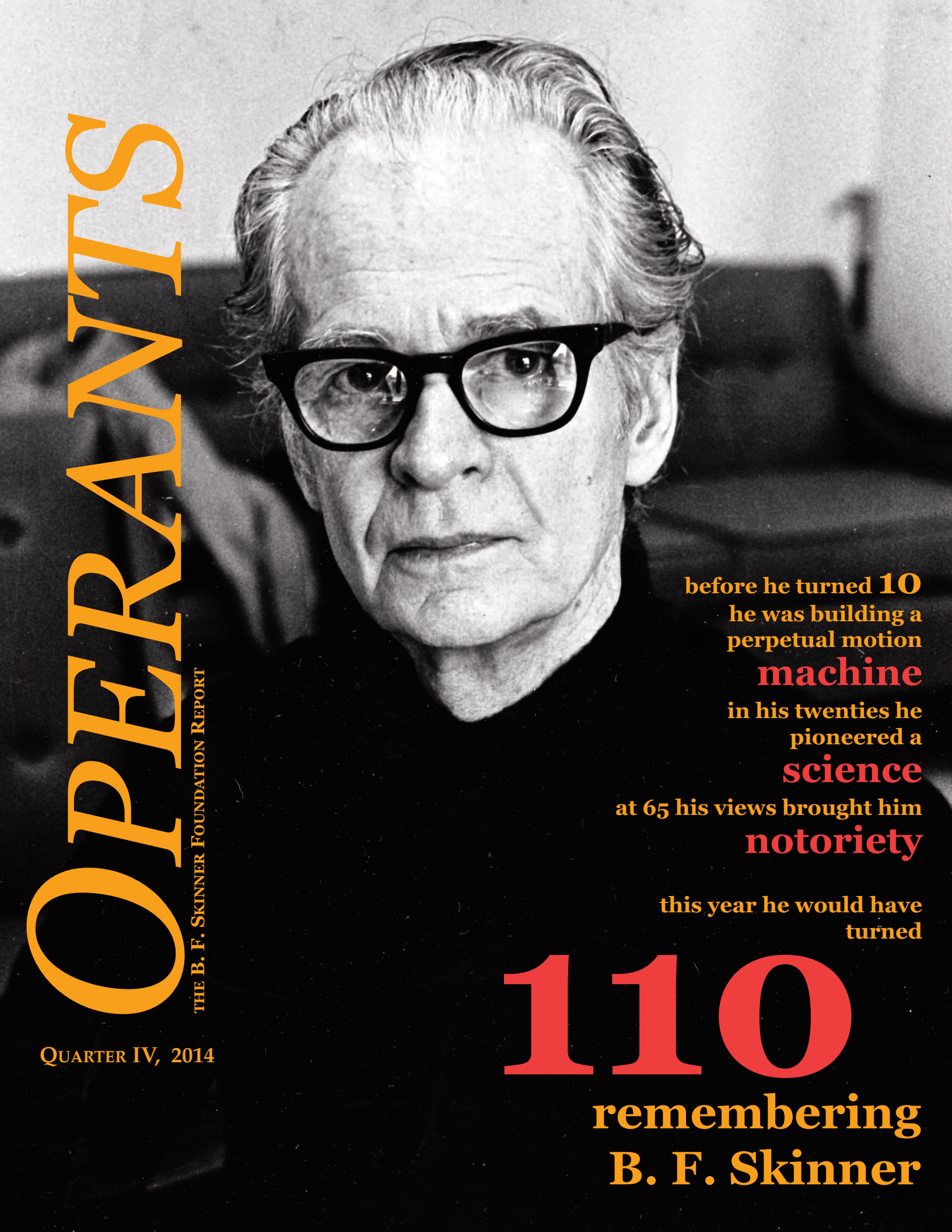


OPERANTS

THE B. F. SKINNER FOUNDATION REPORT

QUARTER IV, 2014

before he turned **10**
he was building a
perpetual motion
machine

in his twenties he
pioneered a
science

at 65 his views brought him
notoriety

this year he would have
turned

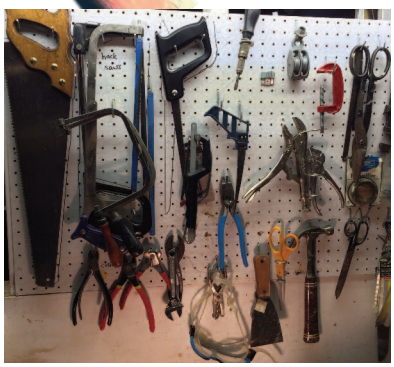
110

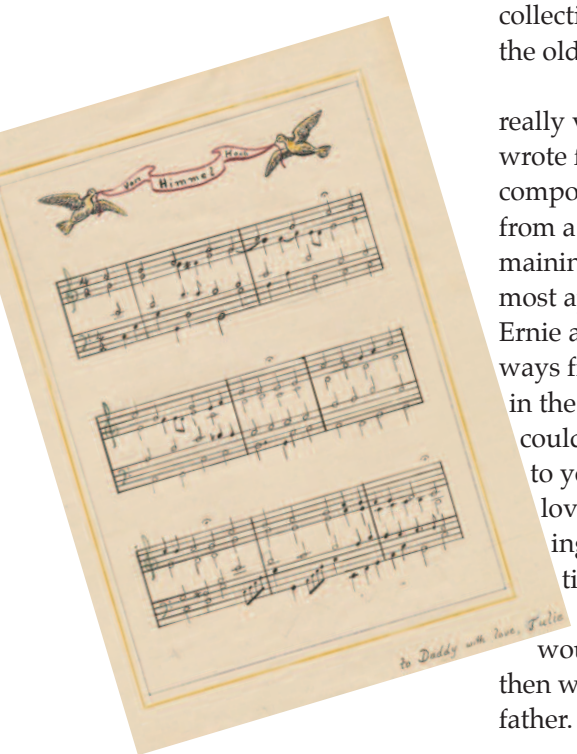
remembering B. F. Skinner

from the president

In Search for the Perfect Gift

This special issue commemorates the 110th anniversary of Skinner's birth. Since we are in the holiday season, I thought I'd write about the difficulties of finding presents for my father. My husband Ernie and I struggled every year to think of something my father would like. Books or audio recordings should have been easy– but not when my father instantly sent off for any book or recording he wanted. Clothing was out. He had enough pajamas and shirts. And many holidays he received a new silk tie from my mother, purchased at the Museum of Fine Arts in Boston where she volunteered. My father appreciated good tools, but he already had a complete set. One holiday, I noticed how beat-up his hammer was, and Ernie and I bought him a new one. He added it to his collection without, we noticed, giving away the old one.





I remember, however, two presents that he really valued. The first was a piece of music that I wrote for an assignment in my undergraduate composition class. We were given a soprano line from a Bach hymn and asked to add our own remaining voices. The second gift that my father most appreciated was not the most expensive gift Ernie and I have ever given. My father was always fixing things, often sacrificing a knife blade in the process. Ernie and I spotted a tool that he could use: a short screw driver you could attach to your key ring. It cost a bit over $1.00. He loved it. We saw him use it many times, saving many pocket knife blades from decapitation.

Were my father alive today, a perfect gift would be a full year of *Operants*. This issue then would complete our 2014 holiday gift to my father.

Julie S. Vargas, Ph.D.
President, B. F. Skinner Foundation

from the president

Chinese Traditional Translated by Coco Liu

這一期特刊紀念Skinner的誕辰110週年，由於我們是在節日期間，所以我想寫尋找禮物為我的父親的困難是多麼的困難。我和我的丈夫ERNIE，我們每年都在努力思考的東西我的父親會喜歡的。書籍或錄音已應該是很容易，但是我父親看到任何他喜歡的書或者錄音都會馬上買。衣服不行，他有足夠的睡衣和襯衫。許多節日，他都會收到我的母親送的一個新的真絲領帶，是在她工作的在波士頓的美術博物館購買的。我父親欣賞的好的工具，但他已經有了一套完整。一個假期，我注意到他的錘子已經不成樣子了，我和ERNIE給他買一個新的。他加到他的收藏裡，我們注意到，他把舊的送人了。
我記得，有兩個禮物，他真的很重視。首先是一段音樂，我寫在我的大學本科的畢業作品。我們要從巴赫的讚美詩女高音線，增加自己的聲音。我父親最欣賞的第二個禮物是不是我和ERNIE送的最貴的禮物。我的父親總是在修東西。往往在這個過程中刀子會受傷。我和ERNIE發現了他可以使用工具：短螺絲起子，你可以連接到你的鑰匙圈。它的成本$ 1.00元多。他很喜歡。我們看見他多次使用，節省很多小刀刀片。

今天我的父親如果在，一個完美的禮物將是Operants滿一年。這一期，會完成我們2014年的節日禮物給爸爸。

Chinese Simplified Translated by Coco Liu

这一期特刊纪念Skinner的诞辰110周年，由于我们是在节日期间，所以我想写寻找礼物为我的父亲的困难是多么的困难。我和我的丈夫ERNIE，我们每年都在努力思考的东西我的父亲会喜欢的。书籍或录音已应该是很容易，但是我父亲看到任何他喜欢的书或者录音都会马上买。衣服不行，他有足够的睡衣和衬衫。许多节日，他都会收到我的母亲送的一个新的真丝领带，是在她工作的在波士顿的美术博物馆购买的。我父亲欣赏的好的工具，但他已经有了一套完整。一个假期，我注意到他的锤子已经不成样子了，我和ERNIE给他买一个新的。他加到他的收藏里，我们注意到，他把旧的送人了。

我记得，有两个礼物，他真的很重视。首先是一段音乐，我写在我的大学本科的毕业作品。我们要从巴赫的赞美诗女高音线，增加自己的声音。我父亲最欣赏的第二个礼物是不是我和ERNIE送的最贵的礼物。我的父亲总是在修东西。往往在这个过程中刀子会受伤。我和ERNIE发现了他可以使用工具：短螺丝起子，你可以连接到你的钥匙圈。它的成本$ 1.00元多。他很喜欢。我们看见他多次使用，节省很多小刀刀片。

今天我的父亲如果在，一个完美的礼物将是Operants满一年。这一期，会完成我们2014年的节日礼物给爸爸。

Japanese Translated by Kanako Otsui

今号の「オペラント」はスキナー誕生110周年を祝したものです。今はちょうどクリスマスやお正月といった年末年始の時期ですので、私の父にプレゼントを探すのがいかに難しかったかということをお話ししたいと思います。私の夫アーニーと私は毎年、父が気に入りそうなものを考えるのに苦労しておりました。本、あるいは音楽などは簡単に思い浮かぶものですが、父は自分の欲しい本や音楽をすぐに自分で注文してしまうので、プレゼントとしてはふさわしくありませんでした。服もダメ。十分なくらいパジャマやシャツを持っていました。また、この時期のプレゼントで父はよく、母から彼女が働いていたボストン美術館で買った新しいシルクのネクタイをもらっていました。父は上等な工具をもらうととてもありがたがっていましたが、すでに全て一式揃ったものを持っていました。ある年、父の金槌が使い古されてボロボロになっていることに気が付き、アーニーと私は新しい金槌を買って父にプレゼントしました。彼はそれを自分の工具一式の中に加えたのですが、古いボロボロの金槌は捨てずにまだありました。
しかし、私は父が非常に喜んでくれたプレゼントを２つ覚えています。１つは、私が大学生のときに作曲の授業の課題で作った楽曲でした。その課題は、バッハの讃美歌からソプラノの節が与えられ、その他のパートを自分たちで作るというものでした。父が最も喜んだもう１つのプレゼントは、アーニーと私がこれまでにあげたプレゼントの中で一番高いものだったというわけではありません。父はいつも何かを修理していたのですが、修理中よくナイフの刃をダメにしてしまっていました。アーニーと私は彼が使えそうな工具を見つけました。それは、キーホルダーに付けることができる小さなドライバーで、1ドルちょっとでした。父はそれを大変気に入りました。私たちは父がそのドライバーを使っているのを何度も見かけました。おかげで、たくさんのポケットナイフの刃を折ってしまうこともなくなりました。
もし今日父が生きていたならば、一年分の「オペラント」が最適なプレゼントとなったことでしょう。そして今回の号は2014年を締めくくる父へのプレゼントとなったのでしょう。

French Translated by Laurent Madelain

Ce numéro spécial célèbre le 110éme anniversaire de la naissance de Skinner. Puisque nous sommes en période de fêtes, j'ai pensé écrire sur la difficulté à trouver des cadeaux pour mon père. Chaque année, mon mari, Ernie, et moi même devions faire un effort pour trouver quelque chose qui ferait plaisir à mon père. Des livres, ou des enregistrements audio, auraient été un choix facile, mais pas pour mon père qui achetait immédiatement tout livre ou enregistrement qu'il désirait. Les vêtements étaient proscris, il possédait suffisamment de pyjamas ou de chemises. Et il reçut souvent une nouvelle cravate de soie de la part de ma mère, qu'elle achetait au musée des beaux-arts de Boston où elle travaillait. Mon père aimait les bons outils, mais il en possédait déjà une panoplie complète. Une année je m'aperçus que son marteau était abimé et Ernie et moi lui en avons offert un nouveau. Il l'ajouta à sa collection sans se débarrasser de l'ancien, comme nous nous en aperçûmes.

Toutefois, je me souviens de deux cadeaux qu'il appréciât vraiment. Le premier était une pièce musicale que j'avais écris pour un devoir de ma classe de composition. Il fallait compléter un hymne de Bach à partir de l'air du soprano en y ajoutant des voix. Le second cadeau favori de mon père fut le présent le moins chère qu'Ernie et moi avons jamais offert. Mon père réparait toujours des ob

French (continued)

jets, sacrifiant souvent la lame d'un couteau. Ernie et moi avions remarqué un outil qu'il pourrait utiliser : un petit tournevis qui pouvait être mis sur un porte-clefs. Il coutait un peu plus d'un dollars. Il l'adorait. Nous l'avons vu l'utiliser très souvent, épargnant ainsi de nombreux couteaux de poche.

Si mon père était vivant aujourd'hui, un cadeau parfait serait une année de la publication d'*Operants*. Le présent numéro compléterait ainsi notre cadeau de noël 2014 pour mon père.

Hebrew Translated by Shiri Ayvazo

גיליון מיוחד זה מנציח את יום השנה ה 110 להולדתו של סקינר. מאחר ואנו נמצאים בתקופת החגים, חשבתי לכתוב על הקשיים במציאת מתנות לאבי. בעלי ארני ואני היינו מתחבטים בכל שנה בחשיבה על משהו שאבי היה מעוניין בו. ספרים, או הקלטות שמע היו יכולים להיות אפשרות קלה אך לא כאשר אבי תר מיד אחר כל ספר או הקלטה שהיה מעוניין בו. בגדים היו מחוץ לתחום. היו לו מספיק פיג'מות וחולצות. ובחגים רבים הוא קיבל מאמי עניבת משי חדשה, שנרכשה במוזיאון לאומנויות טהורות בבוסטון, בו היא עבדה. אבי העריך כלים טובים, אבל כבר הייתה לו ערכת כלים שלמה. באחד החגים שמתי לב עד כמה הפטיש שלו היה שחוק, וארני ואני קנינו לו פטיש חדש. הוא הוסיף את הפטיש לאוסף שלו, וזאת, שמנו לב, מבלי לוותר על הפטיש הישן.

אני זוכרת, בכל אופן, שתי מתנות שהוא באמת העריך. הראשונה הייתה יצירה מוסיקלית שכתבתי כחלק ממטלה בקורס הלחנה בלימודי התואר הראשון שלי. נתנו לנו שורת סופרנו מפיוט של באך וביקשו מאיתנו להוסיף קולות נותרים משלנו. המתנה השנייה שאבי העריך ביותר לא הייתה המתנה היקרה ביותר שארני ואני אי פעם הענקנו. אבי כל הזמן היה מתקן דברים, פעמים רבות היה מקריב להב סכין תוך כדי התהליך. ארני ואני הבחנו בכלי שהוא יכול היה להשתמש בו: מברג קצר שניתן להצמידו לטבעת המפתח. זה עלה מעט יותר מ $1. הוא אהב את זה. ראינו אותו משתמש בזה פעמים רבות, ומציל להבי סכיני כיס רבים משבירה.

אם אבי היה חי היום, מתנה מושלמת הייתה שנה שלמה של *אופרנטים*. הגיליון הזה, אם כן, ישלים את מתנת החג שנת 2014 לאבי.

Italian Translated by Anna Luzi

Questo numero speciale commemora il 110 ° anniversario della nascita di Skinner. Visto che siamo in periodo natalizio, ho deciso di raccontare quant'era difficile scegliere i regali per mio padre. Con mio marito Ernie ci siamo arrovellati ogni anno nel pensare a qualcosa che sarebbe potuto piacere a mio padre. Sarebbe stato facile puntare su libri, o registrazioni audio, ma non quando a mio padre venivano spediti in tempo reale tutti i libri o le registrazioni che voleva. L'abbigliamento era fuori discussione. Aveva già abbastanza pigiami e camicie. E per molti anni ha ricevuto una nuova cravatta di seta da mia madre, acquistata presso il Museum of Fine Arts di Boston, dove lei lavorava. Mio padre apprezzava anche gli utensili di qualità, ma ne aveva già un set completo. Un anno ho notato quant'era consumata la testa del suo martello, ed Ernie e gliene ha comprato uno nuovo. E abbiamo notato che lui lo ha aggiunto alla sua collezione senza disfarsi di quello vecchio.

Ricordo, però, due regali che veramente gli sono piaciuti. Il primo era un pezzo di musica che ho scritto per un compito di Composizione durante le scuole superiori. Dovevamo eseguire un pezzo in chiave di soprano da un inno Bach e io chiesto di aggiungere le nostre voci. Il secondo regalo che mio padre ha apprezzato di più non è stato il dono più costoso che io ed Ernie gli avessimo mai fatto. A mio padre è sempre piaciuto riparare gli oggetti, spesso rimettendoci la lama dei coltelli nel corso dell'operazione. Ernie ed io adocchiammo uno strumento che avrebbe potuto essergli utile: un piccolo cacciavite che si poteva appendere al portachiavi. Ci è costato poco più di un dollaro. Se ne innamorò. Glielo abbiamo visto usare spessissimo e fu così che riuscimmo a salvare dalla decapitazione la lama di molti coltellini da tasca.

Se mio padre oggi fosse ancora vivo, il dono perfetto sarebbe stato un anno pieno di Operants. Questo numero in particolare sarebbe stato il suo regalo di Natale per il 2014.

Norwegian Translated by Monica Vandbakk

Dette spesialnummeret hedrer at det er 110 år siden Skinner ble født. Ettersom vi nærmer oss høytiden tenkte jeg å skrive om hvor vanskelig det var å finne en presang til min far. Min mann Ernie og jeg strevde hvert år med å komme på noe som min far kunne like. Bøker eller lydbøker kunne vært enkelt – men slett ikke når min far øyeblikkelig bestilte hver eneste bok eller opptak han ønsket seg. Klær var utelukket. Han hadde tilstrekkelig med pysjamaser og skjorter. Han hadde i mange år fått nye silke slips som vår mor hadde handlet Museum of Fine Arts i Boston, hvor hun arbeidet. Min far verdsatte godt verktøy, men han hadde allerede et komplett sett. En jul la jeg merke til at hans hammer var i ferd med å gå i stykker, og Ernie og jeg kjøpte en ny hammer til ham. Denne innlemmet han i samlingen sin, men vi la merke til at han også beholdt den gamle.

Jeg husker for øvrig to gaver han virkelig satte pris på. Den første var et stykke jeg skrev som en skoleoppgave i musikk. Vi fikk utdelt en sopranlinje fra et stykke av Bach og oppgaven var å legge til øvrige stemmer. Den andre gaven min far virkelig verdsatte var ikke den mest kostbare Ernie og jeg hadde gitt ham. Min far drev alltid å fikset på ting, og ofte ofret han et knivblad i prosessen. Ernie og jeg kom over et verktøy han kunne ha bruk for: en kort skrutrekker som kunne festes til nøkkelringen. Den kostet litt over en dollar. Han elsket den. Vi så han bruke den mange ganger, og denne gaven reddet antagelig mang et knivblad fra ødeleggelse.

Hadde min far vært i live i dag så ville en perfekt gave vært en hel årgang med Operant's. Dette nummeret ville dermed gjøre vår julegave til min far i 2014 komplett.

Portuguese Translated by Monalisa Leão

Essa edição especial comemora o 110º aniversário de Skinner. Uma vez que estamos em temporada de festas, eu pensei que escreveria sobre as dificuldades de encontrar presentes para o meu pai. Meu marido Ernie e eu lutávamos todos os anos para pensar em algo que meu pai poderia gostar. Livros ou gravações de áudio deveriam ter sido uma boa opção – mas não quando o meu pai dispensava imediatamente qualquer livro ou registro que ele queria. Roupas ficavam de fora. Ele tinha pijamas e camisas suficientes. E em muitas férias ele recebeu uma nova gravata de seda da minha mãe, comprada no Museu de Belas Artes em Boston onde ela trabalhava. Meu pai apreciava boas ferramentas, mas ele já tinha um conjunto completo. Houve um fim de ano em que eu notei como estava velho o seu martelo e, então, Ernie e eu compramos para ele um novo. Ele o adicionou à sua coleção, como notamos, mas sem se desfazer do martelo antigo.

Eu recordo, no entanto, de dois presentes que ele realmente apreciou. O primeiro foi uma peça de música que eu escrevi como um exercício da minha aula de composição na graduação. Nós recebemos uma parte soprano de uma partitura de Bach e foi nos solicitado para adicionar nossas próprias vozes. O segundo presente que meu pai mais apreciou não foi o presente mais caro que Ernie e eu já demos a ele. Meu pai sempre consertou coisas, muitas vezes sacrificando uma lâmina da faca no processo. Ernie e eu encontramos uma ferramenta que ele poderia usar: uma chave de fenda curta que poderia ser anexada em seu chaveiro. Tal ferramenta custou um pouco mais de US $ 1,00. Ele adorou. Nós o vimos usá-la muitas vezes, salvando muitas lâminas de canivetes de decapitação.

Se meu pai estivesse vivo hoje, um presente perfeito seria um ano completo de *Operants*. Essa edição, então, completaria nosso presente de fim de ano de 2014 para o meu pai.

Russian Translated by Konstantin Evdokimov

Этот специальный памятный выпуск *Operants* посвящен 110-летию со дня рождения Скиннера. Поскольку праздники не за горами, я решила рассказать о том, насколько трудно было найти подарки для моего отца. Каждый год мой муж Эрни и я ломали голову над тем, чем ему угодить. Казалось бы, самое простое решение – книги и пластинки, но только не со Скиннером. Если ему хотелось прочесть книгу или послушать музыку, он их немедленно заказывал. Тема одежды не существовала. Пижам и рубашек у него было достаточно, и на многие праздники он получал новый шелковый галстук от моей матери, купленный в Музее изобразительных искусств в Бостоне, где она работала. Мой отец ценил хорошие инструменты, но у него уже был полный набор. Как-то перед праздниками я обратила внимание, насколько “потрепанным” был его молоток, и мы с Эрни купили ему новый. Он добавил его в свою коллекцию, но, как мы заметили, старый не выбросил.

Однако я помню два подарка, которые он действительно ценил. Первым был музыкальный отрывок, который я написала, выполняя задание для класса по композиции. Нам дали строку сопрано из гимна Баха и попросили добавить от себя оставшиеся голоса. Второй подарок, которым мой отец очень дорожил, обошелся нам с Эрни гораздо дешевле многих других. Мой отец всегда что-то чинил, часто жертвуя в процессе лезвием перочинного ножа. Мы заметили в магазине инструмент, который он мог бы использовать: короткую отвертку, крепящуюся к связке ключей. Стоила она чуть больше $1. Скиннер буквально влюбился в эту отвертку. Много раз у нас на глазах он пользовался ею, и его карманный нож был спасен от обезглавливания.

Будь отец жив сегодня, прекрасным подарком для него стала бы годичная подписка на *Operants*. И этот номер, последний в 2014 году, – праздничный подарок моему отцу!

Spanish Translated by Steven Rodrigues

Esta edición especial conmemora el 110 aniversario del nacimiento de Skinner. Ya que estamos en la temporada de vacaciones, pensé que me gustaría escribir sobre las dificultades de encontrar regalos para mi padre. Mi marido Ernie y yo luchabamos cada año para pensar en algo que mi padre le gustaría. Libros, o grabaciones de audio deberían haber sido fácil, pero no cuando mi padre inmediatamente impulsado por cualquier libro o una grabación que él quería. Ropa estaba fuera. Tenía suficientes pijamas y camisas. Y muchas vacaciones que recibió un nuevo colbata de seda de mi madre, comprado en el Museo de Bellas Artes de Boston, donde ella trabajaba. Mi padre apreciaba buenas herramientas, pero ya tenía un juego completo. Un día de fiesta me di cuenta de cómo era destartalado su martillo, y Ernie y yo le compromas uno nuevo. Añadió que a su colección fuera, nos dimos cuenta, regalando a la antigua.

Recuerdo, sin embargo, dos regalos que realmente valora. La primera fue una pieza musical que escribí para una misión en mi clase de composición de pregrado. Nos dieron una línea de soprano de un himno Bach y pedimos que añadiera nuestras propias voces restantes. El segundo regalo que mi padre más aprecio no era el regalo más caro que Ernie y yo hemos dado. Mi padre siempre estaba arreglando las cosas, a menudo sacrificaba una hoja de cuchillo en el proceso. Ernie y yo vimos una herramienta que podría usar: un destornillador corto usted podría adjuntar a su llavero. Le costó un poco más de $ 1.00. A él le encantó. Lo vimos usarlo muchas veces, salvando muchas hojas de cuchillo de bolsillo de la decapitación.

Estubiera mi padre viviendo hoy, un regalo perfecto sería un año lleno de Operantes. Este problema, entonces, sería completar nuestro regalo 2014 de vacaciones a mi padre.

features and articles

We want to thank volunteer Correspondents and Translators who helped to produce *Operants* in 2014:

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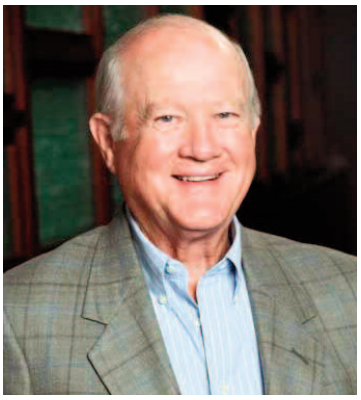
cover story

Brief Encounters
of the Skinner Kind ...

For this special issue we asked a few people who knew Skinner to share a favorite memory of him. Some encounters happened during a scientific gathering, some at a dinner table, some on a small plane or in an elevator. We hope you will enjoy these anecdotes, and that you will understand Skinner the man and Skinner the scientist a liitle better.

Contributed by Aubrey C. Daniels, Ph.D.:



In interacting with Dr. Skinner, you would certainly not have known that he was a world famous person. In my opinion, the final assessment of his influence on world affairs and daily life is yet to be written as his work is still largely unknown and much that is known and written about it has been critically misrepresented by the media and psychologists. His discoveries about behavior are truly changing the way the world works.

I was fortunate to have had several occasions to talk to Dr. Skinner, and as with most people who knew him, I was not only in awe but also found myself pleasantly surprised by what he did and said. What impressed me most was how comfortable Dr. Skinner made me feel. One particular occasion that I will forever remember is when I went to his house in early 1990 to interview him for an article I was writing for *Performance Management Magazine*. Although he died in August 1990, he didn't seem ill and, to the contrary, had a lot of energy as he showed me around his basement office and as we talked for a couple of hours. I'm certain everyone who read his books would have loved to see where and how he worked. His desk had a shade against the wall. When he pulled it down, it activated a clock that kept data on how long he wrote each day. I think he planned two hours. He also had a bed in his office that was given to him by a Japanese company. It was a one-piece bed that I suppose was modernistic for its time, which included a TV, radio (he listened to the BoSox), and a clock. He autographed his latest book as we were talking and signed it upside down (in the back), which made it even more special to me.

Although the occasions where I was able to be with him up close and personal were infrequent, he was always humble, polite, and humorous. He laughed about some of the outrageous criticisms that involved not only what he wrote but also about his children. Robert Epstein, one of his students who did research and writing with him, commented to me that he was the only psychologist that used his research findings in his life. When his influence is assessed in the next decade, I am sure it will have impacted the way we live at home, at work, and at play, and it has brought out the best in people worldwide. Having the opportunity to spend just a little time with Dr. Skinner certainly has had a lasting impact on what has become my life's work. ■

Contributed by David C. Palmer, Ph.D.:

Shortly after graduating from college in 1969, I stumbled on the book *Walden Two*, and it changed my life. I began reading the rest of the Skinner books and soon became a public nuisance, grabbing strangers by the lapel and trying to persuade them of the elegance, parsimony, and power of radical behaviorism. In 1977, I wrote to Skinner thanking him for making sense of the world for me, and to my amazement, he replied by return mail, inviting me to come to Cambridge to talk with him. A few days later I spent an exciting half-hour with him talking about alternative communities, cultural evolution, and the role of behavioral principles in social change. As we parted, he gently suggested that I should go back to school. He was too polite to add, "And learn something." It was good advice, and I took it. I subsequently learned that he was equally generous with everyone. He was wholly devoted to the goal of promoting the science of behavior even if it meant taking the time to nurture the feeblest of green shoots one at a time. ■

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reflections

B. F. Skinner

An Appreciation on His 110th Birthday

Ernest A. Vargas, Ph.D.
Cambridge, Massachusetts

Dr. Ernest A. Vargas is a behaviorologist and Vice President of the B. F. Skinner Foundation. His primary interests are in the history of science and in behavioral theory.

This recognition of Skinner's place in the history of science draws, by permission, from an article on Skinner's Theory of Behavior for the European Journal of Behavior Analysis. *EAV*

A common impression views science as apparently a progressive, unbroken march to foreseen conclusions. It is not. It is a human enterprise with its practitioners' usual set of fiery fits and illusory starts. Everyone does his or her best breaking new trails (a Rosalind Franklin or a Marie Curie), but many endeavors lead to dead ends or simply return to where they started. Looking back with a finer detail than we usually do, we can note concurrent efforts many of which were wrong but all pursued by the pursuers with an equal passion that they were correct. Many examples from any of the sciences can be provided of this concurrency of conflicting analyses, but a couple from the physical sciences should be sufficient. R. S. Westfall (in the *Encyclopedia Britannica*, 1978) describes the situation in Cambridge, England when Newton arrives there for his studies.

> When Newton arrived in Cambridge in 1661, the movement now known as the scientific revolution was well advanced, and many of the works basic to modern science had appeared. Astronomers from Copernicus to Kepler had elaborated the heliocentric system of the universe. Galileo had proposed the foundations of a new mechanics built on the principle of inertia. Led by Descartes, philosophers had began to formulate a new conception of nature as an intricate, impersonal, and inert machine. Yet as far as the universities of Europe, including Cambridge, were concerned, all this might well have never happened. They continued to be the stronghold of outmoded Aristotelianism, which rested on a geocentric view of the universe and dealt with nature in qualitative rather than quantitative terms.

And in Paris, I. B. Cohen *(Revolution in Science*, 1985) portrays much the same scene, "The revolutionary Cartesians fought for power with the forces of orthodoxy—represented by the Jesuits and their schools, the Church and its University of Paris, and the Aristotelians—on every imaginable level". In his

examination of revolutionary changes in science, Cohen provides many instances of intense struggles over what would seem to be cut and dried facts, or at least facts reputable enough to be accepted by everyone. What Cohen makes clear is that the struggle takes place over the philosophical *themas* by which those facts are interpreted. (I use "themas" here in the specific sense that Gerald Holden advances in his *Thematic Origins of Scientific Thought. Kepler to Einstein*, 1973). Further, as Cohen points out, scientific revolutions also have their *ideological* and their *application* components that influence their acceptance. All three factors have played an important part in the acceptance of Skinner's Theory of Behavior.

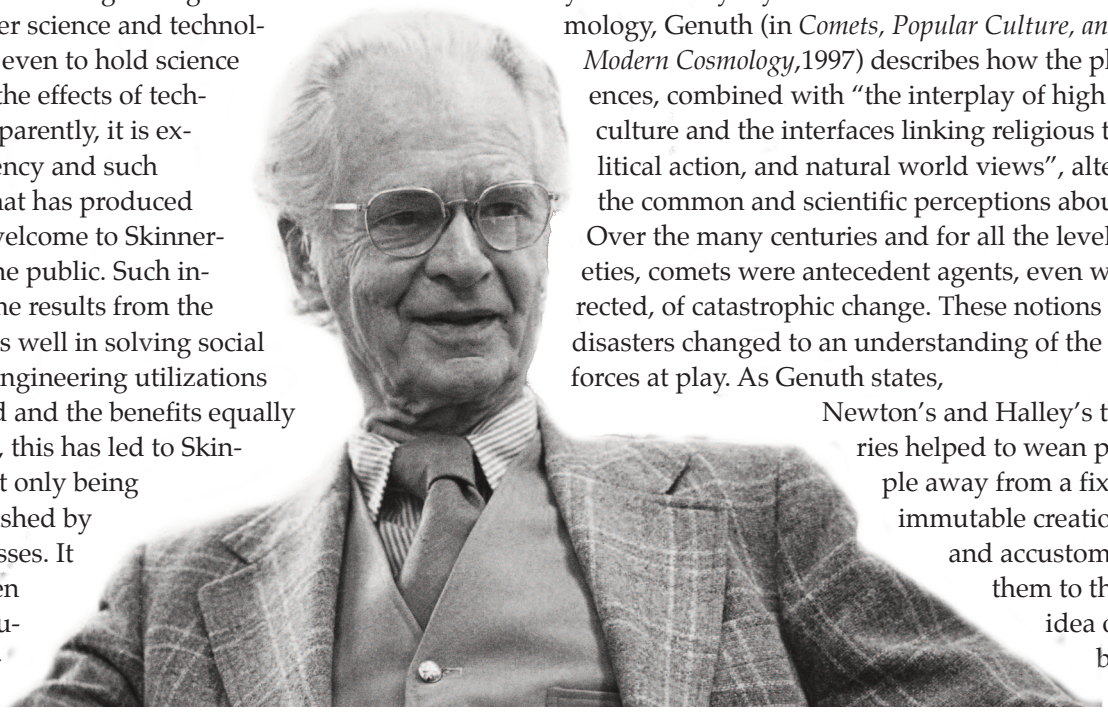
In the scientific community, the philosophic *themas* of Skinner's Theory of Behavior have presented an obstacle to the favorable reception of his behavioral science. Those themas called for a massive shift in how to interpret the facts of experimental operations and those of daily life. As Skinner (in his first book, *The Behavior of Organisms*, 1938) himself noted, his analysis dealt with behavior in quantitative terms ("a quantitative science of behavior") rather than with qualitative ones. A "self" dropped out of the equation; and so did its qualitative attributes, such as what it felt or thought or intended. Such a shift did not imply that the qualitative attributes did not exist. It highlighted instead the deconstruction of qualitative attributes into their behavioral components, observed by directly contacting actions and their contingent relations to other events. If someone is said to be "selfish", such a qualitative attribute is not directly contacted. It is an interpretation of actions such as taking a bigger piece of a shared good. Only actions can be tacted, not the category in which they are placed; and only specific actions can be addressed, through whatever technique is employed. Yes, an action may be viewed in its social and biological matrix, and a different interpretation may lead to a different technique of, say, shaping or medicating; nevertheless, it is still solely the action that is contacted in its contingent relation to other events, including the consequences of the technique employed. Skinner's analysis of behavior rebuffed the postulation and then examination of an inferred inherent self, such as "political man" or "economic man" as the basis of political and of economic activity. In its shift to contingencies and the selective effect of consequences, Skinner's Theory of Behavior put in place an entirely different foundation for the behavioral sciences.

If there was a certain degree of dismay in scientific circles over Skinner's science, the outcry was far greater in the public sector. No behaviorist, even Watson who was accused of advancing "bolshevism", was more pilloried than Skinner. The philosophic thema of no-agency-within transmuted into the *ideological* battle cry against the science; as before, a rather consistent reaction to other prior diminishing of the special importance of the human agent. Copernicus's theory had dethroned humankind as the center of the universe. Darwin's theory removed humankind from any special status in the biological world; and further added that only a common mechanism, natural selection, primarily produced the characteristics of species, and that people were only one kind of species connected to earlier ones. Skinner's theory further removed any notion of an inside homunculus sitting outside the domain of nature. In the twentieth century Freud had stated that all action was determined. There were reasons even behind our accidental slips of tongue. But he accounted for action as struggles between surrogates—ego, id, and superego—of a cultural and biological self. There are no agents, entities, or surrogates in Skinner's Theory of Behavior. It connects with other sciences, such as physiology and ecology, to complete the investigation of the set of contingent events inside and outside the organism that provide the reasons for its behavior. The ideological furor resulted in Skinner being the favorite behavioral scientist to decry as people reacted as if he personally selected their pet principles to gore. Of course, some of the most vociferous voices were those who exulted above all else their supposed at-

It was revolutionary to move from an Aristotelian analysis to a Galilean one, and to add as well Darwin's selection mechanism as the critical force of change and stability.

tributes of the individual, and it has been ironic to see ideologues on the far right and the far left make common cause in their distaste for removal of the individual from center stage of congratulatory concern. For these people, the free will of the individual triumphs *über alles*. Such a promoted triumph seems only to justify selfish action or, the converse, its punishment. But a large challenge looms for Skinnerian science. If actions are due to contingencies and not to a self's inherent right to take them, such an analysis calls for a radical rewrite of institutional arrangements and their vindications. Skinner dipped into this matter (*Walden II* and *Beyond Freedom and Dignity*). But in reworking the behavioral assumptions of institutional arrangements such as law or politics or economics, not much progress has ensued. The difficulties are obvious. The creative breakthrough would require a sophisticated knowledge of Skinnerian theory plus that of what other institutional area is at issue.

Skinner's science has benefited greatly from the *applications* derived from it. In fact, they have brought about a sea change in its acceptance by the public. This is quite contrary to what Cohen (again in *Revolution in Science*) says: "A second kind of societal hostility to a scientific revolution arises . . . from a reaction to the results or applications of science rather than to the science itself". He further goes on to say, "there has been a growing tendency to consider science and technology as one, and even to hold science responsible for the effects of technology". But apparently, it is exactly such tendency and such responsibility that has produced the increasing welcome to Skinnerian science by the public. Such increasing welcome results from the fact that it works well in solving social problems. The engineering utilizations have accelerated and the benefits equally so. Interestingly, this has led to Skinner's science not only being accepted but pushed by the business classes. It has not only been traditional manufacturing industries in which this has occurred, a sector of business much worked in by a branch of applied behavior analysis called *organizational behavior management*. Expansion of the science has also occurred in those areas allied with the medical profession, and especially in the service sector that provides help to children and parents. A great number of small, increasingly larger-scaled, enterprises have flourished. An outcome of these effects has been to call for more teaching of the applied area of Skinnerian science. This coursework has proliferated, ranging from workshops in toilet training or safe driving up to full-fledged university programs at the masters and doctorate levels. Such educational undertakings are taking place on every continent. The educational enterprises are currently emerging under the title of *behavior analysis.* Though I prefer that title for the science's engineering component (and prefer *behaviorology* for the science encapsulated under Skinner's Theory of Behavior), the educational endeavors are having the effect of asserting a discipline independent of other disciplines in the behavioral science sector.



A final consideration, not well explored yet, is how Skinner's science connects and relates to the popular culture. Such an intertwining occurs with all the sciences, but especially those that propose a profound change in the lens by which everyday events are viewed. For example, in cosmology, Genuth (in *Comets, Popular Culture, and the Birth of Modern Cosmology*,1997) describes how the physical sciences, combined with "the interplay of high and low culture and the interfaces linking religious thought, political action, and natural world views", altered both the common and scientific perceptions about comets. Over the many centuries and for all the levels of societies, comets were antecedent agents, even willfully directed, of catastrophic change. These notions of directed disasters changed to an understanding of the impersonal forces at play. As Genuth states,

> Newton's and Halley's theories helped to wean people away from a fixed, immutable creation and accustomed them to the idea of birth

and death in the heavens, the impact of one world on another, and the transformation of one celestial body into another. Whereas their catastrophic theories focused attention on God's direct agency, the evolutionary theories later advanced by Kant, Herschel, and Laplace tended to push God to the margins and emphasized the interplay of natural forces.

Any consideration of the transformation Skinner's science has made on the interpretation of behavioral phenomena brings us to the edge of that world of change it begins to make in the popular culture. Not ascribing change to an inner agent would be one profound alteration; another would be a cultural shift from punitive methods of control to positive ones. The impact of both is easy to imagine in as abstract an area as the political economy and in as concrete a situation as the prison population. Such a metamorphosis advances slowly but, as of now, surely.

In the analysis of behavior, Skinner's *Theory of Behavior* took a revolutionary step. It was revolutionary to no longer cast the explanation of action as due to an actor within an organism, but instead dispense with the qualitative attributes of organisms to focus on the quantitative properties of actions. It was revolutionary to move from an Aristotelian analysis to a Galilean one, and to add as well Darwin's selection mechanism as the critical force of change and stability. It was revolutionary to explain all activity as derived from the contingency relations of properties of actions with other events, especially as these contingent relations were driven by selectional consequences. Skinner initiated a behavioral science whose novel features only now begin to be recognized. Any description of Skinner's Theory of Behavior merely presents a starting point to clarify it further. Such a start sets out an opportunity to articulate the basic principles, to answer the questions yet to be resolved, and to ask new questions that emerge from these efforts.

On Skinner's 110th birthday, he as a person is missed. His science is alive and well. ■

Brief Encounters

(continued)

On the Subject of Science ...

Contributed by Jerome Ulman, Ph.D.:

Dr. Jerome Ulman corresponded with B.F. Skinner about behaviorology.

Dr. Ulman wrote: "…I will even concede that when I first heard it, 'behaviorology' sounded a bit strange. (If I may suggest a remedy: in the privacy of your bath, try saying behaviorology aloud at least 50 times.) Would that the problem was only nominal!"

Dr. Skinner responded in a following: "…I am grateful for the enthusiasm and loyalty of the behaviorologists. I'll try saying the word to myself in the bathtub and see how good a predictor you are." ■

Nancy Hughes Lindsley (wife of the late Ogden Lindsley), reminded us of the story Ogden told often:

When I was a graduate student, I trained a rat whose behavior did not extinguish exactly as the charts in Skinner's book had shown. My rat at first had responded much more rapidly when his responding was no longer reinforced. The rapid responding went on for about 30 minutes, at which time the rat stopped abruptly. I took the cumulative record of the rat's unusual extinction to Dr. Skinner and asked him how this had happened. How could the rat do this when the book showed a very different gradual extinction curve? Skinner answered, "In this case, the book is wrong! The rat knows best! That's why we still have him in the experiment!"■

Ogden Lindsley, Precision teaching: By teachers for children. Teaching Exceptional Children, 22(3) page 12

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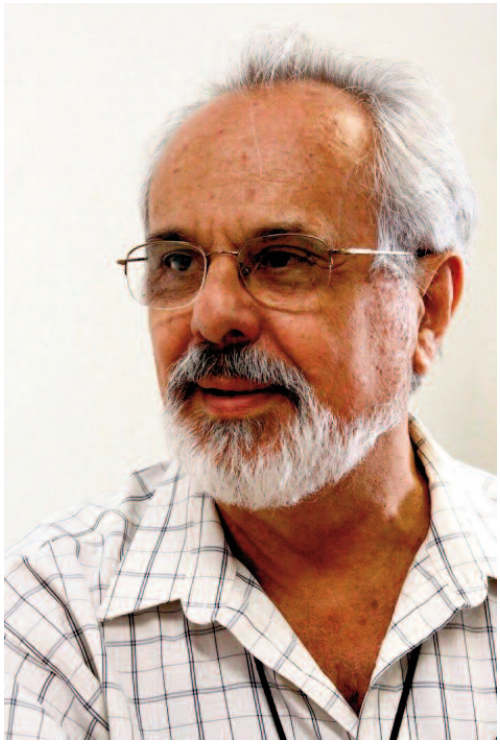
from the archives

An "Unpublished" Interview

Emilio Ribes-Iñesta, Ph.D.
Jalapa, Mexico



As part of a research project on the experimental analysis of scientific behavior, I conducted an interview with B. F. Skinner in 1990. I have transcribed the interview, which was taped as B. F. Skinner responded to a list of questions that I had previously mailed to him. This method prevented the possibility of any further interaction regarding his answers. The questions deal with his retrospective opinions about his scientific career and contributions. In spite of the fact that Skinner was interviewed several times and that he published several papers dealing with his scientific career, the content of this interview provides some direct answers concerning the significance of scientific problems and concepts.

This interview, probably the last recorded interview of Skinner, was made in 1990. Emilio donated Skinner's copy of the audiotape version to the Foundation along with this transcription. First published in the Mexican journal of Behavior Analysis *Issue 25, Number 3, this interview is reprinted here with permission.*

Why did you choose the reflex model – radically modified – to formulate a taxonomy and methodology fundamental for the development of a theory about behavior?

I became interested in reflexes after reading books by Pavlov, Sherrington and Magnus. It was not good preparation for my research. Reflexes are concerned with the responses of organs. My research led me toward the variation and selection of the behavior of the organism as a whole.

In your writings you assume behavior to be orderly – as any natural phenomenon studied by positive science. Do you think this assumption influenced your conception about theory as data-language and of behavior research as technological control? Do you think that data are independent of theory or on the contrary that they are theoretically determined?

I did assume that behavior was orderly, and that basic assumption was no doubt important to me at all stages in my career. I do not regard it as an essential assumption, however. I think data are independent of theory although theories determine the selection of data. That is one of the things I have against theories. All data should be considered.

How do you conceive your analysis of behavior: As a molar or a molecular analysis? The selection of a representative property of the behavior stream leaves open both interpretations.

The distinction between molar and molecular has never been important to me. It is used in too many different ways. If it means the difference between how the organism works as eventually to be revealed by physiology (molecular) and why the organism works that way and why changes from moment to moment during the lifetime of the individual (molar), then I am on the side of molar. I have no interest whatsoever in how the organism works.

Why did you conceptually consider that behavior morphology – and its associated parameters such as duration, intensity (effort), geography and topography- were not important as compared with an effect of behavior —the closure of a micro switch? is not this assumption in contradiction with your approach to verbal behavior?

Operant behavior is primarily a matter of variation and selection. It is selected by a change in the environment, and behavior is most easily analyzed when that change is conspicuous, as it is in the closure of a micro switch. In daily life, actions working on the environment serve the same function, and it

is particularly true in the field of verbal behavior where it is the effect on the listener that defines the verbal operant.

Does the concept of contingency seem to you intrinsic to conditioning as a necessary and/or sufficient relation between events, or do you consider it as a mere temporal relation in regard to its functional properties?

I used the word 'contingency of reinforcement' to represent three features of a situation: stimulation necessary for reinforcement; the behavior reinforced, and the reinforcing consequence. The temporal relations among these three terms are, of course, very important.

Which do you think are the critical experiments in your research career? Could you comment about the reasons you consider for each of them?

In historical order, I think that the recording of a satiation curve in a cumulative record was important. It made visible an orderly change in the probability of behaving. Equally important was the proof that a single reinforcement made an observable change in the probability of pressing a lever. That followed because I was using a mechanical device to deliver food and the device made a noise which, in the procedure that I adopted, had chance to become a conditioned reinforcer and to occur instantly. I think that the demonstration that an absolute immediate reinforcer is so powerful was important. Another result was the demonstration of stimulus control over operant responding. The development of a discrimination as the extinction of the behavior in the presence of a stimulus not correlated with the reinforcement was one of them. Another was the peculiar behavior that I got when I was able to set up a discrimination in which the rat never responded to the unfavorable stimulus. Various schedules of reinforcement were, I think, important, as were the experiments in which responses to two levers were shown to interact in various ways under differential contingencies of reinforcement.

Do you recognize in any of your experiments anomalies or contradictions with the fundamental findings of your research or the fundamental concepts of your theory?

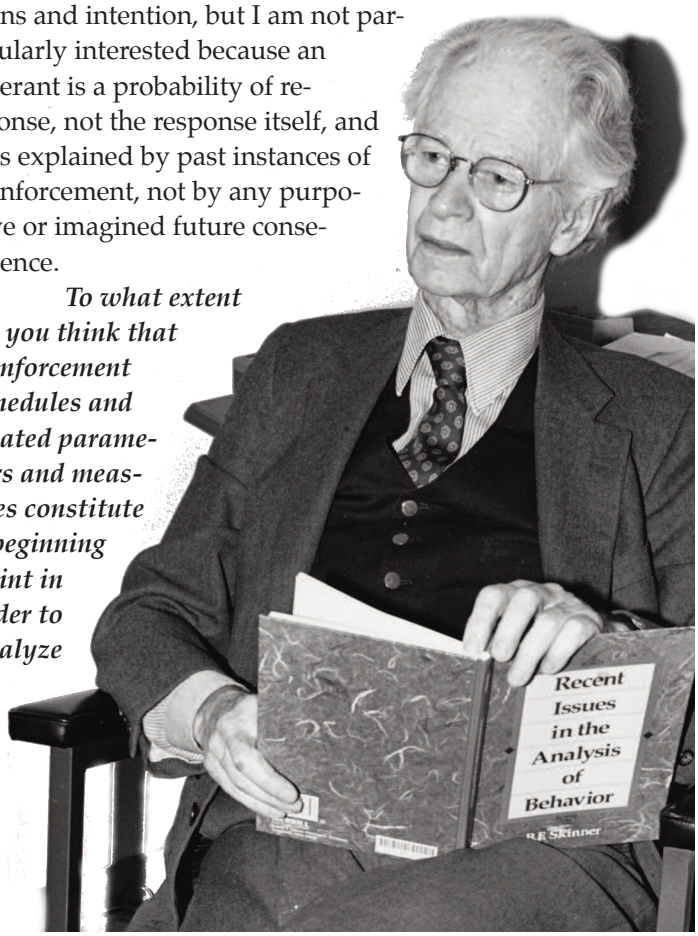
Many puzzling things have certainly turned up in my research and many questions have not yet been answered, but I do not regard them as contradictions, especially because I have never been very much interested in theory.

What do you think, in this context, about your classical experiment on superstition in the pigeon? Do you think that the concept of reinforcement is to be applied such as it was defined in regard to discrete, repetitive and predetermined responses?

I repeated the superstition demonstration many times, often as a demonstration when lecturing to a group. Once you condition a reinforcer so that it acts instantly, then accidental contingencies are necessarily effective. And I have seen pigeons doing many other things superstitiously in addition to those reported in my paper. The things done I would not describe as discrete, repetitive, or predetermined.

Is not the emphasis on contingencies of reinforcement as a fundamental causal factor in contradiction with its dispositional logic functions – such as Gilbert Ryle defines it – in so much as it affects response tendencies?

Philosophers have talked about dispositional functions and intention, but I am not particularly interested because an operant is a probability of response, not the response itself, and it is explained by past instances of reinforcement, not by any purposive or imagined future consequence.



To what extent do you think that reinforcement schedules and related parameters and measures constitute a beginning point in order to analyze

human behavior? Do correlative concepts obtained in the research with nonsocial simpler organisms loose their meaning and usefulness when they are extrapolated?

I believe human beings are susceptible to the variation and selection represented by operant conditioning, as they are susceptible to those represented by natural selection. But I do not think much research can be done on basic properties of operant behavior with human subjects if they've acquired a verbal repertoire. Once a person has learned to analyze the contingencies to which he/she is exposed and to formulate what are essentially rules, the rules enter into the total contingencies affecting behavior. Nevertheless, I think that verbal behavior and the formulation of rules as descriptions of contingencies of reinforcement are nothing more than operant behavior. All human behavior is either reflexive (in which case it concerns responses of organs and is of little interest to me) or operant.

What kind of empirical evidence, or perceived theoretical deficiency inaugurated the formulation of rule-governed behavior?

My paper on rule-governed behavior in 1965 was based upon my book *Verbal Behavior* which was not empirical. It was an interpretation of behavior in the light of empirical facts and principles. We behave either because our behavior has been shaped by contingencies of reinforcement or because we have been told, advised or otherwise directed to behave by those whose behavior has already been contingency-shaped. The evolution of the operant control of the human vocal musculature is, I believe, responsible for the human achievements. l do not believe that anything essentially new followed. It simply became easier for the individual to profit from contingencies of selection which already affected other individuals.

My research led me toward the variation and selection of the behavior of the organism as a whole.

What limitations do you perceive in operationalism as a logical rule to build up concepts? Do you think that relations between general operations and systematic effects support the identification of behavioral processes? Do you think that the limitations you perceive on operationalism may be pointed out in conditioning theory such as it has been developed by Radical Behaviorism?

Logical positivism and operationism arose later than behaviorism. I think we all go back to Ernst Mach, a German physicist, whose book the "Science of Mechanics" influenced me greatly. Although I regard my thesis as an operational analysis, I think it is more than that. I was not reducing the reflex to some other universe of discourse. I was reducing it to some observations. That is equally true of radical behaviorism. Unlike Watson, I molded a science that did not allude to the mind, but also did not allude to the brain. Operant conditioning can be defined without referring to how the body works. It is itself an explanation of why it works that way.

Do you think that your career as a researcher illustrate a research programme? Which would be the fundamental components and criteria?

I don't regard my work as the effect of a program. I did not plan in advance the way it was to go. I simply followed up one thing after another as the data turned up in my research.

Do you think that deprivation states and historical variables are adequately represented in your theoretical formulations?

Yes, I think l have given due attention to such things as deprivation states. See my two very early papers on drive and reflex strength. (Skinner, B. F. (1932). *Drive and reflex strength*. Journal of General Psychology. 6, 22-37. and Skinner, B. F. (1932). *Drive and reflex strength: II*. Journal of General Psychology. 6, 38-48.).

Do you think that private events have, before self-tacting, a physical independent functional status?

I think the bodily states that we can observe and call emotions and feelings and states of mind all exist before we call them that.

According to you, which is the role to be played by mathematization in behavior research and theory?

I do not think it is time for mathematization in behavior research and theory until we have data suitable for that purpose. I do not think that mathematical theories are useful.

Summary: **what I miss in your questions is the whole notion of variation and selection**. I think this is important at three levels: Natural selection, operant conditioning, and the evolution of those social environments we call cultures. Only the second of these can be studied experimentally in the laboratory and I think that advantage should be exploited as intensively as possible. ■

A Daughter's Retrospective

Julie S. Vargas, Ph.D.
Cambridge, Massachusetts

Originally appeared in The Spanish Journal of Psychology *2004, Vol. 7, No. 2, 135-140 1138-7416. Reprinted with permission.*

My father, B. F. Skinner, was born in Susquehanna a small conservative town nestled in the wooded hills of Pennsylvania. His father was a lawyer with a modest practice. His mother was a housewife. He went to the local public schools and graduated second in his class from high school. From these rather modest beginnings, he went on to establish a new science of behavior, different from the S-R psychology of Pavlov and Watson, and different from the "trial and error" analysis of Thorndike. Many people wonder what my father was like as a person and how he became so revolutionary. For not only did he discover the impact of contingencies on behavior, he also extended his analysis to epistemology, education, and cultural design.

Where does behavior come from? Obviously genetics contributes a large part. But the instant a child is born his or her interaction within the immediate setting begins to shape that child's repertoire. Parenting style is a large part of the initial interaction. At one extreme of parenting, a child is given much verbal instruction such as rules about how to behave. At the other end of the continuum a child interacts with nature and others without much adult supervision or guidance. My father's mother, who stayed at home once married, was the main influence in his early life. A clue to her mothering style is found in the "baby book" she kept on my father. One entry says, "Pulled himself up by a chair alone! fourteen months 2 days." Under that is written, "Walked alone July 20th, 1905. Sixteen months old." It took my father two months to take a first step after standing! Clearly his mother did not hurry his walking. Freedom in physical matters seems to have been consistent in his childhood. In his autobiography he mentions roaming the hills without restriction and extreme frustration at trying to turn a screw into an oak plank, not having been told to first drill a hole.

On the other hand, his mother was strict in social matters. Her usual sanction was to say "What will people think?" The two aspects of her child rearing are shown in a story my father reported in his autobiography to solve his forgetting to

Julie S. Vargas is president of the B. F. Skinner Foundation. She began her professional life as an elementary school teacher, and has kept her interest in public education from that time on. After receiving her doctorate, she taught at West Virginia University, working with practicing teachers and with undergraduate education majors. Her publications include Behavior Analysis for Effective Teaching. (2nd Ed. Routledge, 2013). She is currently working on the life and historical context of the works of her father, B. F. Skinner.

hang up his pajamas. At breakfast his mother would check. If he had left his pajamas on the bed or floor, he would "have to stop eating, go upstairs, and hang them up." Finally, my father rigged up a gadget to solve his problem. He described the contraption as follows:

> *The clothes closet in my room was near the door, and in it I fastened a hook on the end of a string which passed over a nail and along the wall to a nail above the center of the door. A sign reading, "Hang up your pajamas" hung at the other end. When the pajamas were in place, the sign was up out of the way, but when I took them off the hook at night, the sign dropped to the middle of the door where I would bump into it on my way out.*

I contrast this with my own upbringing: No one

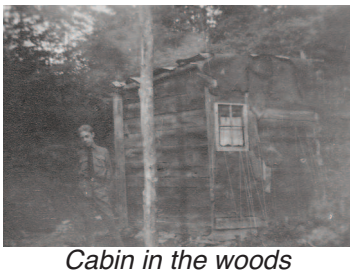
made me hang up my pajamas before breakfast, but I am not sure my mother would have permitted me to drive nails into the door frame and closet area of my bedroom.

By the time he was in elementary school, my father's first love was building things. Among the gadgets he made as a youngster are the following:

- A small reading room with shelves and candle bracket
- Willow whistles, benches, and tables
- Miniature theater with cutout figures, strings and pulleys to open the curtain
- Small houses in backyard and a cabin in the woods
- Slides, teeter-totters, and merry-go-rounds from old lumber
- Scooters from wheels of old roller skates and steerable carts
- Pea shooter, bows and arrows, slingshots
- Steam cannon that would shoot plugs of carrot
- Elaborate hydraulic (water) systems with tubing in grandfather's garage
- Loom that he used to weave mats
- Sprinkler for cleaning floors at the shoe store where he worked
- Gadget to separate ripe elderberries from green ones
- Perpetual motion machine!!! (This one was unsuccessful.)

My father developed an independence both in design and in construction that was to be critical to his discovery years later. I remember him as a Mr. Fix-it. My mother told me that as early as two years old if anything broke, I look up at her with a big smile and say, "Daddy fix it". And he would. His gadgets and repairs were not usually very attractive, being made out of old scraps of wood, pieces of metal, coat hangers, or other debris kept in the shop of whatever house we were living in, but they worked.

Evidence of his "fixes" can still be seen in his last home. An antenna for a small TV is a bent piece of coat hanger. A light switch to enable you to turn off the light at the top of the basement stairs from the bottom consists of a shoehorn attached to nylon fishing line you pull to turn the light off, and a circular ring of metal to pull to turn the light back on. Anyone else would have hired an electrician to put in a downstairs switch. Not my father. Instead he rigged up the nylon lines to operate the upstairs switch from the bottom of the stairs.



Cabin in the woods

In high school my father was not part of any fixed social group. He moved between an Erie Railroad band of mostly older men, a tennis friendship with a Catholic (when his parents were Protestants), friends for exploring, and a teenage dance band he organized. Thus be avoided the strict controls that teenage peers can impose. His independence continued with a canoe trip with four

other boys down the Susquehanna River from his hometown to Harrisburg, a distance of over 200 kilometers. With another friend he built a cabin in the woods complete with glass windows. His mother's social control followed him even there. "We did not smoke cigarettes," he wrote, "because we were forbidden to do so, but we smoked corn silk and certain kinds of dried leaves".

In high school he encountered Francis Bacon's works. His teacher, Miss Graves, to whom he later dedicated *The Technology of Teaching*, had her students read Shakespeare's *As You Like It*. My father's father, probably over the family dinner, had mentioned the theory that Francis Bacon, not Shakespeare, had written that play. My father announced this in class and was roundly admonished. But he did not give up so easily. He went to the library and read everything he could by Bacon. No doubt his new revelations kept that English class interesting, but it is hard to imagine his continued reading just for that discussion. Something in Bacon must have appealed to him. Bacon's insistence that truth was to be found inductively and not through authority would have sounded good to a teenager who loved exploring and tinkering, and who had challenged his teacher. In any case he was to quote "Nature to be commanded must be obeyed" many times in print, and at home.

Miss Graves

College furthered his independence in a backhanded way. My father, though very coordinated, had not practiced any sport enough to make a college team. He also did not know about the importance of picking the "right" fraternity and accepted the first request he received, one at the bottom of the social ladder. Thus his first year he did not become part of any one social group. His second year he became an editor of the student publication *The Royal Gaboon*, and through a tutoring job was invited into the home of the chemistry professor, Percy Saunders, for evenings of chamber music and conversations with well known liberal writers. The Saunders' life appealed to him more than the life he had left back home.

Writing seemed a good career. Encouraged by a letter from Robert Frost, commenting on a story he had sent the poet, my father returned to his parent's home to write the great American novel. He was not successful. Though his parents did not say much, their concern and disapproval must have shown daily in their expressions. Then, too, his new liberal views contrasted with the conservativeness of his parents and their friends. Finally his father gave him a job abstracting legal briefs. That completed, he escaped to New York and got a job in a bookstore. Although he enjoyed the bohemian life, it did not seem a good way to "make something of himself" and he applied to graduate school.

In graduate school at Harvard University, many of

my father's strengths came together to enable him to make the discoveries that began a whole new science. As before, he moved between social groups. Although he became friends with the more radical Watsonian students in psychology, his work was guided, at least initially, by William Crozier, the young chair of the new department of physiology. Crozier was a student of Jacques Loeb and expressed acerbic views against the mentalism of Titchener espoused by the chair of psychology, Edwin Boring. After my father's first year of courses, he was essentially on his own to conduct experiments. Here his independence and tinkering skills came into play. Where others might have used standard equipment or followed a professor's agenda, my father worked independently of such constraints. He loved to work alone and to fix things mechanically. He was quick to toss out equipment he had spent hours constructing when he had a better idea of an experimental procedure to try. The result was that the main control over his experimental behavior was the behavior of the organisms he was studying, exactly the right contingencies for discovery. It took over a dozen major pieces of equipment and two and a half years of intense research before he found that the probability of his rats' actions was controlled not by an antecedent stimulus as he had initially thought, but by the immediate postcedent stimulus. This was, indeed, as he wrote to his friend Fred Keller, "a brand new theory of learning".

Keller and Skinner, 1938

Finally the small town boy from Pennsylvania had become a success. He was awarded a prestigious fellowship to continue his operant research. He varied every aspect of contingencies he could think of, with gratifying results. When the fellowship was over he found a job at the University of Minnesota. And he found a wife.

That is where I come in. The book about my father's operant research, *The Behavior of Organisms*, came out in 1938, and I was born the same year. According to my mother, my father, now an expert at behavioral control, discussed child's raising with her. His lifelong fight against punishment of children must have been part of those discussions. My parents had a low coffee table with some attractive knick-knacks on it. At first, like many parents, when I reached for things I was not to touch, my parents gave my hands a little slap. But reaching did not decrease and my father, remembering experiments that showed slaps to only temporarily suppress behavior, suggested never punishing my behavior again. My mother readily agreed. Many years later I heard my father talk about a similar situation. He said something like, "You have a low coffee table with things on it. They are designed to be at-

Fred and Eve Skinner (1936)

tractive and they will attract a young child. Instead of punishing the baby reaching for them, simply put them on a higher shelf, out of reach. The whole idea is to design contingencies to encourage the behavior you want and to eliminate situation that produce behavior you don't want." The knick-knacks in my parents' home were moved from the coffee table to a high shelf.

Although I do not remember the coffee table incident, I do remember allergy testing. I must have been around two years old. In those days the method of testing for allergies was to lay the patient on a table face down and scratch little bits of potent allergens in rows on the patient's bare back. They must have tested a hundred substances on me. I remember squeezing my father's hand and wincing every time a new scratch was made. Needless to say, I did *not* like going to the hospital. My father mentioned this to the physician who suggested telling me next time that we were going for ice cream. My father was horrified. Instead, for the return trip he told me exactly where we were going. Unwilling to drag me into the hospital, he watched paiently as I walked away from the door, around the grass, and finally into the building.

When I was five years old, my mother was pregnant again. She asked my father whether he could make a better crib than the one I had used. As a baby I had worried her when my bed clothes ended up over my head. My father loved to build "equipment" so he happily set to work.

Deborah Skinner (1945)

The result was the *baby tender*, an enclosed crib that was heated enough so no sheets or blankets were needed. Pleased with his new invention, my father wrote an article for the *Ladies Home Journal*. The editor changed his title to "Baby in a Box" thus beginning the confusion between the experimental chamber that everyone but my father called the "Skinner box", and the *baby tender*. In fact, the new crib was used like other cribs, for sleeping. My sister had a playpen like other babies of the l940's.

By this time we had moved to Indiana where my father had become chair of the Psychology Department. This was a barren time for research, but he used his administrative position to gather operant researchers together, resulting in the organization from which the Society for the Experimental Analysis of Behavior came. The difference had never been clearer between a mainstream psychology that looked inside the behaving organism for causes, and an operant analysis that looked for causes in the interaction between actions and their surrounding contingencies.

My father loved children, especially his own. He spent much time with my sister and me as we were growing up. Perhaps because of his own frustrations in learning to use tools as a child, he taught my sister and me to use hand tools. We were shown how to drill a hole before putting in a screw. Both Deborah and I had our own hand tools as young children, and my father even built a separate workbench for me in our summer cottage when I was around 13. It had a vise and a set of Craftsman tools mail-ordered from Sears.

In I947 Edwin Boring, the same professor whose Titchnerian position my father had opposed as a graduate student, invited my father to give the William James Lectures. It seemed to be a way to look over prospective candidates, because at the conclusion of that fall, my father was offered a professorship in the Psychology Department. He accepted and we moved to Cambridge. After two years, my parents built the house they lived in for the rest of their lives. This house was less than a kilometer of my sister's and my elementary school and only two kilometers from my father's office. Every morning we set out together on the few blocks common to our routes. At the end of the day we again had some time with our father. Most evenings, it was our father that put us to bed. reading stories or just talking. Deborah being the younger, was put to bed first.

Then he'd come to my bedroom. Both of us developed strategies to keep him talking a little bit longer. Mine was to ask a question about science. The only one that he didn't answer to my satisfaction was "What is beyond space?" As a holding technique this was quite effective, because my father turned on the light, made a mobius strip and had me draw a line, showing how the surface turned back on itself so that, without crossing over an edge, your line covered

both sides. "Space," he explained, ,"is like that, but in three dimensions."

One of my father's favorite activities was taking walks. Our house was near a "garden cemetery" that had wooded hills and ponds. Often my father would take me or Deborah on a walk there. In the other direction, a four kilometer path through woods and meadow circled the Cambridge reservoir. Walks around the reservoir took longer. My father used the longer walks to explain material he was working on for a book or article. Years later, when I read my father's publications, I recognized discussions, like those of the "homunculus" or "operationism" from conversations during those walks.

As much time as our father gave us during the academic year, we had even more of his attention during our summers on Monhegan Island. The island is a small island an hour's boat ride off the coast of Maine. As my father's parents had done, he and my mother gave us complete freedom about where on the island we could go. The only rule was to be back by dinnertime. My sister and I explored the high cliffs on the backside of the island, discovered blackberries on little used trails, and generally went all over the island. The freedom we were given extended to the water. My mother preferred the land to the water. but my father loved to be out on the water. He bought me a Folbot, a rubberized kayak-shaped boat with lee boards and a lateen-rigged sail. It had a tiller that stuck out into the rear sitting space. Always on the lookout for improvements, my father replaced the tiller with a pulley system. Instead of holding your arm out in front of you, you could rest your arm on the side of the boat, moving a cord that ran around the sitting space to move the rudder. My sister had a boat, too. He built her (letting her help, of course) a flat bowed rowboat. Neither of our boats held more than two people, so my father would accompany me sailing, or Deborah rowing and fishing. But often we went out by ourselves.

We kept both boats on Fisherman's Beach, high enough on the beach to escape the high tides of that northern latitude. I could not get my boat down to the water by myself. So my father solved the problem by building a carrier to help. He made a cradle for the bow that rested on two large wheels. By lifting the stern I could roll the boat down to the water's edge or push it back up to its resting place. Many days I went out sailing accompanied only by my dog or my guitar. Like the stipulations about land, the only rule I had about where I could go was to be back by dinner.

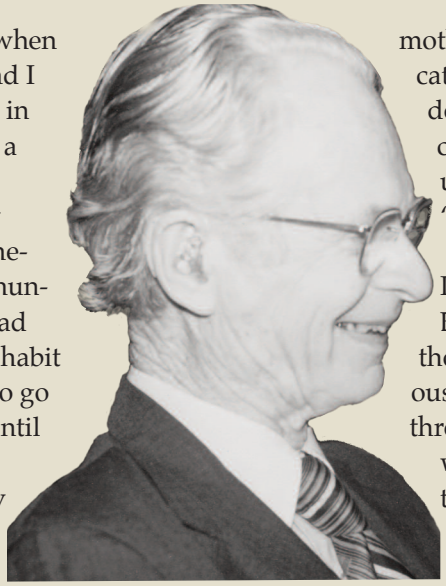
From a World War Two surplus catalog, my father bought a steerable kite with a large picture of a Nazi plane on it designed for target practice off of navy warships. Many days my father and I would launch the kite and steer it back and forth in front of our house. One day my father thought the kite might be used to power my sailboat. The problem with a sailboat is that when the wind blows, the boat tips, so that much wind is spilled out of the sail. My father thought, "Why not pull the boat with our steerable kite?" Somewhere he researched this idea and discovered that the ancient Greeks had tried it, but the fact that they had not adopted it did not discourage him. So one day he got the kite up in the air from the beach and set out in the kayak. Fortunately, he had stowed the paddles that came with the boat, because although the kite steered beautifully, the strings curved around in a beautiful arc, so that the kite pulled only in one direction.

There were few organized activities on Monhegan

Island. It was up to our family to create things to do. My father was often given things by the fishermen or by the summer artists and he inevitably found something to make of them. One day he came home carrying two enormous pulleys. Soon a "tightrope" appeared. It was only a foot off of the ground. but still offered a challenge. Using old broomsticks for balance and keeping our eyes straight ahead as advised by our father, Deborah and I tried getting across the four-meter stretch. Neither of us was successful and we soon gave up. The next day, the pulleys appeared in a new role. They supported what we came to call the "trolley". One pulley was attached 3 meters high up a tree at the top of the hill near our house. Another pulley was attached to a tree 20 meters away down over the hill, pulling a rope between the two pulleys taught. Along the rope a third pulley rode with a bar attached. You would start at the top of the hill, hold on to the bar and ride to the bottom, keeping your feet up as high as you could to avoid hitting the ground. This use of the pulleys was successful. We used the "trolley" quite often.

In 1953 my sister was in fourth grade. Visiting her mathematics class one day with other fathers, my father became agitated. Teaching was supposed to be going on, but almost none of what twenty years of research had showed was needed for successful shaping was being used. It was not the teacher's fault. No one person could possibly do what was required for each child. Teachers needed help, and my father had just the solution. As usual, it was a mechanical gadget. That same afternoon he designed the prototype of the first teaching machine. Unlike the worksheets it was designed to replace, it gave feedback following each answer, and it adjusted what the child got next according to performance. Several models of this teaching machine were made and tried out in schools. But it was not until a sabbatical in 1955 that my father tackled the shaping of new skills. He took the sabbatical to finish his book *Verbal Behavior*. To get away from distractions, he found a little inn near the school in Vermont I attended. He took Deborah with him and she stayed downstairs with the family that ran the inn. While working on his book, he realized that a teaching machine could not only provide practice on skills presumably already taught, but with careful design, material could be presented step by step to shape new skills. He tried out some of his instructional programming with Deborah to great success. Now a new kind of teaching machine would be required. When his sabbatical was over, he designed this new machine and got a small grant to use them to teach his own course. The students' responses were analyzed for revisions and the project was a success. Meanwhile, my father found working with big business terribly frustrating, and he gave up work in education. But the results of his work can be seen today not only in computer-assisted-instruction, but also in the emphasis on performance objectives, the use of reinforcement instead of punishment, and

The story I love best is when my husband, Barry, and I were visiting my folks in Cambridge. We were having a drink before dinner, and I brought up the subject of my cat, Becket, who'd taken to meowing - a lot - when he was hungry. I asked my father if he had any tips on how to break his habit since it seemed not to work to go out of the kitchen and wait until he stopped meowing before feeding him as I assumed my father would suggest. My mother immediately piped up, "You can't really train cats." "Yes, you can," said my father. "They're not like dogs," she went on. "Maybe not, but you can train cats; of course, you can." My mother still protested until my father's final word on the matter (smiling), "Just who do you think you're talking to?"



I don't remember if my father gave me advice on Becket after that, but I have since trained all my cats though not to stop doing things… (They have variously learned to sit up, shake hands, roll over, jump through a hoop, and, in a few cases even play the piano with one paw.) I actually have also shaped one of them to meow if I ask her if she's hungry! ■

by Deborah Buzan (daughter of B. F. Skinner)

the increased use of frequent (if not immediate) feedback both to students and to teachers on progress rather than on final performance.

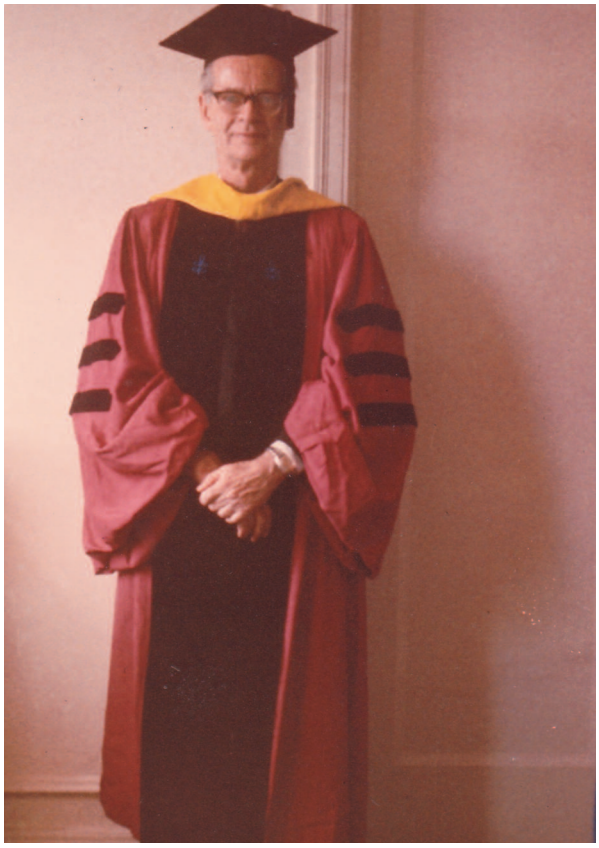
After leaving the field of education, my father

turned to society at large. All of the major problems of the time, – overpopulation, the depletion of resources, pollution, and war – involve human actions. In *Beyond Freedom and Dignity* (Skinner, 1971/2002). my father argued that as a species we have solved physical problems with physical science and that for behavioral problems we need behavioral science. In particular, we need to give up the fiction that our behavior is free, which leads to blaming individuals, and instead to design better the contingencies that actually control what people do. *Time*, a prominent weekly magazine, came out with a picture of my father on the cover under the headline "Skinner says we can't afford freedom." Suddenly my father was famous. Or infamous. Many reviewers attacked *Beyond Freedom and Dignity* with a vehemence that surprised my father, even though he was used to criticism. He pasted the reviews, both good and bad, into a large scrapbook, and tossed it into the back of the basement where it collected spiders along with the boxes of old notes, honorary degrees, and old suitcases. He was now 66 years old.

His new prominence produced many invitations to speak. Too many. As long as I can remember, Deborah and I would encourage our father to turn down talks and consulting invitations, and gradually he turned down more and more. But he rarely turned down requests from former students and never, to my knowledge, an honorary degree. "Resignation" describes how he approached most trips. The commitments he accepted had a way of getting out of hand. He would be invited to give a short talk. Usually he could use something he was working on or planning to write, so that part of the commitment wasn't a problem and he would accept. Then the schedule would come: Since he was going to be on campus, would he visit Professor So and So's class from 9:00 to 10:00? Some students had arranged morning coffee from 10:30 to ll:00. Luncheon would be at the Alumni center with the Dean and a few Department Chairs. At 2:00 the local Public Radio would like an interview. At 5:00 cocktails and a dinner with department members was planned, with his talk at 8:00 and a short reception afterwards. That was the official schedule. In addition to that, former students, students working in his field, student reporters, autograph seekers, and various others would call to arrange time to talk. Once accepting a talk my father never learned to say "no" to all the rest. So when an Honorary degree request would come, with the suggestion that perhaps he might "say just a few words" no one in the family was under any illusions about the level of activity expected. Yet when Mother or Deborah or I would say, "Oh yes, just a few words. Oh, and while you're at it, could we have the article? And how about a few informal talks, or a couple of dinners where you could make a few comments...," our father would say, "Oh, you can't turn down an honorary degree!" I don't think my father accepted these invitations with the kind of noblesse oblige that prompted him to accept even inconvenient invitations from former advisees and colleagues. Rather, I think he liked getting honorary degrees. They were proof he had achieved the social status his mother was so concerned about when she asked, "What will people think?"

From his family, my father carried the ethic of leav-

ing the world a better place than you found it and of self-improvement. As long as I can remember, he worked on his French. He bought the *Goncourt* journals, but found them too difficult, so he settled on detective stories, and read



Honorary Degree. Chicago, 1967

Simenon's *Maigret* series in French. Even in his last year, diagnosed with leukemia, he practiced his French pronunciation with the French-speaking secretary that came to the house.

When my father was diagnosed with leukemia, I took a leave of absence to be with him his last few months, and again lived in the house where I grew up. My father continued the early morning schedule I knew so well. He got up before 5:00, got a cup of coffee and went down to his desk. He turned on a light that also controlled a clock. The cumulative records of hours writing each morning show consistent work, even during the early hours of holidays when Deborah's or my family were visiting. If I interrupted his work, he would switch the light off as long as I wanted to talk. When I left, the light, and clock, went back on. At around seven in the morning, he would come up to the main floor, have breakfast while reading the morning paper, and then shower and dress. Then it was time for a walk. Instead of walking the two kilometers to his Harvard Office, his last year he walked around the neighborhood, and of course I would go with him.

From ten until 12:00 he worked with his secretary, answering correspondence, and getting newly typed revisions of manuscripts on which he was working. Unlike his teaching years, he ate lunch at home. After lunch he relaxed with light reading or listening to Wagner, then came up at 5:00 for cocktails with my mother. After dinner, my father watched a bit of TV and then went to bed early, by 9:00 or 10:00. He planned his afternoons and evenings so that he would be in good shape for the next morning's writing.

He was productive to the end. Ten days before he died, he gave a talk to a huge crowd at the annual meeting of the American Psychological Association. My mother and I were there and were impressed with the force of his speech. Still fighting agencyism, he called cognitive psychology the "creationism" of psychology, getting a gasp from most of the audience and a scattering of applause. But at the end he got a standing ovation that lasted the whole time he was helped down the steps and out of the auditorium.

I wish my father were alive to see the ripple effects of his life's work. Operant procedures have created entire fields like behavioral pharmacology. Operant techniques and analysis underpin operant behavior therapy. "Clicker Training", "Tag Teaching", "Precision Teaching", programmed instruction, and his book *Verbal Behavior* has been responsible for breakthroughs in the teaching of verbal behavior to children with autism. My father always believed that the best measure of a good science was the technology it spawned. By that measure, his discovery of the selection effect of contingencies qualifies as a very successful science. ■

cover story

Brief Encounters

(continued)

On Stage with Skinner ...

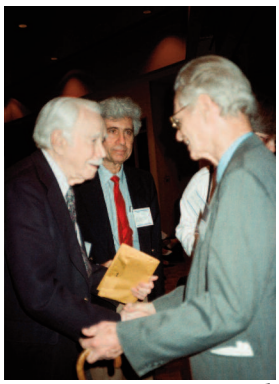
Contributed by R. Vance Hall, Ph.D.:

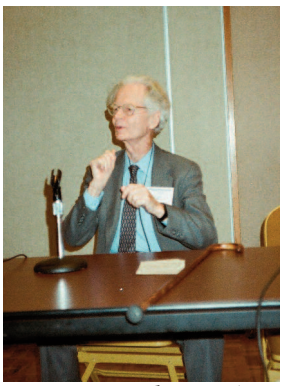
I was a neophyte behaviorist in 1968 and felt honored to be invited to present some of our early research at the American Psychological Association Convention in San Francisco. As I looked around the large conference room, I was amazed that a standing room-only audience had come to hear my presentation. It was true: I was one of the first to use applied behavior analysis strategies in regular public school classrooms, but the overflow crowd was still unexpected. I was quite nervous as I was introduced to the two others on our symposium panel. Both were considerably older than I and, perhaps sensing my butterflies, greeted me warmly and made an effort to put me at ease.

Thanks in part to my relaxed and cordial co-presenters, I too became more relaxed, and my presentation seemed well received by the audience. My co-presenters followed, and each received a standing ovation. In retrospect, I think that perhaps the enthusiastic, overflow audience may have been influenced by the fact my fellow presenters were Fred Keller and B. F. Skinner!

In subsequent years, I became better acquainted with both these giants in our field, presented with them, and even received the Fred Keller Award for Excellence in Behavioral Education in 1998, but nothing could top that very first presentation when these two pioneers of behaviorism reached out to a young follower just entering the field. ■

Contributed by Kurt Salzinger, Ph.D.:






Instead of stories, I have included some pictures (taken by my wife, Dr. Deanna Chitayat) from the 1989 symposium that I chaired called "From the beginning ... recollections and reiterations of the experimental analysis of behavior and recommendations for its future," ABAI, Milwaukee, Wisc. May 1989. The participants are Fred Skinner, Fred Keller ,W, N. Schoenfeld and myself. ■

Contributed by T.V. Joe Layng, Ph.D.:

Paul Andronis and I had the privilege of having Skinner as our discussant for a presentation we made at an ABAI meeting in 1983. We presented our data and showed some videos. Expecting Skinner to simply comment on the work, we took our seats in the front of the rather packed room. Instead, Skinner asked us to join him standing in the front where we had a rather robust discussion, which included some disagreement. It was as if the audience was not even there (until we opened it up for audience questions.) I have never seen a discussant do this to this day. It was quite delightful, not only for us, but I am sure for the audience as well. ■

continued ➠

Brief Encounters

(continued)

cover story

Planes, Policemen, and Prompting Good Behavior ...

Contributed by David C. Palmer, Ph.D.:

In October 1980, I had an opportunity to talk briefly with Skinner at a conference in Amherst. As soon as I began to speak, he immediately cupped his hand behind his ear. "Ah, that amplifies the signal," I thought to myself and began speaking more distinctly and loudly. It was only much later that I realized that he hadn't cupped his hand behind his ear to amplify the signal; he had done it to change my behavior, and it had worked beautifully. Skinner was a master at controlling behavior, and no technique was too trivial to escape his notice. ■

Contributed by Susan Schneider, Ph.D.:

When I became an engineering graduate student at Brown, I was close enough to visit Skinner at Harvard. I had misunderstood his instructions about chatting over lunch and brought a bag lunch, so we simply shared it! ■

Contributed by J. E. Louis Malenfant, Ph.D. and Ron Van Houten , Ph.D:

Below is a picture of us showing Dr. Skinner our "caught driving courteously" pen for drivers yielding to pedestrians at crosswalks on his 80th birthday banquet in Banff Alberta. He was amused and pleased and told us we were breaking new ground in applying Applied Behavior Analysis to traffic safety. B.F. Skinner was amused that the police were somewhat apprehensive about stopping drivers to reinforce them for yielding to pedestrians at crosswalks. They thought that drivers would be annoyed and that they might complain. We were able to convince them, and to their surprise, drivers reacted very well. Some drivers were relieved when they realized that they would not be cited, and most drivers were pleased to receive positive reinforcement from the police. In fact, some of the drivers who were stopped drove around the block and reentered the roadside check point to receive a second pen. This was also the first time they had police stopped drivers for good behaviour, and they really enjoyed the operations. The police department received good media attention, and the pens became hot items. The distribution of "Caught driving courteously" pens were first used in Moncton, New Brunswick. We obtained the same results with folded cards the size of a business card thanking drivers with a message from the police agency on how to protect pedestrians at crosswalks when they were used in Halifax, Nova Scotia and in St. John, Newfoundland. This research was carried out in the early 1980s. ■

Contributed by Hank Pennypacker, Ph.D.:

On the 22nd of September, 1981, B.F. Skinner addressed an audience at the University of Florida as part of its Frontiers of Science series. I was tapped by the Physics professor who ran the series to assist with the arrangements. I managed to persuade him that the planned venue which seated about 500 was inadequate and we arranged to hold the event in Alligator Alley, then the main campus gymnasium. It was my honor to make the introduction and Skinner's topic was "Why are we not acting to save the world?" There was an overflow crowd in excess of 8000; many watched on giant screens from outside the arena.

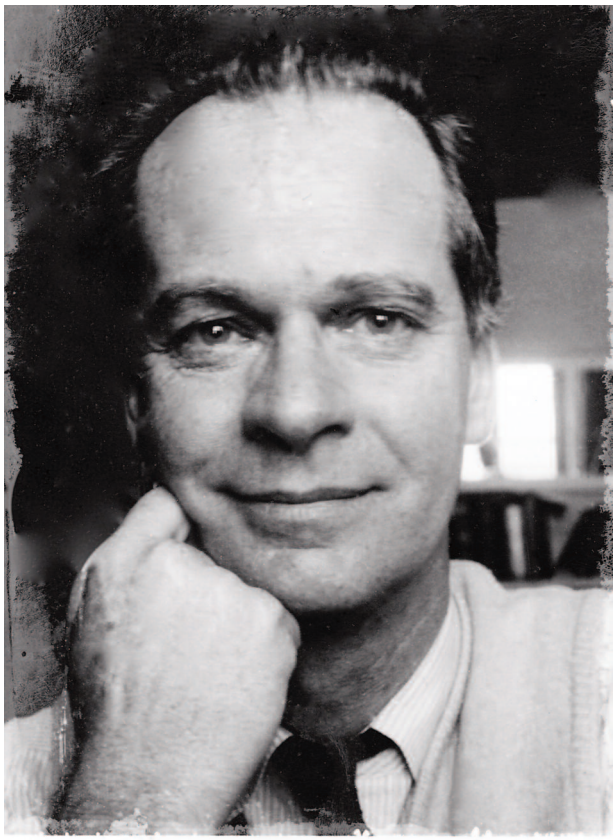
Fred was also scheduled to address the Florida Association for Behavior Analysis in Orlando on the 25th of September.

continued on page 28

from the archives

How To Be Productive

by B. F. Skinner
Putney, Vermont (1955)



Putney, Vermont (1955)

In Quarter II, 2014 edition of Operants, *we published some of the notes about establishing a "real"* Walden Two *that B.F. Skinner made during his sabbatical in Putney, Vermont in 1955. In this issue, we share more of Skinner's notes, this time on his approach to the workload and "free" time.*

To set the stage; Skinner decided he needed solitude to finish the book Verbal Behavior *that he had been working on for over 20 years. He found a small inn near his older daughter's boarding school. It was run by a family that accommodated his younger daughter as a member of their family. Living upstairs in a single room, eating with the family downstairs, and taking walks over fields and through woods, he was reminded of* Walden Two. *In addition to completing* Verbal Behavior, *Skinner wrote his thoughts in notebooks. Notes were written in long hand and later typed by his secretary.*

Feb 10 (My first day at the Putney School Inn.)

If not Walden Two, at least a reasonable Walden One. I am resolved to construct a mode of living which will keep me in top condition for 1) finding out what I have to say and saying it and (2) enjoying music, literature, etc. Fatigue is a ridiculous sort of hang-over from too much reinforcement. As soon as I rest up — as I did last night, going to bed at 8 o'clock — I begin to bubble over with things to say, leads to follow. Why isn't this the optimal life? Two things needed:

1) Some way of controlling the strength of my own behavior. How to stop work before the optimal condition fades? This might be automatic if it were not for left-over compulsive effects of earlier aversive control. Some techniques of self-control based upon emphasizing the productive aspects of doing nothing. Exhausting avocations are a danger. No more chess. No more bridge problems. No more detective stories. Let those who have no interesting activities turn to such. When I am not working, I must relax — not work at something else! This is an art. (My handwriting is a case in point. I will want to reread all this. But my writing will make that difficult. Can I control my speed of writing so that I can eventually make the best use of this material?)

A good measure of one's fatigue would be very helpful. I can tell how tired I am when playing the piano. Early in the morning, well rested, I surprise myself. Late in the day, I accept my errors as inevitable. I think my handwriting is also a gauge. It would be nice to have a shibbolith — a passage to be written in ten seconds, the errors to determine whether I work or relax.

Another useful thing is a profitable way to relax. This is a sort of compromise between positive reinforcement and aversive control. I must keep busy? Then relax profitably. The books I have brought with me were so selected:

Mencken's Quotations (fun to read, full of new points of view, reviewing the "wisdom" of the ages.) Hawthorne's works (a. question of techniques of novel b. Blithedale Romance and Walden Two). Courant and Robbins "What is Mathematics" — relaxing work, profitable for my research and my analysis of verbal behavior, Les Miserables (in French) (somehow I feel productive in bettering my French, and I certainly like the French flavor of books in French), Lecky's History of European Morals (if you're going to argue with historians!)

I've just read this over. Not only is my handwriting going to reduce the usefulness of these notes, I see a tendency to elide, to use a telegraphic style, which will cause trouble. The other day, in going over some notes used in an old lecture, I found I missed many of my own points on first reading.

One rule I shall try to follow — when too tired to be fully interested in reading or writing, lie down — and sleep if so minded. Music is always available at such times. Bruckner is all I have with me. (A good example of the carry-over of earlier aversive control: as I wrote the above, at 9:25 a.m., I asked myself whether I should not actually lie down now, but I felt anxious lest the housekeeper, coming to make my bed, should find me stretched out at such an hour. God knows I plan an energetic term — why should I be concerned lest someone think me lazy?)

A good sign — after breakfast I came to my room intent on getting started on the V.B. But I was less than optimally interested (still tired from my "tour"?) and so I started the Blithedale Romance instead.

2) The other thing which will be needed: careful planning to avoid necessary labor, which cannot be postponed and which is aversive. I must review the results of my teaching. Is Nat. Sci. 114 worth it? A good part of a term goes that way. Yet: 1) I believe the course is important for Harvard and am getting plenty of evidence that it is affecting the local culture. 2) Students are going out and using it. 3) It keeps me interested in undergraduate education and similar courses elsewhere. I need teaching help. If I could find the right man, I'd work hard on Mac Bundy and the G. E. Committee to get him. If I had the time, I'd like to convert the course to freshman level as one of the social science group. But that would be a job.

My research: simply a question of money. I can get excellent help there. No more building of apparatus by me, etc.

Committees: avoid them. I will have served Harvard on the CEP for a five year term by June 56. That's enough for awhile. National organizations? No. Department? No.

Lecturing elsewhere: I can see this building up. Northwestern (lecture) leads to Ohio State (and that immediately to Denison). I hate to think of giving one or two lectures again and again. Acres of Diamonds! But if I can integrate lectures with my current thinking, this seems worthwhile. Publishing articles or even books makes very little impression on the people I ought to be reaching. Especially since my main audience may lie outside psychology.

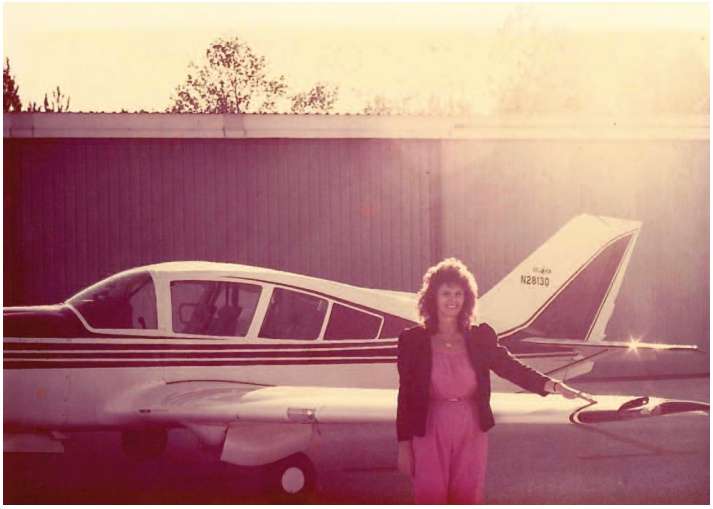
In sum: the optimal use of my energy will require a lot of planning. How many irons in the fire? The psychotic project has been an excellent pattern: Promote, get in a good man, keep an eye on it for a year, gradually withdraw.

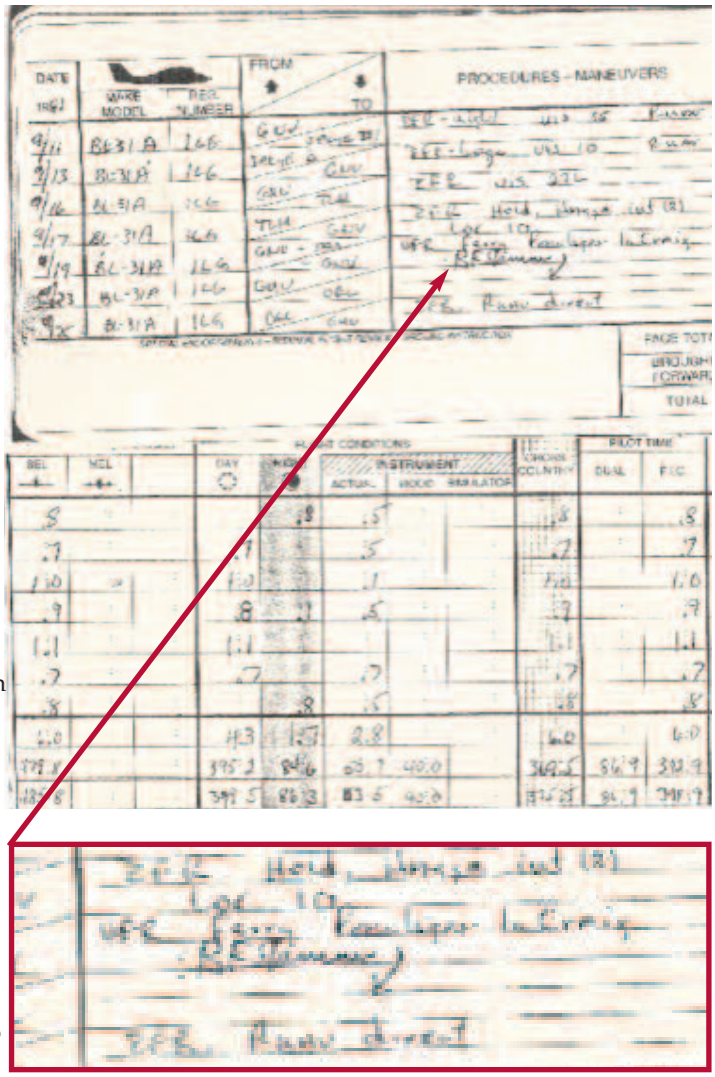
(Break to set up my phonograph, lie down, and listen to Bruckner.)■

cover story

Brief Encounters

(continued)





As we were making arrangements for Fred's accommodations in Gainesville and travel to Orlando, I mentioned to Fred that my wife and I would be flying to Orlando in my four-seat plane and he was more than welcome to accompany us. He declined politely, saying that his family would be worried sick if they thought he was flying in a small plane. I said I understood and arranged for him to travel to Orlando with some graduate students.

I met Fred at the Gainesville airport the day before his talk. As we were walking to my, car he asked if the invitation to fly with us was still open. I assured him that it was, but that I had thought he couldn't do that out of concern for his family. He replied that the family would not be concerned because they thought he was being driven, therefore there was no reason not to fly with us. I will never forget the smile that crossed his face at that moment.

The flight was uneventful although for the first time in my aviation life, I was given a VIP clearance from Gainesville to Orlando and the controllers frequently asked if my passenger was comfortable, would we like a different altitude, etc. After we landed, I asked Fred to sign my log book and he graciously complied. Here is a copy of the entry memorializing this special event. ■

Contributed by Joanne Robbins, Ph.D.:

In 1988, I was attending ABA (before we were officially ABAI). I had my three-month old son Zach in a stroller in the elevator, and Dr. Skinner said, "that's one way to increase our membership!"

Zach and younger brother Russ have attended ABA annually ever since! ■

continued on page 32

science corner

Skinner's Concept of Latent Behavior

by David C. Palmer, Ph.D.
Smith College
Northampton, Massachusetts

Skinner has argued that the principles of behavior that have emerged from the laboratory apply equally to all behavior, whether or not we are in a position to observe that behavior. Private events are experimentally inconvenient because, by definition, they cannot be objectively measured, but there is no reason to assume that they obey a separate set of behavioral laws. However, some behavior analysts object to any appeal to private stimuli or covert behavior, because doing so seems to invite subjectivity and speculation into a science founded on reliable and objective measurement. Their error lies in overlooking the difference between an experimental analysis of laboratory phenomena and the interpretation of fragmentary data outside the laboratory. We derive our principles of behavior from highly controlled studies using only observable and manipulable variables, but we can then apply those principles outside the laboratory to make sense of the world around us. In this respect, we are doing just what all other sciences do: Scientists use laboratory analyses of physical and chemical phenomena to interpret the composition of stars, the speed with which they recede from us, the orbit of distant planets, the flattening of the earth at the poles, and myriad other phenomena in the field of cosmology. None of what we think we know about the universe beyond our planet is the result of a direct experimental analysis. We simply assume that the physical principles found on earth can be extended to the heavens. The extrapolation of laboratory principles to complex behavior is precisely analogous. Consequently, many of us find Skinner's view of covert behavior to be parsimonious, powerful, and conceptually sound.

Although Skinner's position on covert behavior is fairly well known and is frequently debated, his concept of latent behavior is almost never discussed. Covert behavior is actually emitted; it is just unable to be recorded objectively given current circumstances or current technology. Latent behavior is a more nebulous concept. It is behavior in one's repertoire that is not emitted at the current time. In other words, it is behavior that has been emitted and reinforced in one's history, but prevailing conditions do not evoke the response sufficiently strongly for it to be dominant at the moment. Skinner points out that we must conceive of such latent behavior as varying in probability. That is, at any moment, some latent responses will be stronger than others, although none of them are actually emitted. I think most

David C. Palmer studied inter-response times and conditioned reinforcement in pigeons at the University of Massachusetts under John Donahoe in the early 1980s. Upon graduation, he took a job teaching statistics and behavior analysis at Smith College, where he remains today.

His interests in behavior analysis are broad, but his main contributions have all been attempts to extend Skinner's interpretive accounts of human behavior, particularly in the domains of language, memory, problem solving, and private events. He remains convinced that behavioral principles offer an adequate foundation for interpreting such phenomena. Together with John Donahoe, he authored the text, Learning and Complex Behavior, *which was an attempt to justify such optimism.*

readers find the concept of response probability so intuitively plausible that they do not notice that they are acceding to a concept far more subtle than that of covert behavior: What are these entities that vary in strength, and what is their status in a behavioral science? In what sense does a response that has not been emitted exist and how is it strengthened? Skinner's discussion of latent behavior is sprinkled throughout his writings, but his most explicit remarks are found in the William James Lectures (1948, unpublished manuscript available at www.bfskinner.org):

> Our basic datum, we may recall, is not a verbal response as such but the probability that a response will be emitted. This datum takes us beyond the classical notion of a vocabulary. One can be said to possess a number of different verbal responses in the sense that they are observed from time to time. But they are not entirely quiescent or inanimate when they are not appearing in one's own behavior, as the older notion of the "use of words" seemed to assume. We recognize the additional fact that some responses are more likely to occur than others and that, in fact, every response may be conceived of as having at any moment an assignable probability of emission … *A latent response with a certain probability of emission is not directly observed. It is a scientific construct. But it can be given a respectable status, and it enormously increases our analytical power.* (p. 25, emphasis mine)

To speculate about fluctuations in the strength of behavior that has not even been emitted may strike one as an unnecessary flirtation with hypothetical will o' the wisps unbecoming of a natural science, but Skinner is right. The concept of response probability—and hence, the concept of operant behavior itself—entails a concept of latent behavior.

A few examples will suffice to make the point: Stimulus control is additive. Two discriminative stimuli that evoke responses of the same topography may be effective when presented together under conditions in which either alone might be insufficient. In a crossword puzzle, an answer might be emitted only under multiple control of the clue, the length of the word, and a few crossing letters. Another everyday example is the "tip-of-the-tongue" phenomenon. When we meet an acquaintance, we may fumble for his name. We can almost say it, but not quite. Under these conditions, simply being told that the name begins with "W" may be sufficient. "Williams!" we cry with alacrity and force that suggests that the response is under multiple control. Consequently, a common mnemonic strategy under such conditions is to simply recite the speech sounds of the alphabet in order. In applied settings a verbal, visual, or gestural prompt is a standard device: a stimulus that by itself does not control the target response but that combines its strength with other variables to do so.

In *The Verbal Summator and a Method for the Study of Latent Speech* Skinner (1936) summarized work showing that faint, rhythmic clicks or meaningless speech sounds, repeatedly heard, will eventually induce a listener to report hearing coherent speech:

> A few repetitions of the skeletal sample *ah-uh-uh-oo-uh* may evoke the response *stars overlooking*. This is by no means the only response matched by the sample, and since it is not evoked by any stimulus acting at the moment, its emergence may be said to be due to its own relative strength. (p. 71)

That is, the emitted response is latent but "not entirely quiescent."

In *Verbal Behavior,* Skinner alludes to the effect of special audiences on a wide range of responses in one's repertoire. We speak with one vocabulary to maiden aunts, with a second to our pals in the tap room, with a third to learned colleagues. He suggests that the presence of such special audiences simultaneously potentiates all elements of the relevant vocabularies. Clearly, any such effect must be confined to latent behavior, since one cannot simultaneously emit all of the responses in one's vocabulary.

As Skinner noted, the concept of latent behavior greatly

increases our analytical power. It would be hard to make sense of many empirical phenomena without it, and the central datum in operant behavior, namely, response probability implies such a concept. However, we are still left with a puzzle: What are the physical dimensions of latent behavior? If two latent responses have different "strengths," that difference must be realized physically. The only plausible answer seems to be that difference exists at the level of the physiological substrate of behavior. Fortunately, this is not implausible. All behavior is mediated by the nervous system. The effect of any population of neurons is a function of rate of firing, and rate of firing can vary continuously. Rate of firing increases when a relevant stimulus is presented, but most fluctuations in neural activity necessarily fall short of evoking behavior. Thus, the concept of latent behavior may be, as Skinner says, a scientific construct, but it does not raise insurmountable conceptual obstacles to an objective science. Moreover, it is an indispensable tool for interpreting verbal behavior and many other examples of complex human behavior. ■

This past summer, the second annual Ethics in Professional Practice conference took place at the Endicott College Campus in Beverly, Massachusetts. A one-day conference featured leaders in the fields of Psychology, Business, Autism, and Applied Behavior Analysis. During the conference, the sculpture of B. F. Skinner was unveiled by the sculptor, internationally acclaimed artist Gilda Oliver (on the left) and Dr. Julie S. Vargas, President of the B. F. Skinner Foundation. The conference and the unveiling of the statue were sponsored by the Cambridge Center for Behavioral Studies. You can learn more about the Center from their publication, *The Current Repertoire*: http://www.behavior.org/repertoire.php ■

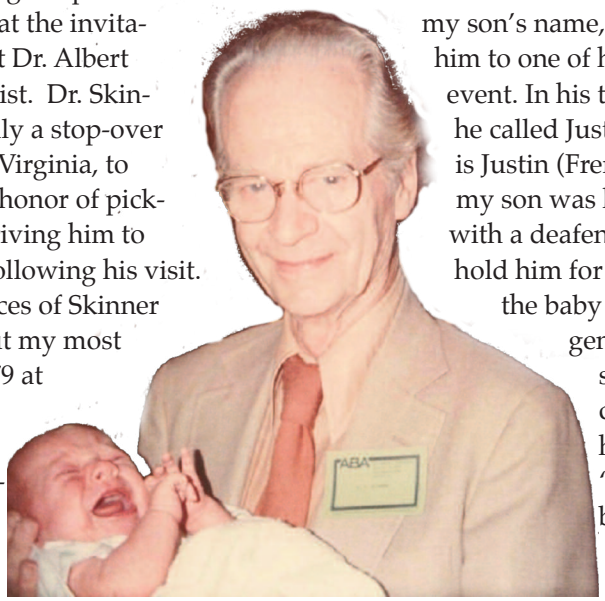
cover story

Brief Encounters (continued)

Cute Babies and Words of Gratitude ...

Contributed by Vincent J. Carbone, Ph.D.:

I had the good fortune to spend time with B.F. Skinner while I was an undergraduate in psychology at Marietta College, Marietta, Ohio. During the period 1968-1972, he visited our campus at the invitation of the chair of the department Dr. Albert Prince, an ardent radical behaviorist. Dr. Skinner's visits to Marietta were usually a stop-over on his way to Morgantown, West Virginia, to visit his daughter Julie. I had the honor of picking up him up at the airport in, driving him to campus and then returning him following his visit. I have many memorable experiences of Skinner interacting with us at Marietta, but my most notable remembrance came in 1979 at the Association for Behavior Analysis annual conference in Dearborn, Michigan. I was attending the conference as a graduate student in behavior analysis at Drake University and had with me my three week old son. At a conference sponsored social event, I was lucky to have a few moments to chat with Skinner while I was holding my son. When I told him my son's name, he told me he wanted to introduce him to one of his granddaughters who was at the event. In his typically kind and generous manner, he called Justine to join us and said "Justine this is Justin (French pronunciation)." At a time when my son was hungry and he was letting us know with a deafening cry, Skinner kindly agreed to hold him for a photo. In this photo, it is obvious the baby is screaming however Skinner, in the gentlest way, held him in his arms and smiled with an undisturbed and calm countenance. His only comment as he handed him back to me was "lovely baby." That's how I remember B. F. Skinner. ■



Contributed by Edward K. Morris, Ph.D.:

In 1987, I wrote B. F. Skinner asking if he would support my appointment as a visiting scholar at Harvard University for the spring semester of 1988. He did, and I was appointed. I did not see much of him, though. He had health problems that year. However, I was able to partake of the area's riches. I rented an apartment from DiDi Stevens, widow of S. S. Stevens, and went to a concert with her. I attended Pigeon Lab meetings, psychology colloquia (e.g., Seligman), and the Symposium on the Quantitative Analysis of Behavior. I audited Sheldon White's course on the history of psychology where I met public intellectuals (e.g., Chomsky). I had lunch in the faculty club with Dick Herrnstein on several occasions. I wrote a manuscript on why behavior analysis was contextualistic in its worldview, not mechanistic. I met Jim Mazur, Maggie Vaughn, Will Vaughan, and Stuart Vyse. I visited the Eunice Kennedy Shriver Center as well as the Cambridge Center for Behavioral Studies. At the latter, Van Orman Quine was introduced as the only philosopher who was also a radical behaviorist, to which he retorted, "No, I am the only philosopher who will admit it." I drove with Karen Lifter to the University of Massachusetts to meet Beth Sulzer-Azaroff and her students. I taught a pro bono behavior analysis course at the May Institute's Arlington offices. I rode my bicycle to Walden Pond. I skied in Vermont. I ate and drank wine at many Italian restaurants. I flew to Dublin, Ireland for St. Patrick's Day and visited Alan Costall in Southampton, England. I spent most the summer at the May Institute in Chatham, MA. I saw Phil and Katey Hineline for an evening in Stonington, Maine, but had a bicycle accident a few days later. Small world: Karen Lifter knew people who knew people who arranged for my transfer to Brigham and Women's Hospital in Boston for the best reconstructive surgery possible. Without Skinner's support, none of this would have happened. All of it enriched my life immeasurably. I owe him that debt. ■

Brief Encounters (continued)

cover story

What Skinner Said ...

by A. Charles Catania, Ph.D.
University of Maryland, Baltimore County

The following is a slightly revised version of: Catania, A. C. (1990). What Skinner said. Division 25 Recorder, 24/25 (Fall), 26-27.

The personal reminiscences of B. F. Skinner that I offer here date from a time when I spoke of him only as Skinner. I began to call him Fred only much later, and even then some time passed before I could do so comfortably. I know now that I should never have been uncomfortable about it. At a meeting in Liege, Belgium, I once introduced some European colleagues to him who were reluctant to introduce themselves. I later told him about their deference. He remarked with a shake of his head that some people had come to think of him as if he were not a person.

Charlie Catania in the summer of 1959, between his first and second years as a graduate student at Harvard

I did get a proper introduction at our first meeting. I was a Columbia undergraduate and was among those briefly introduced to him after he had given a colloquium on teaching machines at Barnard College. But our first real conversation was in the Fall of 1957, when, encouraged by Fred Keller and Nat Schoenfeld, I applied to the graduate program in psychology at Harvard and visited Cambridge for an informal interview. We met somewhere in Harvard Yard and as we walked together to Memorial Hall it began to rain. I was without an umbrella and there was no realistic way for Skinner to share his with me, so we made our way awkwardly across the Yard with his umbrella tipping first one way and then another. We talked, mostly about teaching machines, in the room in which he and Charlie Ferster had prepared the figures for the book, *Schedules of Reinforcement*. Although we were both somewhat damp, the interview must have been reasonably satisfactory, because I returned to Cambridge the next year as a student in the program.

Somewhere along the way, some of us in that entering class began an informal competition, never quite stated explicitly, in which the objective was to demonstrate experimentally that Skinner had erred about something. Harlan Lane, for example, noted the treatment of animal cries as respondent behavior in Skinner's appendix to his "Verbal behavior," so he reinforced chicks' vocalizations and brought them under the control of schedules. The research eventually became Lane's Ph.D. thesis. I suppose that part of our mutual socialization as graduate students was to demonstrate to each other that we were not intimidated by our mentor.

My own opportunity came relatively late, when I became responsible for preparing the animal demonstrations for Skinner's undergraduate course, Natural Sciences 114. The content had been well established over previous semesters and Skinner left most details to us. Ogden Lindsley's show was already legend. He was said to have entered the classroom with his arms outstretched, one pigeon perched on each wrist and a third on his head. The birds on his wrists were dyed, one red and the other blue. On the front desk stood a pigeon panel without an enclosure. When Lindsley released a pigeon onto the desk, it walked over to the panel and began to peck the key. Each pigeon had its turn at the panel and each responded according to a different schedule. The different colors helped the students keep track of which pigeon and schedule was which. (I learned later, though, that the coloring of the pigeons probably had happened whereas the performance at the unenclosed panel probably had not.)

When my turn came to prepare pigeons for the demonstrations, I was more conservative. I did not dye my birds, and they worked within the confines of the demonstration apparatus, a chamber with clear plastic walls. When one happened to flap vigorously while facing the feeder, I recalled that Skinner had said that wing-flapping

under such circumstances was an emotional response that was not susceptible to reinforcement (he had never held the position that all responses were equally reinforceable). I decided to try reinforcing the flapping with food deliveries.

Fortunately, I knew a little about pigeons' wing muscles. I was teaching my first course, an undergraduate section in Comparative Psychology, and had just prepared lectures on animal locomotion. The two modes of avian flight are the energetic flapping that gets birds off the ground and up to air speed, with wings sometimes even touching both above and below the body, and sustained flight with wings outstretched as airfoils, when movement is mostly restricted to the wing tips where the feathers provide forward thrust by tilting up and down as the wings move; the ends of the feathers are the pigeon's propeller blades. The muscles that drive the energetic takeoff flight are breast muscles. We know them as white meat because they are low in myoglobin, which means they fatigue rapidly. The muscles of sustained flight are, like postural muscles, richer in myoglobin and less subject to fatigue. That is why a pigeon in an enclosed space flies around for only a minute or two before alighting: It cannot reach the air speed that allows it to switch from effortful flapping to the less demanding sustained flight.

After a minute or two, therefore, I removed the bird from the apparatus. Had I continued, wing-flapping would have stopped. Over the next few days, I established fixed-ratio wing flapping by working with the bird only a few minutes at a time.

The day of the demonstration arrived. The first bird, in a superstition procedure, began raising its beak toward the ceiling of the apparatus, and Skinner commented that it was looking toward the great reinforcement dispenser in the sky. The next birds went through their paces, illustrating schedule control and simple discriminations. Then I placed the last bird in the chamber and demonstrated the fixed ratio wing-flapping, complete with post-reinforcement pauses and high rate runs. I quit after a few ratios and briefly outlined the significance of the bird's muscle physiology, closing with the comment that now that we could reinforce wing-flapping our next project would be to teach the bird to fly.

Skinner, unflappable, picked up his lecture from there. As far as I can tell, he was totally incapable of punishment. The only sign of his disapproval was his quiet comment after the class that I should have told him my plans for the demonstration ahead of time. He had no problem with the reinforcement of wing-flapping.

I'm glad we students had not been intimidated by him. We learned that for Fred Skinner, as it should be for all of us, it was not whether he had said it that was important; it was whether the data supported it. It was possible to prove him wrong from time to time, but I and my graduate colleagues had to work at it. Now we all continue to care about what he said not because he said it but rather because what he said was so often right. ■

Operants *editors want to thank everyone who contributed their stories, photographs, and other material to this edition. If you have a memory about Skinner, the Foundation would appreciate your emailing it to operants@bfskinner.org.*

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(English)
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(Hebrew)

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Torne-se um amigo

Sua doação apóia atividades da Fundação, tal como o Prêmio de Pesquisa para Estudantes. Nós agradecemos a sua ajuda na criação de novos programas e na expansão do nosso trabalho atual.

Consulte nosso site para mais informações: bfskinner.org.

Obrigada por apoiar a Fundação.

A Fundação B. F. Skinner é uma organização isenta de impostos.

(Russian)
Стань другом

Ваше благотворительное пожертвование будет использовано для поддержки деятельности Фонда. Мы ценим вашу помощь в создании новых программ и расширении нашей текущей активности.

Посетите наш сайт для получения дополнительной информации: bfskinner.org

Благодарим вас за поддержку Фонда.

Фонд Б. Ф. Скиннера является освобожденной от налогов организацией.

(Spanish)
Conviertase en un Amigo

Sus generosas donaciones se utilizarán para apoyar las actividades de la Fundación. Nosotros apreciaremos su ayuda para poder establecer nuevos programas y expander los ya presentes.

Visite nuestra página para más información:
bfskinner.org.

Muchas gracias por apoyar la Fundación.

The fundacion B.F. Skinner Foundation es una organización exentos de impuestos 501-C3.

As always, the editors welcome your feedback. Suggestions and news items are very welcome. Feel free to contact any of us by emailing operants@bfskinner.org.

the arts

This stained glass of Skinner was made in 1975 by Travis Thompson and given to Skinner. It now hangs in the entry window of the Skinners' former home.

B. F. Skinner Foundation

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