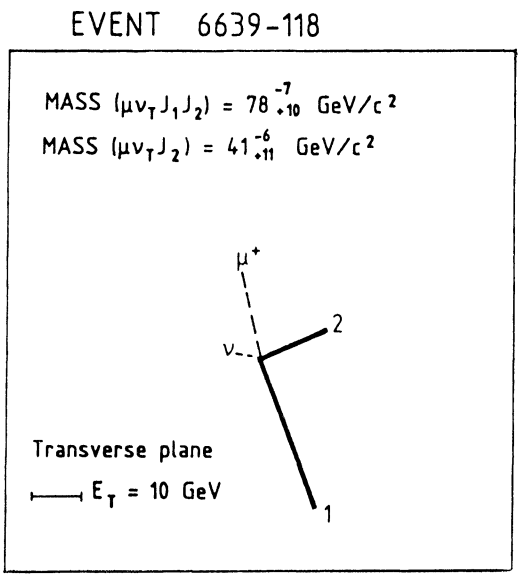
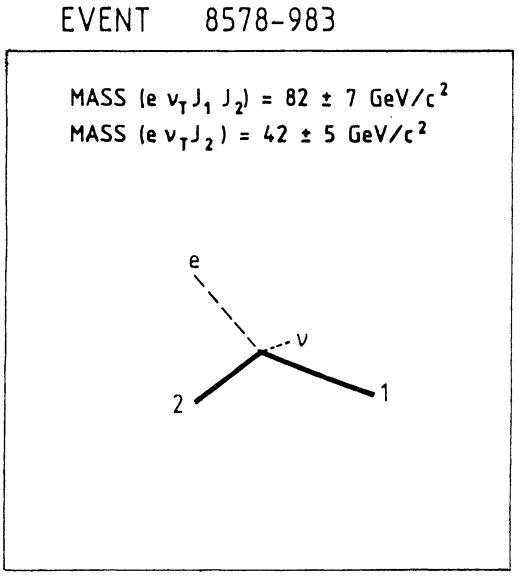
bulletin

WEEK MONDAY 16 JULY n° 29/84 SEMAINE DU LUNDI 16 JUILLET



Two of the candidate 'top' events seen by UA1, showing the characteristic wide separation of the tracks.



Deux des événements candidats 'quark du sommet' observés par UA1 et montrant la large séparation entre les traces qui les caractérise.

Collider reaches for the top

Although the big experiments at the SPS proton-antiproton Collider have taken no new data for a year now, there are still plenty of treasures being unearthed in the data accumulated in 1983. The first big Collider discovery was the clean signal of the W boson's decay into an electron (or muon) and a neutrino ('missing energy'). Attention then turned to the search for other W decays, and UA1 now has an initial indication of the long-awaited 'top' state, the quark needed to complete a nice pattern of three quark pairs, three leptons and three neutrinos. Because this sixth quark is so heavy (experiments at lower energies have failed to find it), its characteristic 'fingerprint' is expected to be 'jets' of hadrons plus single leptons, all with clear separations. The UA1 team isolated a sample of six interactions showing isolated leptons accompanied by two hadron jets (three interactions giving electrons and three giving muons), with all tracks clearly separated. Analysis shows that each event is fully compatible with the decay of a W boson, and the fragments produced by the heavier quark fall into a band around 40 GeV. While these initial suggestions are encouraging, more data is needed from the coming run before it can be said that CERN has reached the top!

Collisionneur : le sommet est en vue !

Bien que les grandes expériences avec le collisionneur proton-antiproton du SPS n'aient plus recueilli de nouvelles données depuis un an déjà, tout ce qu'on a accumulé en 1983 continue à livrer de nombreux trésors. La première grande découverte faite avec le collisionneur fut le signal net de la désintégration d'un boson W sous forme d'un électron (ou d'un muon) et d'un neutrino ('énergie manquante'). Puis l'attention se porta vers la recherche d'autres désintégrations du W et l'équipe d'UA1 a maintenant obtenu une première indication de la présence de l'état appelé 'du sommet', attendu depuis longtemps, c'est-à-dire du quark nécessaire pour compléter le système harmonieux constitué de trois paires de quarks, trois leptons et trois neutrinos. Comme ce sixième quark est très lourd (les expériences à plus basse énergie n'ont d'ailleurs pas permis de le déceler), on pense que son 'empreinte' caractéristique prend la forme de 'jets' de hadrons associés à des leptons isolés, avec des séparations très nettes entre tous ces éléments. L'équipe d'UA1 a découvert un échantillonnage de six interactions montrant des leptons isolés accompagnés par deux jets de hadrons (trois interactions donnant des électrons et trois donnant des muons) avec une séparation nette entre toutes les traces. L'analyse montre que chaque événement est entièrement compatible avec la désintégration d'un boson W, et la masse des fragments produits par le quark plus lourd correspond à un domaine situé autour de 40 GeV. Ces premières indications sont encourageantes, mais il faut attendre que la prochaine période d'exploitation de la machine fournisse davantage de données pour affirmer que le CERN a atteint le sommet !

SEMINARS
SEMINAIRES

Monday 16 July

EP SEMINAR

at 17.00 hrs – Auditorium

Determination of the B–lifetime

by Peter STEFFEN / CERN–EP and DESY

Inclusive production of muons, electrons and hadrons in e^+e^- annihilation into multihadronic final states has been analyzed using the JADE detector at the PETRA storage ring at DESY. The B–lifetime is determined from the measurement of the displacement of the extrapolated tracks from the production vertex of the event. Two different methods of analysis will be presented which give compatible results significantly different from zero.

Wednesday 18 July

THEORETICAL SEMINAR

at 14.00 hrs - Theory Conf. room

The Laplacian of the potential and the order of energy levels

by A. MARTIN / CERN

We prove that for a non-relativistic two-body system, the order of energy levels with the same principal Coulomb quantum number is controlled by the sign of the Laplacian of the (spherically symmetric) potential. If it is positive, the levels with larger angular momentum have lower energy. If it is negative, it is the opposite. In numerous situations in particle and nuclear physics as well as atomic and solid state physics the Laplacian has a definite sign.

Monday 23 July – Friday 27 July

WORKSHOP ON RF-SUPERCONDUCTIVITY

at 09.00 hrs – Concil Chamber

From Monday 23 July to Friday 27 July the Second Workshop on RF Superconductivity will be held at CERN. It is considered as the continuation of the First Workshop held at Karlsruhe in 1980.

The Workshop should sum up the experimental, technological and theoretical progress in the field since 1980 and it should serve the communication between the individual groups working in the fields.

The first day is reserved for status reports of the different laboratories, the next three days will be dedicated to different topics in RF-Superconductivity and the last day will be devoted to the application of RF-Superconductivity for large storage rings.

For more information please contact H. Lengeler (Tel. 5862/2998), EF Division.

Thursday 26 July

CERN COLLOQUIUM

at 16.30 hrs – Auditorium

Ultrahigh energy neutrino physics and astronomy

by Arnon DAR / Technion-Israel Institute of Technology, Haifa, Israel

TRAINING AND
EDUCATION
ENSEIGNEMENT

SUMMER STUDENT LECTURES

Mon.	16 July	08.30	C. Fabjan — Electronics detectors, instrumentation and data acquisition (1)
		10.00	F. James — Monte Carlo (1)
		11.15	V. Weisskopf — Particles and symmetries (1)
Tue.	17 July	08.30	C. Fabjan — Electronics detectors, instrumentation and data acquisition (2)
		10.00	F. James — Monte Carlo (2)
		11.15	V. Weisskopf — Particles and symmetries (2)
Wed.	18 July	08.30	C. Fabjan — Electronics detectors, instrumentation and data acquisition (3)
		10.00	E. Iarocci — Underground experiments in Europe, status and perspectives
		11.15	V. Weisskopf — Particles and symmetries (3)

Thu.	19 July	08.30	W. Bell	Electronics detectors, instrumentation and data acquisition (4)
		10.00	D. Burckhart	Electronics detectors, instrumentation and data acquisition (5)
		11.15	V. Weisskopf	Particles and symmetries (4)
Fri.	20 July	08.30	D. Burckhart	Electronics detectors, instrumentation and data acquisition (6)
		10.00	A. Bogaerts	Electronics detectors, instrumentation and data acquisition (7)
		11.15	---	

Next week

Mon.	23 July	08.30	L. Camilleri	Hard hadronic interactions (1)
		10.00	Bell / Bogaerts / Burckhart / Fabjan	Electronics detectors, instrumentation and data acquisition (8) (Demonstration)
		11.15	---	
Tue.	24 July	08.30	T. del Prete	Soft hadronic interactions
		10.00	L. Camilleri	Hard hadronic interactions (2)
		11.15	E. Wilson	An introduction to accelerators (1)
Wed.	25 July	08.30	L. Camilleri	Hard hadronic interactions (3)
		10.00	E. Wilson	An introduction to accelerators (2)
		11.15	V. Weisskopf	Particles and symmetries (5)
Thu.	26 July	08.30	L. Camilleri	Hard hadronic interactions (4)
		10.00	E. Wilson	An introduction to accelerators (3)
		11.15	V. Weisskopf	Particles and symmetries (6)
Fri.	27 July	08.30	P. Jenni	Missing transverse momentum, a signature for new physics
		10.00	E. Wilson	An introduction to accelerators (4)
		11.15	V. Weisskopf	Particles and symmetries (7)

All lectures are given in English and are held in the Auditorium.

Fellows and Associates Service (4471).

INFORMATIONS ***GENERALES*** GENERAL ***INFORMATION***

ROADS AND CAR PARKS

At short notice, SB Division has had to carry out roadworks at the junction of Routes PAULI and BAKKER (near the LIL building).

The road will be surfaced between 16-20 July.

This junction will therefore be closed. Road users are requested to follow the temporary diversion signs.

Maintenance / Civil Engineering Section SB

ROUTES ET PARKINGS

La Division SB a dû entreprendre, en urgence, le carrefour des routes PAULI-BAKKER (près du bât. LIL).

L'exécution du revêtement routier se fera du 16 au 20 juillet 1984.

Ce carrefour sera donc fermé. Les utilisateurs devront se conformer à la signalisation routière provisoire de déviation.

Section Entretien Génie civil SB

25e ANNIVERSAIRE DES CONCERTS DU CERN

Cette saison 1984-1985 marquera le 25e Anniversaire des Concerts du CERN et nous permettra d'entendre dix ensembles ou solistes prestigieux représentant chacun un Etat membre. Comme pour les saisons précédentes, ces soirées musicales seront accessibles à l'ensemble du personnel mais également au public de la périphérie et d'ailleurs.

L'éclat particulier que nous avons voulu donner à cette saison a pu être obtenu grâce à la collaboration de la Radio Suisse Romande qui enregistrera les dix concerts, et à la généreuse contribution :

- de certains Etats membres,
- de la Société de Banque Suisse,
- des Wagons-lits Tourisme,
- du Restaurant Coop
- et de Gabriel Tortella.

Exceptionnellement, et pour des raisons évidentes, deux concerts seront donnés dans la salle du Grand Casino de Genève. Le succès toujours plus grand de cette activité culturelle nous oblige à lancer dès à présent les demandes d'abonnement, pour nous permettre de pallier à un éventuel dépassement de la capacité de l'Amphithéâtre! Dans cette optique, nous vous prions donc de bien vouloir nous faire parvenir au plus vite votre demande d'abonnement. **Date limite pour les anciens abonnés : lundi 30 juillet.** Après cette date, les places des abonnements non renouvelés seront redistribuées.

SAISON 1984-1985

* Jeudi 27.9.84	**I MUSICI** A. Corelli, A. Vivaldi, N. Paganini, C.Ph.E. Bach
Vendredi 26.10.84	**SOLISTES DE SALZBOURG** W.A. Mozart, D. Dragonetti, P.I. Tchaikowsky, Fr. Schubert, A. Dvorak
* Vendredi 16.11.84	**ORCHESTRE PHILHARMONIQUE DES PAYS DE LA LOIRE** Direction : Marc SOUSTROT H. Dutilleux, J.N. Hummel, H. Berlioz
Vendredi 7.12.84	**QUATUOR SAULESCO** J. Haydn, C.B. Blomdhal, J. Turina, G. Gershwin, D. Chostakovitch
Jeudi 10.1.85	**ENDELLION STRING QUARTETT** W.A. Mozart, B. Britten, L.v.Beethoven
Jeudi 7.2.85	**ORCHESTRE DE CHAMBRE DU NAMUROIS** Direction : Jean-Luc BALTHAZAR
Jeudi 14.3.85	**KAMMERORCHESTER SCHLOSS WERNECK** Direction : Ulf KLAUSENITZER
Jeudi 18.4.85	**RONALD BRAUTIGAM,** piano L.v. Beethoven, Fr. Schubert, S.V. Rachmaninov, R. Schumann
Jeudi 9.5.85	**QUATUOR TARRAGO,** guitares F. Guerero, J. Dowland, G.Ph. Telemann, A. Vivaldi, I. Albeniz, L.L. Balada
Vendredi 7.6.85	**ORCHESTRE DE CHAMBRE NICOLAOS MANTZAROS** N. Mantzaros, D. Vizvardis, P. Kaloyeropoulos, L.v. Beethoven, H. Sutermeister, Fr. Schubert

*Grand Casino de Genève, à 20.30 h
Pour les autres : Amphithéâtre du CERN, à 20.00 h.

Prix des places et abonnements

Série A : 5 concerts Frs. 60.- 27/9, 7/12, 7/2, 18/4, 7/6

Série B : 5 concerts Frs. 60.- 26/10, 16/11, 10/1, 15/3, 9/5

Abonnement général : 10 concerts Frs. 110.-

Prix des billets : vendus en fonction des places disponibles
Amphithéâtre du CERN : Frs 12.-
Grand Casino de Genève : Frs. 12.-, 16.-, 25.-
(Droit des pauvres compris)

N.B. Le prix des abonnements comprend également la place pour le(s) concerts au Grand Casino de Genève dans la catégorie Frs. 16.-.

M^me^, M. _____ Prénom _____

Service _____ bureau _____ Tél. _____

ou

adresse _____ N° C.P. _____ Tél. _____

Souscrit à ____ abonnement(s) série A à Frs. 60.-
____ abonnement(s) série B à Frs. 60.-
____ abonnement(s) général à Frs. 110.-.

Je verse la somme de Frs. _____ sur le compte SBS 751887 'Concerts du CERN', Agence CERN, Meyrin.

Retourner ce bulletin accompagné d'une copie du versement ou chèque à :
G. ADAM, Division SPS, Concerts du CERN, 1211 GENEVE 23.

ANNUAL REPORT 1983 OF THE STAFF INSURANCE SCHEME

The Annual Report 1983 of the Staff Insurance Scheme, which was approved by Council at its session of 28 and 29 June 1984, is now available in English and in French from the Divisional Secretariats.

RAPPORT ANNUEL DE LA CAISSE D'ASSURANCES

Le Rapport Annuel 1983 de la Caisse d'Assurances, approuvé par le Conseil lors de sa session des 28 et 29 juin 1984, est maintenant disponible en français et en anglais auprès des secrétariats de division.

ISR VISITS

The decomissioning of the ISR started on the 26th of June. For security reasons, all visits are strictly forbidden in the ISR tunnel and auxiliary buildings during the dismantling period.

You are also reminded that the ISR tunnel, being a radiation-controlled area, film badges must be worn.

However, if, for a specific reason, visitors do have to enter the tunnel, official authorization is to be requested through the LEP Secretariat.

S. Pichler, A. Perrot
LEP-MA

VISITES DES ISR

Le démontage des ISR est commençé depuis le 26 juin. Pour des raisons de sécurité, toutes les visites sont interdites dans le tunnel des ISR et dans les bâtiments auxiliaires pendant la période de démontage.

Par ailleurs, le tunnel ISR demeure une zone contrôlée de radiations et le port du 'film badge' est obligatoire.

Si, pour des cas spécifiques, des visiteurs doivent entrer dans le tunnel, une demande motivée d'autorisation doit être adressée au Secrétariat de la Division LEP.

S. Pichler, A. Perrot
LEP-MA

LOOKING FOR...

...a black Siemens Wheatstone Bridge, no. DD 90; S/N 543-0. Please contact Mr. J. Rochez, DD, tel. 4899.

On RECHERCHE...

...un pont de mesure de résistances, marque Siemens, couleur noir, N° DD 90; S/N 543-0. Veuillez contacter M. J. Rochez/ DD, tél. 4899.

BULLETIN

ASSOCIATION DU PERSONNEL

Les informations paraissant dans la rubrique «Association du personnel» sont publiées sous la seule responsabilité de l'Association du personnel du CERN.

STAFF ASSOCIATION

The information presented in the Staff Association section of the Bulletin is published under the sole responsibility of the CERN Staff Association.

The other side of CERN

The British Government has decided to review the UK's participation in high energy particle physics. This will be carried out by the Advisory Board for the Research Councils (ABRC) and the Science and Engineering Research Council (SERC) under the chairmanship of Sir John Kendrew.

The proposed terms of reference for the review are :

"Having regard to the long term health of British science and engineering research and to the Common Criteria for the support enunciated by the Advisory Board for the Research Councils in its Second Report, 1974-1975 :

i. to review UK participation in the study of high energy particle physics, with particular reference to that necessarily carried out under international auspices ;

ii. to consider possible future involvement, the role and extent of international collaboration, and the implications of reallocation of the resources in whole or in part to other areas of science ;

iii. to report to the Chairman of the ABRC and the Chairman of the SERC."

Clearly the review group must question the continued participation of the UK in CERN and, already, they have arranged to come here on a fact-finding visit.

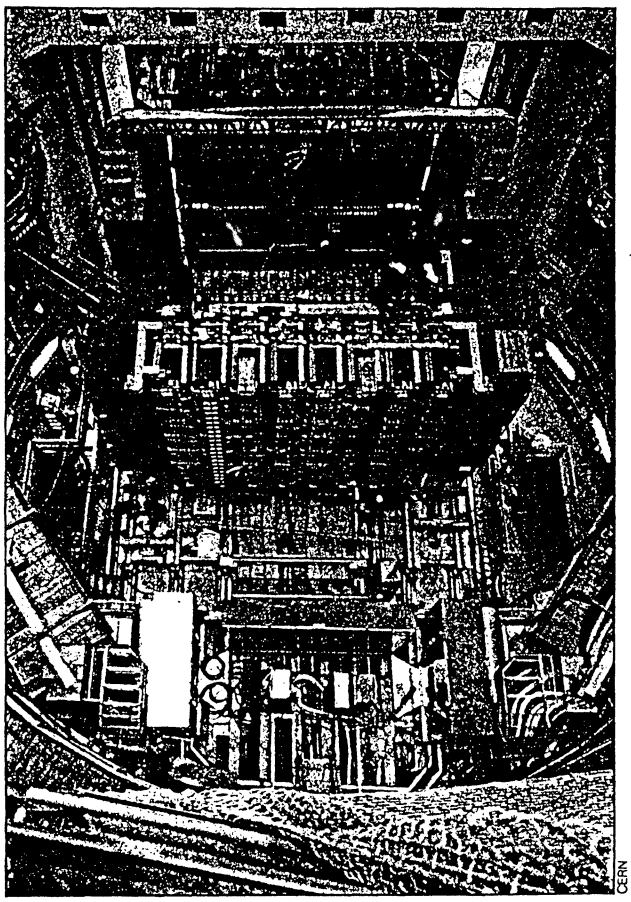
With these events in mind the Staff Association has decided to publish the following article which appeared in the 7 June issue of the New Scientist. It was written by Derek Imrie (Chairman of SERC's Subcommittee on Particle Physics) and John Walsh (UK delegate to CERN's Finance Committee) and is reproduced with their kind permission and that of New Scientist.

> The purpose of the article is to remind not only Britain but all the European countries that CERN has much more to offer than the particle physic results for which it is already world famous.

CERN is well known as Europe's centre for particle physics. But its involvement with R&D in other fields, the business opportunities it offers, and its educational programmes are less familiar. These are CERN's "other side"

Derek Imrie and John Walsh

FROM THE Jura mountains in south-east France on a clear day you can see right across Geneva to the Alps and Mont Blanc. But there below you lies CERN, the European centre for research in particle physics, a monument to European cooperation that straddles the Franco-Swiss border. CERN is the phoenix that rose from the ashes of European science after the Second World War, when the continent's researchers had been flung far and wide to escape persecution or to work for governments on the atomic bomb. Now the laboratory has a number of "firsts" to its credit, including most recently the discovery of the W and Z particles that transmit the weak nuclear force. CERN has also come to symbolise an example—perhaps the only example—of a European collaboration that works. But it has more to offer than its fame in particle physics may at first suggest.



UA1, one of the experiments at CERN which found the W and Z particles last year

When, in the early 1950s, several leading European scientists, encouraged by UNESCO, came to consider a project suitable for collaboration, the field of particle physics (or nuclear physics as it was then called) was a natural choice. The research requires high-energy particle accelerators, and it makes good sense to share the cost of such large facilities among several nations. The European Organisation for Nuclear Research came into being in 1954. Now it is better known by the original acronym CERN, which stands for *Conseil Européen pour la Recherche Nucléaire*, that was dissolved on the formal founding of the Organisation.

Today, 13 states are members of CERN and contribute to its budget in approximate proportion to their GNP. Belgium, Denmark, France, West Germany, Greece, Italy, the Netherlands, Norway, Sweden, Switzerland and the UK were all founder members of the organisation, along with Yugoslavia which subsequently withdrew. The other member states at present are Austria, who joined in 1959 and Spain, which joined in 1961, withdrew for financial reasons in 1968 and rejoined last year. Several other countries have formal or informal links with CERN, including Canada, China, Japan, the US and the USSR.

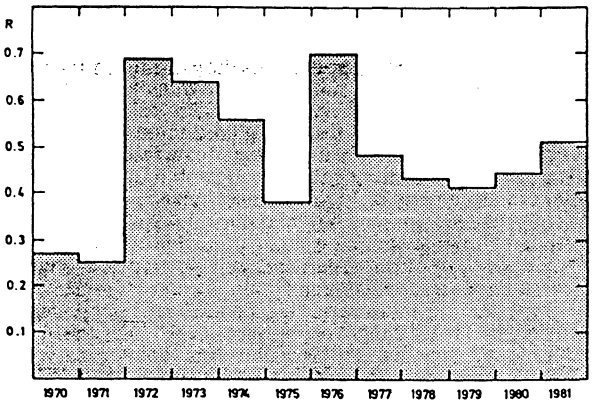
CERN's primary task is to construct and operate world-class high-energy accelerators for its users. During its first 20 years, the establishment grew steadily as its accelerators increased in number and power. The original small site on the Franco-Swiss border near Geneva was enlarged in 1965 when the Intersecting Storage Rings (ISR) were constructed. These were two interlaced rings of magnets designed to store counter-rotating beams of protons and bring them together head-on to produce what were for over a decade the highest-energy particle collisions in the world. A second site in France was added in the early 1970s when the 7-km ring of the Super Proton Synchrotron was built. This accelerates protons to 150 times the energy of CERN's original proton synchrotron.

During the past decade, CERN's budget has declined steadily in real terms and is now around 80 per cent of its peak in 1974. It is currently some £220 million. The organisation took a considerable gamble in 1981 when it decided to construct its next accelertor, its largest ever. This machine, the Large Electron Positron Collider (LEP), will have a circular tunnel 27 km long, stretching out from the existing site under the Jura. It will collide electrons and positrons at energies almost double those reached by existing similar machines. By dint of strict economies in other programmes, closing the ISR while the device was still producing excellent results, and cutting its staff, CERN expects to be able to complete the first phase of LEP by late 1988, within the original cost estimate of £325 million. Needless to say, in these difficult times the prospect of a constant budget has proved illusory; the budget has in fact fallen in real terms by a couple of per cent, though the rate of decline is less steep now than it was in the late 1970s.

There are now just over 3500 staff at CERN, serving an ever-growing community of more than 2600 users from around 200 different institutions. Nearly half the CERN budget is spent on salaries and other personnel costs, and nearly half the remainder on utilities and on contracts for items that must, inevitably, be purchased locally in France

and Switzerland. As a consequence, the money available annually to purchase materials and equipment, for which all member states may reasonably hope to compete, is about £60 million; much of this will be for items for LEP during the machine's six-year building programme.

CERN awards contracts after competitive tender among firms in the member states; the net is cast wider only if no firm in a member state can supply a particular item. Competition is usually severe, because firms recognise that



Britain's return ratio: the fraction of CERN's purchases secured by the UK/the UK's fractional contribution to CERN's budget

supplying CERN brings a variety of benefits. CERN is a valuable "shop window" for advanced equipment, and securing a contract carries the implication that the successful tenderer must be among the best in its field in Europe. A study in 1975 of the knock-on effect of CERN contracts showed that, on average, £100 000 of sales to CERN generated £420 000 of sales elsewhere; surprisingly, perhaps, most of these were to areas outside particle physics. A contract will often require a firm to develop a product or process to a new level of performance. CERN will pay a fair price for the development and may even provide expert assistance.

The past performance of the UK in gaining CERN contracts has been rather mixed. A measure of a country's performance in this respect is the "return ratio", the percentage of CERN's total utilities and materials budget gained by firms in the country, divided by the country's percentage contribution to the CERN budget. As half the budget goes on salaries and so forth, this ratio should be 2 if all of a country's contribution to the CERN budget is being returned by way of industrial contracts. The non-host states have an average return ratio of about 0·5. A few of the smaller ones manage to achieve a ratio of 1 in some years. Only Switzerland consistently scores an average greater than the magic figure of 2.

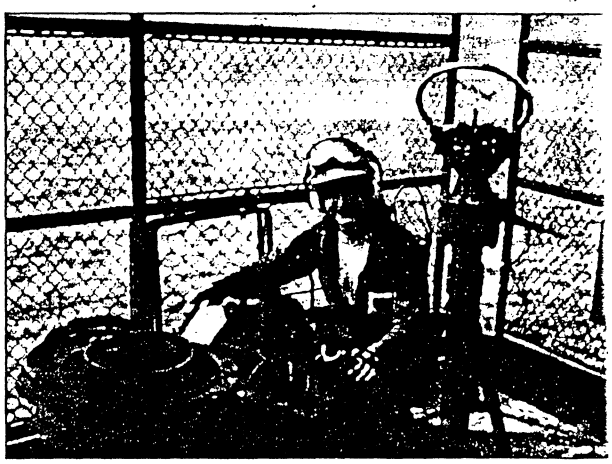
The UK contributes 16·1 per cent of CERN's budget at present; although the UK's return ratio of around 0·5 is quite creditable, there is little doubt that it could do better, given its relatively broad industrial base. As the Figure shows, in the early 1970s, when the SPS was being constructed, it regularly reached values between 0·6 and 0·7. Distant member states are likely to do better when a major project is underway, because large, one-off contracts are on offer, rather than a mass of routine purchases. So far, the UK's performance has not shown the increase one might have hoped for with the LEP project. In some project areas, firms in the UK have done very well; sound preparation has led to competitive tenders. Elsewhere, tenders from Britain have been embarrassingly high by comparison with the average, indicating a lack of international competitiveness, or, possibly, an over-conservative approach to costing research and development activities.

Although one naturally thinks of CERN in terms of high technology—superconducting magnets, high-vacuum systems, electronics, microprocessors, high-speed data links, and so on—a glance at the list of suppliers from the UK during 1983 reveals some surprises. Hidden among the specialist firms are a high-street department store, which provided many of the furnishings for a new hostel, and a well-known academic bookseller, who supplied many of the specialist monographs purchased by the CERN library.

Looking to the future, LEP and its associated experiments will require large quantities of electronic circuits controlled by many microprocessors and minicomputers. The UK's acknowledged expertise in hardware and software should put it in a strong position to gain contracts in these areas.

The Department of Trade and Industry has recently set up a Working Group under the aegis of the British Overseas Trade Board to inform British industry of the business opportunities available at CERN, and to offer legal, marketing and shipping advice. The Working Group aims to increase the UK's ratio of return to around 0·75. If it succeeds, an additional £3 million per annum of contracts from CERN will be won by firms in the UK.

It is not an exaggeration to regard CERN as one of Europe's foremost technical universities—a "European MIT"—whose facilities operate 24 hours a day, seven days a week, for most of the year. Each week there are courses and seminars at a variety of levels. Industrial firms call regularly with travelling exhibitions, and larger exhibitions from the countries involved in CERN are mounted two or three times per year. The constant ebb and flow of users and visitors provides both



Now a petroleum engineer with BP in Aberdeen, Karen Gregson spent a year of her sandwich course in applied physics at Bradford working at CERN as a technical student on an electronic system to emulate an IBM mainframe computer. In her opinion,"CERN is an excellent environment for a young person who is going to work in industry"

changing audiences and new speakers. Just as in other fields, today's creative innovation is tomorrow's routine application, and a new development by one group of experimenters spreads rapidly to others and to their home institutes. The discovery at CERN of the W and Z particles—important participants in the weak nuclear interactions—is a striking example of a development that had lecturers throughout the world revising their undergraduate lecture courses within days of the results being announced. There are many examples in other fields that illustrate the rapidity with which discoveries and technical developments at CERN affect teaching in universities.

CERN provides a variety of opportunities for scientists

and technologists to spend significant periods of time at the laboratory. The Fellows and Associates Programme will pay salaries in full or in part for one or two years to permit graduate personnel to work in many areas of science and engineering. Each year, CERN appoints around 50 fellows on two-year contracts and around 150 associates for shorter periods. The UK fills at least its fair share of these posts, despite severe competition. During the past five years an average of 11 British candidates have been awarded CERN Fellowships each year.

At any time, there are about 200 experimental particle physicists in the UK who are students working for a PhD, or post-doctoral researchers with short-term appointments and spend some time at CERN, either on short visits while their experiment is operational, or for longer periods to set up an experiment, develop equipment or analyse data on the CERN central computers. CERN is an excellent environment for younger staff, owing to the broad spectrum of technologies to which they are exposed, and because all experiments are performed by large, international collaborations. The discipline of working in a multinational team and of learning to produce work on a timescale dictated by the needs of the collaboration is possibly the most important aspect of the training.

There are also two programmes at CERN for undergraduate students. The Technical Students' Programme allows 40 engineering and applied science undergraduates per year to spend between 6 and 12 months on industrial training at CERN. British universities and polytechnics offering sandwich courses have made excellent use of this scheme; since 1976 more than 100 undergraduates from the UK have worked at CERN for the part of their courses where they must spend time in industry.

CERN also organises an annual Summer School for around 100 undergraduates. The students remain at CERN for between one and three months, attend lecture courses and join in the work of one of the divisions. The shortness of British undergraduate courses by comparison with those in other member states means that undergraduates are encouraged to attend the Summer School after completing their degree, which undoubtably dissuades some who wish to take up employment immediately after graduating. The fact that demand from well-qualified British graduates always substantially exceeds the number of places on offer illustrates the quality of the scheme and the esteem in which it is held by the students.

Finally, CERN takes seriously its duty to inform ordinary members of the public about its activities. A variety of pamphlets and other descriptive material is published by the Information Service, and there are guided tours for visitors. A most testing experience for a young graduate student is to find his experimental control room invaded on a quiet Saturday afternoon by a party of 30 to 40 French pensioners, and to be asked by the tour guide if he could possibly explain briefly, in French naturally, what he is doing and why!

CERN's "other side" is part and parcel of its role as a large, international research laboratory, and a good example of the principle that expenditure on "big science" can be expected to provide a broad range of technological, industrial and educational benefits. Perhaps the best commentary on CERN's activities was provided by a distinguished British visitor who, comparing CERN with other European foundations, is alleged to have remarked, "The difference is, this place works!" □

Dr Derek Imrie is reader in physics at University College, London, and chairman of the SERC's Subcommittee on Particle Physics. **John Walsh** is in the SERC's Head Office in Swindon, and is UK delegate on the CERN finance committee.

CLUBS

Y A C H T I N G

Résultats de la Régate du 7 juillet 1984.

Organisation : J. BUCHENBACHER et W. KLEMPT
Surveillance : RODEL/RODEL et TALBOT/TASWELL

Dériveurs

	Bateau	Temps réel	Temps comp.	rang
STEPHEN/WOTSCHAK	485-7	2h42	2h37	1
CHAINTREUIL/BOUILLEU	Caravelle	3h41	3h00	2
HAGELBERG/HELLMAN	420-2	3h30	3h02	3
ROCHEZ/RAY	420-3	3h42	3h13	4

Lestés

SCHUT/SCHUT/VANDOOREN	Blackbird	2h24	2h18	1
BOIMOND/WAELCHI/ROSA	Comet 850	2h27	2h27	2
HENRICHSEN/SWOBODA	Bianca 28	2h44	2h35	3
THOLLE/THOLLE	Sangria	2h57	2h47	4
CANIAC/CANIAC	Meteor	3h24	3h24	5
KOBRIN/LECLERC/ GASE-BONDA	Kelt 8	3h24	3h25	6
STUDER/STUDER	Vega	3h41	3h41	7

Planches à voile

HOYER	Alpha	1h14	1
TURNER	Alpha	1h18	2
HEINZE	Fanatic	1h28+	3
FOCKER	mistral	1h39	4

C R I C K E T

On Sunday, July 8, Geneva C.C. were the visitors in the second of three matches played over the season between the two clubs for the John Harvey Trophy, which is at present held by CERN C.C. In perfect weather conditions the match developed into a closely-fought tussle. Geneva C.C. lost three early wickets, but a forth-wicket stand of 60 saw them to a respectable total, despite a late rash of tumbling wickets. CERN C.C. lost wickets rapidly at first, but from 30 for 6 held out for a draw with finally less difficulty than might have seemed possible at an earlier stage. Scores :

Geneva C.C. : 113 all out
CERN C.C. : 84 for 7
Match drawn.

Since CERN C.C. won the first match of the season this results means that whatever the outcome of the third match, which is due to be played on July 22 (CERN C.C.'s next match), CERN C.C. retain the John Harvey Trophy for 1984.

Net practice is held on Thursdays from 17.30 at the SPS pitch.

Assiduous cricket fans are hereby advised that due to the holiday period there will be no practice on July 26 or August 2, i.e. practice as usual on July 19 and from August 9 onwards.

Anyone interested in cricket is welcome to call 2923 or 2655 for further information.

V E L O

Samedi 14 juillet

Pique-nique du Club - 2 parcours au choix

1. Divonne-Genolier-St. Georges-Col du Marchairuz-Le Brassus-St. Cergues-Gingins-Divonne : 97kms ;
2. Divonne-Genolier-St. Georges-Gimel-Vich-Trelex-Divonne : 68kms.

Départ : 8h.00 à Divonne (Lac), ou rendez-vous directement sur les bords du Lac à 13h.00 sur la zône de pique-nique du Lac avec vos enfants, parents, amis, jeux de plage, jeux de mots, etc... Grill sur place.

Samedi 21 et dimanche 22 juillet

Week-end dans le Jura.

. Samedi 21 juillet :
Départ : Ferney (parking Piscine) 13h.00.
Parcours : St. Cergues-Morbier-Clairvaux les Lacs soit 86 kms.

Le soir : feux de camp et grillades.

. Dimanche 22 juillet :
Départ : Clairvaux
Parcours : St. Claude-Mijoux-Gex-Ferney soit 90kms.

Petit déjeûner et repas assurés. Le transport des sacs sera effectué par un véhicule. La nuit de samedi à dimanche se passera dans une grange et dans le calme. Prévoir son sac de couchage ainsi que ses couverts (pas pour le froid mais pour manger).

P E T A N Q U E

VENDREDI 13 JUILLET 1984 dès 19h.30

Concours en doublettes formées - 3 parties.

Buffet. Buvette.

POUR INFORMATION

COLLECTES A LONG TERME

Nous reproduisons ci-dessous le texte de la lettre qui nous a été adressée le 27 juin 1984 par "Enfants du Monde" concernant le projet de "Mantibirita" en Colombie.

"Nous accusons réception de vos versements du 29 mai 1984 de Frs 125.- et du 20 juin 1984 de Frs 2'500.- que nous avons attribués, comme les précédents, à l'action de parrainages que nous poursuivons en Colombie, en faveur du Centre communautaire de Mantibirita.

Nous vous prions de bien vouloir transmettre nos plus vifs remerciements aux membres de l'Association du Personnel du CERN pour leur fidèle et généreux soutien.

Avec nos meilleurs messages.

Elisabeth HAEMMIG
Responsable des parrainages"

COOPERATIVES

C O O P I N

A PROFITER. Nous offrons à tout acheteur d'un appareil photo un cadeau de 10 Frs.

Pour vos vacances, grand choix de produits solaires de qualité ainsi que des bonnes crèmes pour le visage.

Epilacire pour épilation à la cire chaude.

ACTION. Nous avons encore les films pour quelques jours. Profitez-en !

I N T E R F O N (Bât. 36 S-013)

PERMANENCE TECHNICO-COMMERCIALE : MARDI 17 JUILLET de 14h.30 à 17h.00 au Secrétariat et ensuite au magasin jusqu'à 19h.00. Vous serez informés sur :

. cuisines en bois massif, placage, stratifié, livrées (-30%) ou livrées et installées (-21%) en France et en Suisse. Devis gratuits (REMA).

. Constructions en traditionnel avec possibilité de vous réserver certains travaux ou résidences de vacances dans les Alpes (BERTA-VOISIN).

. Vitrages isolants, vitrerie, miroiterie, menuiseries aluminium (ISO-MIR).

LITERIE SIMMONS. Toute la gamme à prix coopérative.
VELOS, MOBYLETTES MOTOBECANE. Renseignez-vous au Secrétariat et au magasin.

Plats du jour des restaurants

SEMAINE DU 16 Juillet 1984 AU 20 Juillet 1984

Midi/Lunch Time	No. 1 Bâtiment Administratif Administration Building Meyrin (CH)	No. 2 Bâtiment 504 Building 504 Meyrin (CH)	No.3 Bâtiment 866 Building 866 Prévessin (F)
Prix	I 5.10 II 5.90	I 5.30 II 6.10	FF. 17.30 - FF. 22.10
LUNDI/ MONDAY	Spaghetti Zingara Salade Verte Poulet Rôti 2 Garnitures	Spaghetti Bolognaise Roosbeef Maison Pommes Mousseline Légumes	Piperade Niçoise Pommes Purée Légumes Saison Bavette à l'Echalotte
MARDI/ TUESDAY	Oeufs Durs Florentine Riz Sauté d'Agneau à l'Algérienne	Assiette Froide Niçoise Lapin Grand-Mère Nouillettes au Beurre Légumes	Piccata de Porc Spaghetti Légumes Saison Rôti de Veau
MERCREDI/ WEDNESDAY	Salade Niçoise Poitrine de Veau Rôtie 2 Garnitures	Saucisse de Veau Garnie Omelette Fines Herbes Pommes Frites Légumes	Filet de Poisson Provençale Riz Légumes Saison Tête de Veau
JEUDI/ THURSDAY	Schubling Grillé Pommes en Dés Salade Verte Ragoût de Boeuf 2 Garnitures	Raviolis au Parmesan Quiche Lorraine	Hamburger Oeuf à Cheval Pommes Dorées Légumes Saison Truite Meunière
VENDREDI/ FRIDAY	Vol au Vent Charcutière Riz Salade Verte La Marée du Jour Garnie	Les 4 Anchois aux Herbes de Provence Truite Meunière Pommes Persillées Légumes	Tendron de Veau Gratin Dauphinois Légumes Saison Merguez

Heures d'ouverture

Restaurant No.1
Lundi au Vendredi :
06h30 à 02h30
Samedi et Dimanche :
1. Cafétaria : 08h à 20h
2. Restaurant : 11h30 à 14h
18h00 à 19h30

Restaurant No.2
Lundi au Vendredi :
06h à 20h30
Samedi :
08h00 à 14h00

Restaurant No.3
Lundi au Vendredi :
07h00 à 18h00
(Restauration à midi seulement)

CALENDRIER HEBDOMADAIRE 1984 WEEKLY CALENDAR

LUNDI / MONDAY 16.7

(A) **SUMMER STUDENT LECTURES**

8 30 Electronics detectors, instrumentation and data acquisition (1)
by C. FABJAN

10 00 Monte Carlo (1)
by F. JAMES

11 15 Particles and symmetries (1)
by V. WEISSKOPF

17 00 **EP SEMINAR** (A)
Determination of the B-lifetime
by P. STEFFEN / CERN-EP and DESY

MARDI / TUESDAY 17.7

(A) **SUMMER STUDENT LECTURES**

8 30 Electronics detectors, instrumentation and data acquisition (2)
by C. FABJAN

10 00 Monte Carlo (2)
by F. JAMES

11 15 Particles and symmetries (2)
by V. WEISSKOPF

MERCREDI / WEDNESDAY 18.7

(A) **SUMMER STUDENT LECTURES**

8 30 Electronics detectors, instrumentation and data acquisition (3)
by C. FABJAN

10 00 Underground experiments in Europe, status and perspectives
by E. IAROCCI

11 15 Particles and symmetries (3)
by V. WEISSKOPF

14 00 **THEORETICAL SEMINAR** (Th)
The Laplacian of the potential and the order of energy levels
by A. MARTIN / CERN

17 45 **CINE-CLUB** (A)
Dark Star
by Dir. J. Carpenter
Int. B. Narelle, D. O'Bannon

JEUDI / THURSDAY 19.7

(A) **SUMMER STUDENT LECTURES**

8 30 Electronics detectors, instrumentation and data acquisition (4)
by W. BELL

10 00 Electronics detectors, instrumentation and data acquisition (5)
by D. BURCKHART

11 15 Particles and symmetries (4)
by V. WEISSKOPF

20 30 **CINE-CLUB** (A)
Dark Star
by Dir. J. Carpenter
Int. B. Narelle, D. O'Bannon

VENDREDI / FRIDAY 20.7

(A) **SUMMER STUDENT LECTURES**

8 30 Electronics detectors, instrumentation and data acquisition (6)
by D. BURCKHART

10 00 Electronics detectors, instrumentation and data acquisition (7)
by A. BOGAERTS

23.7

(A) **SUMMER STUDENT LECTURES**

8 30 Hard hadronic interactions (1)
by L. CAMILLERI

10 00 Electronics detectors, instrumentation and data acquisition (8) (Demonstration)
by BELL / BOGAERTS / BURCKHART / FABJAN

9 00 **WORKSHOP ON RF-SUPERCONDUCTIVITY** (C)

24.7

(A) **SUMMER STUDENT LECTURES**

8 30 Soft hadronic interactions
by T. DEL PRETE

10 00 Hard hadronic interactions (2)
by L. CAMILLERI

11 15 An introduction to accelerators (1)
by E. WILSON

9 00 **WORKSHOP ON RF-SUPERCONDUCTIVITY** (C)

25.7

(A) **SUMMER STUDENT LECTURES**

8 30 Hard hadronic interactions (3)
by L. CAMILLERI

10 00 An introduction to accelerators (2)
by E. WILSON

11 15 Particles and symmetries (5)
by V. WEISSKOPF

9 00 **WORKSHOP ON RF-SUPERCONDUCTIVITY** (C)

26.7

(A) **SUMMER STUDENT LECTURES**

8 30 Hard hadronic interactions (4)
by L. CAMILLERI

10 00 An introduction to accelerators (3)
by E. WILSON

11 15 Particles and symmetries (6)
by V. WEISSKOPF

9 00 **WORKSHOP ON RF-SUPERCONDUCTIVITY** (C)

16 30 **CERN COLLOQUIUM** (A)
Ultrahigh energy neutrino physics and Astronomy
by Arnon DAR / Technion-Israel Institute of Technology, Haifa, Israel

27.7

(A) **SUMMER STUDENT LECTURES**

8 30 Missing transverse momentum, a signature for new physics
by P. JENNI

10 00 An introduction to accelerators (4)
by E. WILSON

11 15 Particles and symmetries (7)
by V. WEISSKOPF

9 00 **WORKSHOP ON RF-SUPERCONDUCTIVITY** (C)

(A) Amphithéâtre/bât. Auditorium/bldg. 500

(C) Salle du Conseil/bât. Council Chamber/bldg. 503

(Th) Salle Théorie/bât. Theory lecture room/bldg. 4

(L) Amphithéâtre LEP/bât. 30-7e ét. LEP Auditorium/bldg. 30-7th fl.

(PS) Amphithéâtre PS/bât. 6, 2-024 PS Auditorium/bldg. 6, 2-024

(DG) Sixth Floor Conference Room ADM bldg. (60)
Salle de conférence du 6e ét. bât. ADM

(S) SPS Auditorium – Prévessin/Bloc 1 – 1st fl.
Amphithéâtre SPS 1er ét.

(DD) DD Auditorium bldg. 31-3rd fl.
Amphithéâtre DD bât. 31-3e ét.

▶ lieu selon indication / place as indicated

(EF) EF Conference Room bldg. 13, 2-005
Salle de conférence EF bât. 13, 2-005

Deadline for insertions: Tuesday 12.00 hours
Staff Association (Wilson Hut) – Tel. 2819
Publications Section (DOC) – Tel. 4106-3475

Dernier délai pour insertions: mardi 12 h 00
Association du Personnel (Bar. Wilson) – Tél. 2819
Section des Publications (DOC) – Tél. 4106-3475