to more than one hour. Systematic measurements of seeing conditions have been made only since the erection of the Domeless Coudé Refractor [see Sky and Telescope, 31, 3, 1966], summer 1965. This instrument is wind and weather protected by an independent mounting, carrying a wind shield tube around the telescope. Prime aperture 350 mm, equivalent focal length 16 meters, auxiliary equipment: Grating spectrograph of 20 meters focal length, dispersion

of 9 mm/Å in the 5th (blazed) order, measured resolving power 500 000; H α -Lyot filter with automatic exposure and programming device; a high resolution magnetograph for simultaneous mapping of longitudinal and transverse magnetic fields. The sensors of the photoelectric guiding are placed on the limb of the 150 mm solar image and work on the second mirror, thus giving a time response of < 0.1 sec. Image quality is measured in the same focus: Image motion by a photocell on the limb, image contrast by a photocell scanning the granulation. Furthermore temperature fluctuations in the vicinity of the telescope can be measured and recorded by thermocouples at different heights.

The preliminary result is as follows: During a stable high pressure situation (except during N-winds) which mostly brings a hazy horizon (visibility over sea about 10 km), the images are often quite stable and sharp about 1 hour after sunrise for some time, however with a rather strong extinction. Around 10 to 11h local time a pronounced maximum of good to excellent image quality is observed — duration 30 to 60 minutes, sometimes even longer — which appears with a remarkable regularity and which has enabled us already to obtain a number of high resolution spectrograms and filtergrams. This morning maximum is probably based on a complicated interplay of the local sea breeze which moves around the island with the sun and the topography of Capri, which is cut in the middle by the Monte Solaro massive (800 m a. s. l.). The objective of the Coudé during this period is about 14 to 15 m above ground.

The same maximum, but much less distinct, is observed with a dome housed telescope nearby (objective 9 m above ground). From this and from many other observations we conclude with confidence, that the large electronic and mechanical expenditure for the domeless telescope definitely was worth while. The concept is right. On the other hand we do know now, after 2 years of working with it and after having collected some seeing experiences in the Near East (Israel, Egypt, Iran and Greece), that a site in an extended plain at latitudes < 35° would certainly enable us still to increase the efficiency of this instrument.

Finally I would like to stress, that not only the elimination of thermal disturbances around the telescope and the choice of site are important. The permanent use of a seeing monitor is just as indispensable. We have put quite an effort into improving this gadget and we feel more and more that hunting for good seeing — especially in solar research — is becoming a rather complicated atmospheric experiment. This experiment will be successful only if everything is done to know the thermal properties of the air in the vicinity and inside the telescope and of the air mass above. The Earth's atmosphere has become nowadays an active and not an easy partner of ground based solar research!

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NUNCIUS SIDEREUS has its editorial office at the following address: Faculty of Law, Room 144, telephone 267441, extension 247. All communications are received at this location. In case of absence, kindly call at Rooms 142-143. In case of total absence, you may deposit your contribution in the box provided next to the door of Room 144. In this manner we are at your service day and night around the clock.

AN HISTORICAL OCCASION such as the Congress makes a man's thoughts turn to other historical occasions. I have attempted to imagine how it will be the first time someone succeeds in capturing signals from extra-terrestrial intelligent beings.

1 Breathless astronomer bursts into director's office:
"Sir! I have just detected a signal from planet X..."

"Kindly refrain from wasting my time, young man. After all, you've read my book — ten years ago I proved that intelligent life on other planets cannot exist. So...?"

2 Breathless astronomer bursts into next office:
"My dear colleague, I have just detected a signal from planet X..."

"Don't excite yourself needlessly, my dear colleague. After all it's obvious. It's an exponential system transmitted by means of a coherent radiation pattern; each call signal is repeated twice to indicate the code, and is then followed by a short message, in turn followed by the code repetition... You see, I have worked



The STEPHANION ASTRONOMICAL STATION (Greece): A new international observing station 15 km south of Corinth (altitude 800 m) including a) one satellite observing station equipped with a LASER and a DOPPLER-system belonging to CNES, b) one astrophysical observing station equipped with a 40-cm reflector used by the astronomers of all the Astronomical Institutes of the Netherlands for photoelectric observations and c) one astrophysical observing station equipped with a 40-cm reflector used by the groups of Dr. H. NECKEL (Hamburg Observatory) and Prof. Dr. L. N. MAVRIDIS (University of Thessaloniki) for photoelectric observations carried out with the financial support of the NATO Science Committee. LNM

FAITS DIVERS

COMMISSION 10, Saturday morning. Most important perhaps was the discussion on the publication of magnetic maps of active solar regions. The submitted examples showed that materials that are today obtained at observatories are not sufficiently homogeneous; differences may even lead to errors. Despite this, obtaining magnetic maps and finding a way to making them accessible to the widest possible circle of interested parties, has been shown to be indispensable. Just as, at one time, the publication of chromospheric maps meant progress, so at the present stage of solar physics progressive elements are contained in the publication of magnetic maps. At present, it is not possible for one observatory to do everything and process everything. It is, therefore, necessary to concentrate means and efforts. And this is precisely why the publication of magnetic maps represents the way to a solution.

COMMISSIONS 12, 40, 43 AND 44 — and other participants — under the chairmanship of Prof. V. K. PROKOFEV, on August 25th discussed the technical aspects of space astronomy. R. WILSON reported on the state of optical stellar observation from positions in space, namely satellites, balloons and stabilized rockets. Photographs taken from rockets launched by the United States (Aerobee), Great Britain (Skylark) and German Federal Republic (Dragon) attained an average limit magnitude of 3m with field fixed to a precision of 1°. Prof. DE JAGER of Utrecht spoke of the possibility of recording X-rays, specifically of constructing a spectrograph for the range of 1.3-3 Å. The possibility is also being studied of recording spectra in the range of 45-200 Å with a resolution power of 0.5-1 Å. k+k+ig

COMMISSION 17 — In the morning session SHOEMAKER projected a motion-picture taken by Surveyor III softlander. The work of a scoop was clearly visible. Israel TABACK showed some interesting pictures taken by Lunar Orbiters. A series of 60 slides was presented by Dr BRUNK. In serie 60 picture from both front and far side was presented. Very nice picture of the Earth taken by LO V was included. UREY talked about evidence of presence of water on Moon.

COMMISSION 27, on variable stars, had twelve papers on the agenda of its fifth session. J. D. FERNIE of Canada and L. DETRE of Hungary presented a most interesting report on the variable star RU Cam. The pulsation of this cepheid ceased about two years ago, and for some time the star remained quiet. However observations in recent months reveal that RU Cam has again begun to pulsate. The amplitude of pulsation is increasing, and if this trend continues the cepheid will by the beginning of 1969 attain its original state before the prior pulsations disappeared. Present pulsation periodicity is not constant, and varies within limits of 22 to 25 days. Besides increasing amplitude of light variations, height of maximum and depth of minimum light curve are also observed. P. BOYCE presented the results he obtained during long-periodic variations in the infrared range, where he found an intense band of CO and water vapor.

DEEP SKIES WONDER

ASTRONOMY IS TODAY a highly specialized science, and the scientists who gather at the congress speak at meeting in an exclusively technical jargon, which the astronomer who works in another field is often unable to understand. (Here I am referring not only to the subject matter of the discussion but also to the language side itself, which sometimes creates great difficulties, partly because for many astronomers the main congress language — English — is not their native tongue, and partly because for the other part of astronomers English is, unfortunately, their native tongue.)

M. Plavec in the
Czechoslovak Astronomical Quarterly
Cosmic Review, No. 2, 1967

Dr. Bohumil ŠTERNBERK as seen by Otakar ŠTEMBERA



out a detailed theory of interplanetary signal communication. Your observation is only its practical application..."

3 Breathless astronomer bursts into police station:
"Your driver's license, please. You'll have to pay a fine for disrupting street traffic."

"But I am... that is... it's the fault of signals from planet X..."
"All right. That doesn't excuse you, but he'll be fined as well. Signalling in the downtown area is against the law. What make did you say that automobile was, a Planet? And license number X... what?"

4 Breathless astronomer bursts into a bar:
"A shot of cognac, quick... I'm terribly excited; I've just detected signals from planet X..."
"Tak, tak, dearie," answers the elderly waitress, "something is forever happening somewhere. I tell you, Professor, it's all on account of the hurry folks are in nowadays. When I was young we flew in ordinary jet planes, and we didn't miss anything.

Do you suppose the ambulance will get there in time?"

5 Breathless astronomer all but collides with neighbor on stairs.

Naturally he can't keep from sharing his news with him.

"That means, then, that out there are intelligent beings with a highly developed civilization? Why, that's tremendous! Of course you're going to reply, aren't you, Professor?"

"I hope we'll succeed in doing so."
"And you'll be present, won't you?"
"I hope so."

"Then may I ask you a small favor? Couldn't you tell them that I would offer a complete set of Honduras and two blue cancelled 20-cent stamps — such as animals, perhaps."

6 Breathless astronomer bursts into his home:
"Annie! Wonderful news! I've caught signals from planet X! I've really caught them!"

"Isn't that nice, darling. But again you've forgotten to stop off and pick up the laundry..." GABRIEL LAUB

L'Observatoire de Nice

Fondé en 1881 par un mécène, le banquier R. Bischoffsheim, l'Observatoire de Nice était alors l'un des plus grands du monde. Equipé d'instruments puissants — deux lunettes équatoriales, dont une de 76 cm d'ouverture, lunettes méridiennes, grand coudé —, il connut d'abord une période d'activité intense. Après la première guerre mondiale pourtant, cet observatoire, qui semblait promis à un si bel avenir, déclina lentement. Quand J. C. PECKER prit sa direction en 1962, son personnel scientifique était réduit à 3 astronomes, et un seul instrument, la lunette de 38 cm, restait opérationnel.

Sous l'impulsion énergique et efficace de son nouveau directeur, l'Observatoire de Nice reprend maintenant une place de premier plan dans l'astronomie française. Ces principaux instruments sont réparés, améliorés ou en cours de restauration, l'effectif des chercheurs passera en octobre 67, à 18, dont 9 docteurs ès-sciences.

Dès à présent, l'activité scientifique s'exerce dans des domaines variés. P. Couteau continue l'observation des étoiles doubles avec la lunette moyenne dotée, depuis cette année, d'un objectif de 50 cm. B. Milot suit les comètes et les astéroïdes à l'astrographe double Zeiss. M. Treillis achève l'installation d'un coronomètre Lyot-Carvin. M. Lacoarret interprète des spectres stellaires pris à l'Observatoire de Haute-Provence.

Des recherches théoriques sont poursuivies par O. et F. Bély (collisions atomiques, physique de la couronne), par J. Lefèvre (matière interstellaire et circumstellaire), par J. C. Pecker (atmosphères solaire et stellaires) et par J. P. Zahn (structure interne des étoiles). Des liens très étroits unissent l'Observatoire à l'Université de Nice où vient d'être créé un enseignement de 3^e cycle d'astronomie, et où F. Roddier dirige un laboratoire d'astrophysique [spectrophotométrie solaire à haute résolution].

On mesurera à cette énumération le chemin parcouru depuis 1962... Mais l'expansion de l'Observatoire de Nice ne s'arrêtera pas là: le nombre de chercheurs doit doubler au cours des 4 prochaines années. Un nouveau bâtiment, dont la construction est financée par des crédits inscrits au 5^e plan, permettra de les accueillir. Des moyens de calcul relativement puissants seront mis à leur disposition, puisque Nice héritera dans un

an de l'ordinateur IBM 7040 actuellement en service à l'Observatoire de Meudon.

Au cours de ces trois dernières années, l'Observatoire de Nice a abrité le Secrétariat de l'Union Astronomique Internationale. Mais il entend manifester de façon plus ambitieuse sa vocation internationale. Le projet du Centre International d'Astrophysique de Nice est en cours d'exécution. Celui-ci permettra d'accueillir des congressistes, et leurs familles, réunis pour des séminaires des colloques, des écoles d'été, ou encore en groupes de travail temporaires. Et s'il appartiendra aux organisateurs de ces futures rencontres de les rendre intéressantes et fécondes, ils seront déchargés du souci de meubler les moments de détente: Nice, la Côte d'Azur, l'arrière-pays montagneux sont autant d'invitations à la promenade, à la pratique des sports nautiques et alpins... A bientôt donc, à Nice! J. P. ZAHN

Telescope coudé as seen at ASTRONOMIA NOVA 1967 by J. Marco. Framed by other Zeiss-jena Instruments



The exhibition ASTRONOMIA NOVA 1967 is open daily (including Sunday) from 9 A. M. to 5 P. M.

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Radio Galaxies and Quasars

PROFESSOR SIR MARTIN RYLE

In a grand spanish manner, Prof. G. HARO introduced lectures of Sir Martin RYLE and Dr. Allan SANDAGE. Both scientists presented brilliantly most advanced reviews of the quasars mystery.

If we observe the sky with a radio telescope operating at metre wavelengths we find: (i) a continuous background emission, partly due to the Galaxy and partly to extra-galactic sources; (ii) compact sources a few minutes of arc or less in extent. About 8,000 of these compact sources have now been discovered, but only a few hundred of the most intense have been studied in any detail.



UNIVERSITAS CAROLINA
ORDINE REI PUBLICAE ORNATA

HONORI SIBI TRIBUTIT INVITARE
AD GRADUM SCIENTIARUM-DOCTORUM

V. A. AMBARCUMJAN
POLYDORO SWINGS

INDAGATORIBUS IN ASTROPHYSICA

EMINENTISSIMIS

HONORIS CAUSA

CELEBRITER TRIBUENDUM

DIE MERCURII XXX AUGUST

ANNO MCMLXVII HORA 14

IN MAGNA AULA CAROLINI

PRAGA ZELEZNA 9

Dr. A. Sandage emphasised the grand foresight of academician AMBARCUMJAN, which is admirably confirmed by the present observations.

Their radio emission is very great, in some cases a million times greater than that from our own Galaxy, the Andromeda nebula and other nearby galaxies. These powerful sources are known as Radio Galaxies.

Observations with instruments of high resolving power show that about 60% have a double structure, with radio emission from two components, one on each side of the related galaxy; the two components are frequently of unequal intensity, and they may be located at unequal distances from the galaxy.

In addition to these sources, some 35% are of much smaller angular size; many of them are less than 1" arc in extent; in some cases the structure is again double, with components ~0.1" arc in diameter, separated by a few seconds of arc. Many of these compact sources have been found to be associated with very small optical objects which look like stars, and they have become known as quasistellar sources (QSS). I shall be presenting evidence which supports the former interpretation, that they are at great distances.

The radio spectra of many QSS show a remarkable cut-off at low frequencies; most radio galaxies and QSS have a spectrum which may be described by: $S \sim \lambda^\alpha$, where $\alpha \sim 0.7$ but for QSS there is often a fairly sharp cut-off at low frequencies.

The physical explanation for this cut-off is now reasonably well understood. The only satisfactory mechanism which has been suggested to account for the generation of radio waves in both QSS and radio galaxies is the synchrotron process, in which electrons of high energy are accelerated in a magnetic field. This mechanism not only provides a simple explanation for the observed spectra, — including the low frequency cut-off in the most compact sources, but also

predicts the presence of linear polarization in the emission from sources where the geometry of the magnetic field is simple; the observation of such polarization in many sources has provided further confirmation of the synchrotron mechanism.

The energy which is necessary to account for the most powerful radio galaxies — and which must presumably be released within the parent galaxy, is of the order of 10^{61} ergs — equivalent to the conversion to Helium of a mass of Hydrogen of about $10^6 M_\odot$. It is I think significant that if the red-shift of the QSS is interpreted as of cosmological origin, the emission from the most powerful of these sources also implies energies of the same order.

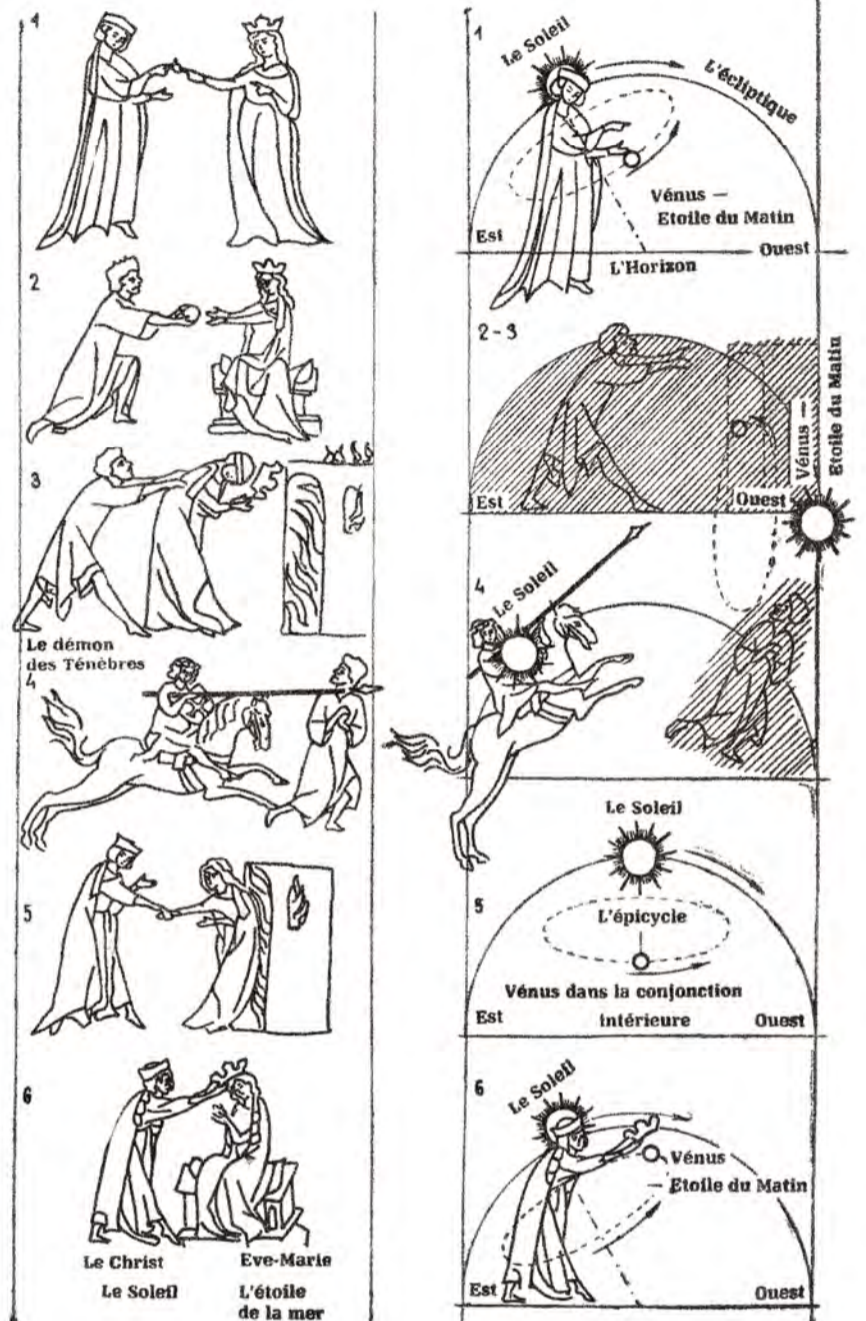
The life-times of the electrons in the extensive radio galaxies is only about a million years, and the large separation of the emitting regions from the parent galaxy implies that they must have been ejected from the galaxy with velocities close to the velocity of light.

These results suggest that QSS and radio galaxies may simply be different stages in the evolution of the same class of source. It seems certain that radio galaxies must have their origin within the related galaxy and that the source must therefore have passed through a more compact stage; can we indeed release 10^{61} ergs a time $< 10^6$ years in a galaxy and not observe it by optical or radio means? It is equally certain that the energy density in QSS is so high that they must expand very rapidly; where are the sources resulting from such an expansion if they are not the radio galaxies?

It is suggestive that the recent high-resolution observations (Jodrell Bank — Malvern) of a number of the most compact QSS known, also reveal a double structure, so that if we adopt the cosmological interpretation of their red-shifts, two-component sources are now known which cover a range of separations from 1 to 450 kpc.

In order to visualize how QSS and radio galaxies might evolve, a simple model has been constructed by M. S. Longair and myself which supposes that a large amount of energy ($\sim 10^{61}$ ergs) is suddenly released at the centre of a galaxy, and that this gives

page 2



Déchiffrement du contenu astronomique des vieux tableaux

C'est l'historien de l'art Dr. Karel Stejskal qui s'en occupe, ayant recouru à de nombreux documents dans les sources historiques.

LE PASSIONNAIRE DE L'ABESSE CUNÉGONDE,

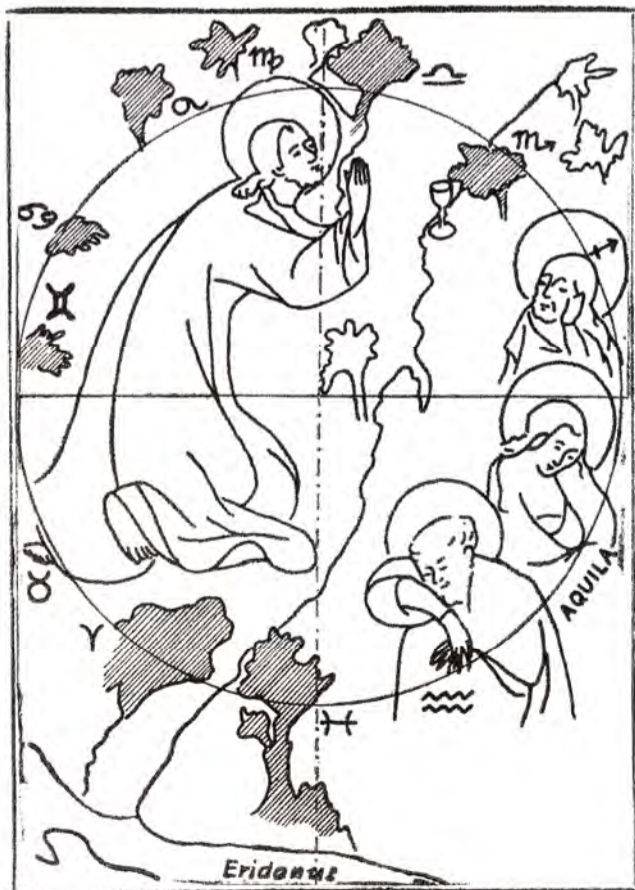
un manuscrit enluminé écrit en latin, lui servit de point de départ pour ses recherches. Le manuscrit, écrit au Château de Prague, peut être vu actuellement à la Bibliothèque nationale et universitaire. De 1312 date la première composition du Passonnaire, la Parole mystique d'un chevalier hardi. On y raconte comment le chevalier Jésus-Christ a libéré sa fiancée. Le Christ est littéralement désigné comme le Soleil et sa fiancée Eve-Marie comme l'étoile de la mer. Le séducteur l'avait «enlevée» et jetée dans les ténèbres. Le Christ-Soleil triomphe de ce démon des ténèbres et jette ensuite des noces mystiques avec l'étoile de la mer. Le mot latin coniunctio signifie en effet mariage et aussi conjonction. Les différentes phases de l'histoire répondent aux phases de la planète Vénus.

LE MAÎTRE DU RETABLE DE TREBON

a peint vers 1380 le Christ au mont des Oliviers. La tableau se trouve à la Galerie nationale à l'exposition unique d'art gothique au palais Sternberk sur la place de Hradčany. Le tableau est composé sur un cercle. Les pieds du Christ, les têtes des trois apôtres et huit arbres divisent le cercle en douze parties. Dans l'art médiéval, les douze apôtres sont souvent mis en rapport avec les signes du zodiaque. Saint Pierre correspond à Janvier — au Verseau. Le Taureau est le symbole de la patience du Christ. Si l'on marque les douze parties du cercle par ces signes, on constate que le Scorpion est juste en train de monter à l'horizon. En effet, c'est le cas de Pâques à minuit lorsque Jésus-Christ fut arrêté au mont des Oliviers.

PIETER BRUEGEL L'ANCIEN

a peint le fameux tableau L'Adoration des Mages (National Gallery, Londres). Ce tableau prouve que le mode de composition mentionné ne tomba pas, même plus tard, dans l'oubli. Avec son humour irrésistible, Bruegel a caractérisé les personnages dans le cercle entourant l'Enfant-Jésus — le Soleil, comme neuf constellations qu'on peut voir à Noël sur la voûte céleste. ZH



Radio Galaxies and Quasars

Summaries of the Invited Discourses of Monday, August 28, continued

From page one

rise to the ejection of two plasma clouds travelling out in opposite direction with an initial velocity $\sim c$.

The results obtained at Cambridge in the 4C survey and at Parkes have shown a distribution of sources which is isotropic at flux densities which correspond to values of the red-shift z of at least 1, but their distribution is not uniform in depth; with decreasing flux density the number of sources initially increases much faster than expected for a uniform population, suggesting that at earlier epochs the number or intrinsic power of radio sources was greater than at present.

The greatest excess of sources appears to be due to sources having red-shifts $z \sim 2-3$.

Observations with the one-mile telescope at Cambridge, have allowed the detection of sources some 100 times fainter than the limit of the 4C and Parkes surveys; these further results shows a remarkable convergence, with the number of sources increasing only slowly with de-



SIR MARTIN

creasing flux density, suggesting that a cut-off in the number of sources must occur at an epoch corresponding to $z \sim 3$.

It appears that the source counts and the integrated extragalactic radio emission reveal important evolutionary effects associated with the expansion of the Universe; prior to some epoch corresponding to a red-shift $z \sim 3$, (which may be related to the formation of galaxies) radio sources apparently did not exist. Subsequently, galaxy formation may have led to the birth of radio sources which were either more powerful or more numerous than they are at the present epoch.

Entirely independent evidence for an evolutionary cosmology has been provided by the recent discovery of isotropic microwave background radiation having a blackbody spectrum; the only explanation which has been proposed to account for this emission is that it represents the fossil radiation from the "fireball" associated with the highly condensed initial stages in evolutionary cosmologies.

Professor Ryle has already mentioned that QSS show radio doubling, just as do radio galaxies. The linear distance between the radio components of galaxies are distributed between 1 and 450 kpc. The same range is covered by the double radio components of QSS if they are at the Hubble distance, but not if the QSS are local.

A second crucial discussion, due to Heesch (Ap. J. 148, 517, 1966) shows that the radio surface brightness, B_r , of QSS blends continuously with radio galaxies when plotted against absolute radio power, L_r , calculated as if all sources are at their Hubble distances. Because B_r is independent of distance, and L_r de-

Dr. ALLAN R. SANDAGE

Only 9 quasars were known at the beginning of 1964, but now several hundred are confirmed or suspected, and as many more as desired can be found at will.

The quasi-stellars (QSS) are still a mystery, Schmidt's discovery of the redshift of 3C273 in 1963, and his subsequent identification of the Lyman Alpha hydrogen line in 3C9 at an observed wavelength of $\lambda = 3666 \text{ \AA}$, giving $\Delta\lambda/\lambda_0 = 2.012$, suggested that quasars partake of the general expansion of the universe. No other explanation for such large apparent velocities had heretofore been successful in a scientific sense, and the evidence is clear and abundant that the redshifts for normal galaxies are strictly correlated with distance.

The unanswered questions concerning QSS are: (1) what are they? (2) where are they? and (3) are they useful? Question (3) covers two areas. Are they useful and interesting in physics as new phenomena which will tell us about particles and fields in strange conditions; or are those QSS with large redshift useful in astronomy and cosmology in contributing to the problem of evolution and first origins by serving as beacons far back in time? The answer to question (3) is not likely to come until problems (1) and (2) are solved.

All emission lines in quasars show the same redshift to within narrow limits. This appears to be a strong argument against the interpretation of the redshift as due to an intense gravitational field of a single, compact, massive object. The forbidden lines must be formed in regions of low pressure so as to prevent collisional de-excitation of the metastable levels. Such regions, for a single compact body, will almost certainly have a lower gravitational potential than the region of permitted line formation, and hence a smaller redshift, which is contrary to the well established fact. This, and the arguments of Greenstein and Schmidt (Ap. J. 140, 1, 1964) seem persuasive against the gravitational interpretation.

QSS may, of course, not be stable. Evidence comes from the several sources which have absorption lines. Of the 103 QSS with known redshifts, at least 20 have absorption lines, and, in many of these cases, the absorptions are displaced blueward of the corresponding emission lines, as in P Cyg stars. The simplest explanation is that of an expanding, cool

envelope with apparent subsequent mass loss. Setti and Woltjer have concluded from the available observations that a minimum initial mass on any assumption of distance is $15^M M_\odot$ per average QSS — a number which is important in the later discussion of the local vs. the cosmological interpretation of the redshift.

The rapidity of the light variations has raised doubts about the cosmological origin of the redshifts. Terrell has shown that the time scale of the optical fluctuation of the order of days requires that the linear size of that part of a QSS which is outbursting must be less than a few light days across. A few years ago this was considered the death-knell of cosmological redshifts because of (a) the seemingly impossibly small angular size which was required and (b) the apparent impossibility of maintaining synchrotron radiation for any appreciable time in such a compact region of high energy density due to the inverse Compton losses of the electrons as they collide with their own photons. This last effect was pointed out by Hoyle, Burbidge, and Sargent.

Both views may be overly pessimistic. Radio angular diameter measurements from the long baseline interferometer experiments of the Jodrell Bank group and the Royal Radar Establishment in England, and by the Green Bank workers in the U.S., together with the radio scintillation results at Cambridge and at Arecibo, Puerto Rico, show that all active QSS have angular diameters less than ≈ 0.02 arc seconds. These measurements are upper limits and, therefore, do not yet constitute an argument against the cosmological distances.

The argument of energy loss by inverse Compton effect can apparently be overcome by a proper arrangement of the magnetic fields and electron trajectories (Woltjer, Ap. J. 148, 597, 1966). Although the requirements for such a regular field may seem severe, a field of this type in fact appears to be demanded by high degree of optical polarization observed by Kinman and Visvanathan.



Dr. SANDAGE as caught by Otakar ŠTEMBERA at the Editorial office of Nuncius Sidereus last week

pends on the distance squared, the observed correlation and continuity would be destroyed if the QSS did not follow the Hubble law. Heesch's result appears to be almost the crucial experiment required to show that quasars do obey the red-shift-distance relation of the expanding universe.

The answers to these questions will eventually be clear, but in the meantime they drive the theoreticians to think, and the observers to the dark and quiet of their telescopes, both radio and optical, to help unravel the greatest mystery known to man — the scientific story of creation revealed through the history of galactic systems and their predecessors.

bers of the committee need instructions... The interview definitely ends with the secretary making a very quick dash by car in the direction of Ožvičlé dřevo, where presumably a jashlon show is not proceeding entirely smoothly... Thus I obtained only a few scraps of information.

THE BIGGEST PROBLEM WAS TO FIND HOTEL ROOMS FOR ALL.

He who has never hunted a room in a Prague hotel at the height of the tourist season will not understand what a problem this can be under normal circumstances. By the way, such a quantity of people all at once could perhaps not easily be placed even in the supertouristic Switzerland. The LOC was well aware of



All nationalities, but mainly British and American, on the Prachovské skály (The Rocks of Prachov). Pictures by Jindřich MARCO

On the Lithium Problem

Probably the two most interesting new points put forward were 1 the evidence given by Dr. FEAST that, whereas during the main-sequence life of a star the lithium is gradually depleted, the lithium abundance again increases when the star becomes a subgiant, and 2 the results presented by Miss BOESGAARD that the lithium content decreases along the main-sequence going from spectral type F to K, while on the other hand the beryllium content just show the opposite tendency. Further interesting items of the joint discussion were:

It now seems fairly certain that the synthesis of lithium and other light elements occurs during the pre-main-sequence stages of stars. Otherwise it seems difficult to explain — as mentioned by Dr. REEVES — that Hyades stars of similar spectral type may differ in lithium content by as much as a factor of five. The fact that one T Tauri star which — as mentioned by Dr. HERBIG — was not yet visible more than thirty years ago, now already has very strong lithium lines, indicates that the formation of lithium must already have taken place before the T Tauri stage. From remarks made by Drs. REEVES and CAMERON it became clear that this fact evokes enormous difficulties from the point of view of the energy involved, so that no reasonable formation process can be put forward at present. The poor Sun came out to show no evidence of the presence of lithium in its photosphere. The only spectral line previously ascribed to lithium — and now discussed by Miss MÜLLER — turned out to be a line of CN at high-dispersion spectra shown by Dr. DELBOUILLE from Liège. Only in sunspot spectra the presence of lithium can hardly be doubted, as spectrograms presented by Drs. DUBOV and ELSTE showed.

Finally, with regard to the destruction of lithium in stars, Dr. SPIEGEL (in a 25-minute talk!) argued that normal convection in the solar envelope cannot be responsible for the destruction of lithium, since the temperature at the bottom of the convective zone is not sufficiently high. Other processes such as the torque exerted by the solar wind on the surface of the Sun, may evoke convective motions in the solar radioactive core. These motions — as Dr. Spiegel argued — may carry lithium into regions of sufficiently high temperature to be destroyed in the case of the Sun. The time scale for these destructive motions would be of the order of 10^9 years. HG

X-RAY ASTRONOMY

A joint Discussion was held on Monday 28, afternoon in the House of Artists, with the participation of some 500 persons. H. FRIEDMAN informed the group about measuring X-sources in Scorpio and Sagittarius carried out with the aid of Skylark rockets as well as plans for X-ray apparatus for artificial satellites. R. GIACONI compared the distribution of X-ray sources with the optical and radio models of the Galaxy. After this there was a report about X-ray observation of

southern sources from Woomera station, Australia. H. M. JOHNSON presented data on the optical variability of the Sco X-1 source, and G. W. CLARK reported on rocket experiments in searching for extragalactic sources, which was supplemented by L. PETERSON's paper on balloon experiments. R. WEYMANN spoke about cosmic X-ray background and W. TUCKER presented a theoretical review on current theories about the origin of X-radiation. He supported the theory of synchrotron and bremsstrahlung mechanisms. jg

FAITS DIVERS



COMMISSION 5 at its meetings on August 23 and 24 discussed the implementation of the following projects: revision of the Astronomy section (52) of the Universal Decimal Classification, publication by the USSR of an English translation of the Astronomy section of the Referativnyj Zhurnal, publication of the Bibliography of Astronomy 1881 to 1898, publication of a revised edition of Les observatoires astronomiques et les astronomes. The names of J. B. SYKES and K. F. OGORODNIKOV are proposed as incoming President and Vice-President respectively. jbs

COMMISSION 7 — Monday, 28. Aug. The colloquium on the use of computers for the literal development of the disturbing functions brought into the lecture room about 150 keen listeners that were all impressed by the efficiency and high speed of programmers giving the literal development of complicated mathematical expressions, as revealed in the lectures of DAVIES and KOVALEVSKY. In fact, in this way the computers do the lengthy and troublesome work which formerly was sometimes the main occupation of celestial mechanics during the last two centuries — the analytical production of the different terms in the long development of disturbing functions. S

COMMISSIONS 30 AND 42 met Monday morning. A. BATTEN has announced the sixth edition of the catalogue of spectroscopic binaries completed. R. KOCH, M. PLAVEC and D. POPPER stressed the need for closer cooperation of photometrists and spectroscopists in eclipsing binaries. T

DEEP SKIES WONDER

YOU TAKE THE HIGH ROAD AND I TAKE THE LOW ROAD...

From the Final Programme page 17:

The palace U hybernů is a five minutes' walking distance from the LOWER END of the Wenceslas Square... The end where most of the necking seems to be going on! jbs

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At the Gothic Castle Kost (The Bone) — Sunday, August 27



"THE IMPOSSIBLE WE DO IMMEDIATELY, miracles take a bit longer". This is the slogan of the Local Organization Committee inscribed in bold letters on the desk of its secretary, Vladimír RAJSKÝ. I don't know how it is with the miracles but impossible things there are surely enough. For example, it is quite impossible for the duration of the Congress to speak quietly with Mr. Rajský because representative of the management of Prague hotels has to discuss several economic problems caused by the fact that a few of the announced Congress participants didn't come, several delegates are unclear about some thing or other which can be cleared up only by the secretary of the LOC, the bookkeeper needs his signature, mem-



United Kingdom

At the Tuesday press conference, Dr. I. S. SKLOVSKIJ was at his best again. He demonstrated the interaction of an exited overcrowded Moscow tram in 1953 and discoveries in astronomy. In answering the evergreen question

What's the good of such discoveries?

he reminded us of AMBARCUMJAN having once said:

The difference of man and beast?

Man looks up — to the stars...

Well, here we have the very

young astronomers at the Congress

Nuncius knew what he was saying (Pragae MCMLXVII 20. VIII) when greeting 2900 astronomers — there are so many, with the future ones, and wives, and husbands, for that matter... **Bi**

Even Czechs happen to be polite (sometimes). And as first things should come first, Nuncius Sidereus ventured to bother the President of the Union first. Professor Pol SWINGS got three questions:

- 1 Quelle était, selon vous, la chose la meilleure de ce Congrès?
- 2 Imaginez que j'ai une baguette magique et que je peux améliorer une seule chose pour le prochain Congrès. Laquelle choisiriez-vous pour votre plaisir personnel?
- 3 Que pensez-vous du Nuncio Sidereeo?

Black and White Spots of the Congress

Here are his views:

Améliorer? Il faut que les Présidents de Commissions aient conscience de leur autorité et de leurs responsabilités dans le choix des auteurs de communications, et dans la limitation de leurs interventions.

La chose la meilleure pour moi est l'enthousiasme des jeunes, de la nouvelle génération, qui nous assure que l'Union continuera d'être prospère. Quand ils bavardent, ils parlent de choses professionnelles.

Depuis trois jours, je répète à chacun que l'organisation du Congrès était excellente, surtout grâce à Monsieur RAJSKY.

Le Nuncio Sidereus a rempli un rôle extrêmement utile et agréable. Il a créé de nouveaux genres, qui n'existaient pas lors des précédents Congrès.

Democracy is a good thing. A very good thing indeed. So Nuncius has decided to approach just a man in the street. Prof. Dr. O. HECKMANN, having no presidential obligations, spoke his native German, and English at the same time. Der Herr Direktor der Hamburger Sternwarte sagte uns in Eile:

The best thing of the Prague Congress? The wealth of scientific stimulations, ja, das Reichtum der wissenschaftlichen Anregungen.

What one thing to improve for the next congress? Eine merkwürdig schwere Frage, extremely difficult. The whole Prague Congress was quite unique for its excellence.

The Nuncius? Very interesting, well edited, by people who know their job.

Bohumil BÍLEK



Czech — forty months



Photos by JINDŘICH MARCO

Turkey

The Call of Space

The Call of Space means even more to me than the current widespread interest in the conquest or the exploration of space by man and his vehicles, remarkable as are these manifestations of human ingenuity and skill. To me it is the Call of Space that has insistently motivated all astronomers throughout all ages to observe and to attempt to explain the great unknowns of the universe about and beyond us. The Call of Space is part of the motivating force that has led man beyond a purely animal existence to great intellectual and artistic expression. It is also a call in time as well as in space, for the finite speed of light carries us back to antiquity billions of years ago in our study of distant objects in the sky. Even with the naked eye we can see back 2 million years in time, to the great spiral galaxy in Andromeda. Perhaps it is literally true that on a clear night we can see forever--into the past.

page 2



USA



Turkey



France ▲

▼ Italy



Turkey



Italian child + Englishman



Italy



France



